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Demographic Dividend of Ghana: The National Transfer Approach

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Abstract

Clarifying and managing demographic changes are central to national economic planning. Yet, how to measure the demographic transition can be fiendishly difficult. This paper breaks new grounds by using the National Transfer Accounts Approach to estimate the lifecycle deficit and the first demographic dividend for Ghana in 2005. The results of the National Transfer Accounts for Ghana indicate that, lifecycle surplus runs for about 30 years and peaks around age 50. Further, there is early entry into and late exit from the labour force, probably due to significant unregulated labour market activities in Ghana, particularly in the informal economy. The results reveal that Ghana started enjoying her first demographic dividend in 1990 and is expected to peak around 2031. The paper proposes some policies geared towards strengthening the labour market which potentially would develop the human capital particularly in the productive ages to help sustain the benefits.

1. Introduction

The role of institutions in the process of Africa's growth and change has been carefully researched (see, for example, Fosu & Gafa, 2020; Obeng-Odoom, 2020). The demographic dividend–regarded as the increase in economic growth which results from a fall in fertility and the subsequent change in the age structure of the population (Bloom et al., 2003) – must also be considered. A significant reduction in the number of children implies a reduction in the number of dependents which, in turn, frees up resources for development and improvement in welfare (Lee & Mason, 2006). With lower fertility every year, the working age population temporarily grows faster relative to the number of dependents hence creating a window of opportunity for rapid economic growth. The dividend accruing from these is potential as it must be accompanied by the right social and economic policies as well as appropriate investments for any country to benefit (Gribble & Bremner, 2012). The temporary nature of the increase in the growth of the working age population makes it important to study the time path of the demographic dividend of a country to ensure the right policies are set in place. Many African countries, including Ghana, are already experiencing a decline in their fertility rates with associated changes in the age structure of their population (Yeboah & Jayne, 2018). This

calls for investigation of the pace and pattern of these changes so as to propose appropriate ways of harnessing the economic benefits associated with them.

Ghana is positioned to benefit from the dividend given her economic and population growth profiles. The country upgraded from low-income status to a lower middle-income status in 2011 with a per capita income of $1,343 and a GDP of $32.5 billion (World Bank, 2013). The economy then had low-income status in 2005 with a per capita GDP of $502 and a GDP of $10.73 billion (World Bank, 2013). Obviously, there has been a significant growth in GDP since 2005. The growth of GDP was 5.9 percent in 2005, 8 percent in 2010, 14.4 percent in 2011 and around 7 percent in 2012 (World Bank, 2013). These growth rates are above African averages of between 3.5 and 6.6 percent during the same period (African Economic Outlook, 2013). The main contributor to the growth of GDP in 2005 was agricultural sector which rose from 5.1 percent in 2004 to 5.6 percent in 2005 (Bank of Ghana, 2005). In 2005, agriculture contributed about 40 percent to GDP, followed by the services and industry sectors which contributed 32.9 and 27.6 percent respectively to GDP (ISSER, 2011). It is important to note that services currently are the largest sector contributing 48.5 percent to GDP followed by industry which contributes 25.9 percent in 2011 (Bank of Ghana, 2011). Recently, Ghana's GDP grew to an estimated value of value of $68.53 billion in 2020 from an annual average of 55.54 billion from 2011 to 2019 (World Bank, 2021). Ghana's growth rate averaged 7% in 2017 and 2019 which was halted by the COVID-19 pandemic, the March 2020 lockdown, and a sharp decline in commodity exports with an overall GDP as low as 0.4% (World Bank, 2022).

Ghana's population growth rate has averaged 2.6 percent per annum between 1955 and 2010 and has seen a constant decline to 2.2 percent in 2012. The average annual population growth rate between 2015 and 2020 is 2.19 percent (United Nations, 2022). At the same time, the working age population (15-64 year olds) has been growing on average and by 2010 it had grown by about 3 percent. However, the growth rate of the working age population declined slightly to 2.5 percent in 2012 (United Nations, 2013). Since 1977 the working age population has been growing faster than the overall population growth such that the share the former has been more than 50 percent of the latter. In 2005, there were 1.27 working age adults per dependent (child and elderly) and by 2010 the number of working age adults per dependent had increased to 1.4 (United Nations, 2013).

The trends in mortality and fertility in Ghana indicate that both decline after 1970 (United Nations, 2022). Total fertility has declined from 6.95 in 1970 to 4.49 in 2005. The figure has further declined consistently to a rate of 3.89 between 2015 and 2020 (United Nations, 2022). Life expectancy at birth has significantly improved over 55-year period (1955 – 2010) on average by approximately 50 percent, that is, the average number of years of life expected by a cohort of individuals improved from 41.7 years in 1955 to 59 years in 2005 and it is expected to further increase to 64.94 years between 2020 and 2025 (United Nations, 2022).

Within this context, it is important to analyze the link between population structure and economic growth. The nature and significance of population shifts from "youthful" to "old" population structures have become important in the development literature (Kpessa-Whyte, 2018). This has arisen due to the potential effects that population shifts, as opposed to population size and population growth, have on economic growth of both countries in the Global South and the Global North. An increase in the young working age population is beneficial for the economic growth of any country (Lutz et al., 2019). Therefore, by isolating and focusing on age-structural changes (rather than population size and population growth) it is possible to make clear the link between demographic change and economic growth (Bloom et al., 2003). This allows us to determine the extent to which growth in the proportion of the working ages contribute to the ratio of effective producers to effective consumers (i.e., the economic support ratio).

One of the main approaches used to estimate demographic dividend is the National Transfer Accounts (NTA) approach. The strength of the approach lies in its ability to capture the intergeneration effects of economic transfers across different generations as the age structure of the population

changes. The purpose of this study is to use the NTA approach to estimate demographic dividend for Ghana over the period 1950 – 2050 and consequently use it to examine the period when the demographic dividend was achieved. We also seek to construct the age profiles for labour income and consumption and subsequently lifecycle deficits for Ghana in 2005 using individual and household level data as well as some relevant macroeconomic control variables. We find that the lifecycle surplus runs for about 30 years in Ghana and peaks around age 50. We further find that there is early entry into and late exit from the labour force, probably due to significant unregulated labour market activities in Ghana, particularly in the informal economy. Finally, we find that Ghana started enjoying her first demographic dividend in 1990 and it is expected to peak around 2031.

The rest of the paper is organized as follows: Section 2 presents the review of relevant literature. Section 3 looks at the general methodology and the data types and sources used in the estimation. Section 4 present the results of the estimates of the lifecycle accounts and the first demographic dividend respectively for Ghana. Section 5 discusses the results and provides some policy implications. Section 6 concludes the paper.

2.   Literature review

Demographic dividend is the economic growth potential that can result from shifts in a population's age structure. It is the economic effect of changes in population age structure in economic growth (United Nations, 2013). There are basically two dividends – first and second. However, in recent times, the third demographic dividend is being suggested. The first demographic dividend is attributable to an early stage of [demographic] transition, where fertility rates fall, leading to fewer young mouths to feed. During this period, the labour force temporarily grows more rapidly than the population dependent on it, freeing up resources for investment in economic development and family welfare (Lee & Mason 2006). The first demographic dividend operates through growth in the economic support ratio which defines the living standard of countries. The second dividend unfolds when a larger number of workers is also more productive. This comes about in part through investments in human capabilities that, for instance, allow people to do more skilled jobs. At this stage, demographic change leads to increased saving and favourable changes in spending in human and physical capabilities formation, then we can talk of a second demographic dividend (Bloom et al., 2015). New evidence suggests that the second demographic dividend does not encompass, itself, the full potential that society could obtain from a larger population of older and aging adults. If people arrive at old age healthy, and if the large, unrealized social capital of older adults could be activated, then it is likely to realize additional and sustainable benefits. Thus, the proposition that there should be investment in education, disease prevention and health promotion so that people arriving at old age stay healthier and longer, and new social institutions and roles to enable paid work by older adults is the realization of the third demographic dividend (Bloom et al., 2015; Fried, 2016).

The pace and pattern of the dividend is shaped by the profile of fertility and mortality in the country. Generally, Global South countries have high fertility rates and low life expectancy (United Nations, 2012). This has resulted in a large proportion of the population in the younger age groups. Bongaarts & Bulatao (1999) have argued that Sub-Saharan African countries are not likely to earn demographic dividend. However, studies such as Bloom et al., (2007) and Ashford, (2007) have argued that Ghana is among eight Sub-Saharan countries with high potential to benefit from demographic dividend. Estimates of demographic dividends have been obtained for different African countries (Olaniyan, et al., 2012; Oosthuizen, 2013; Canning et al., 2015).

The NTA comprises an accounting system for measuring intergenerational reallocation of resources across ages at the aggregate level in a way that is consistent with the National Income and Product Accounts (NTA, 2010). Unlike the National Income and Product Accounts which only estimates macroeconomic variables such as consumption and income that are delinked from population's age structure, the NTA can estimate the aggregate consumption and income for the

population of each age in a given economy. Consequently, the NTA has been developed to assess the economic performance of countries in relation to changes in the population structure (Lee et al., 2008). The NTA uses the economic lifecycle deficit to exhibit intergenerational transfers, and hence the extent of dependency, in a population (Mason and Lee, 2011). At any point in time the working age population, supplies the resources that are consumed by the whole population through transfers to dependents (mostly children and the elderly), saving by effective workers and dissaving by, mostly, the elderly. An increase in the number of effective producers per consumer, the support ratio, then implies improvement in welfare. The number of the working age population increases when fertility rate falls to free more women to join the labour force (Martin, 2012). In addition, continuous fall in fertility rate decreases the proportion of children in the population relative to the working age. The resulting demographic transition creates a window of opportunity for economic growth depending on the response of the markets and workers (Martin, 2012). And demographic dividend is estimated as the growth rate of the effective number of producers per effective consumer (support ratio) (Mason & Lee, 2011).

One focal point in the demographic and population literature in recent times has been the consequences of the changing age structure of population on the economic growth and development (see Lee & Mason, 2011; Bloom et al., 2010; Lee & Mason, 2006). Studies on Ghana considering this issue are, however, scanty. Anarfi and Kwankye (n.d) explore areas where demographic dividend in Ghana can be harnessed and focused on four key areas: education, health, economy and governance. We first seek to find out whether Ghana has achieved a demographic dividend? If so, how long will the dividend last? The paper seeks to answer these questions using the National Transfer Accounts (NTA) approach.

3. Methodology and Data
3.1   The National Transfer Accounts Framework
The National Transfer Accounts (NTA) is a comprehensive system for measuring economic resource flows across ages, done at the aggregate level and for a prescribed period of time. In the NTA, the individual is the fundamental analytic unit. As analyzed in Mason and Lee (2011), all transactions are treated as flowing to (inflows) and from individuals (outflows) and are classified on the basis of the age of those individuals. The idea behind the construction of NTA is illustrated by Equation (1). This is a summary expression obtained by rearranging the basic inflows = outflows identity:

$$\underbrace{C - Y_l}_{\text{Lifecycle deficit}} = \underbrace{Y_A - S}_{\text{Asset-based reallocations}} + \underbrace{\underbrace{\tau_g^+ - \tau_g^-}_{\text{Net transfers}} + \underbrace{\tau_f^+ - \tau_f^-}_{\text{private transfers}}}_{\text{Net public transfers reallocations}} \tag{1}$$

Equation (1) (from Mason and Lee, 2011) presents the key variable of interest is $C - Y_L$ and is defined as the life-cycle deficit (the difference between consumption and labour earnings at each age). In this equation, inflows to individuals of any given age consist of labour income (Y_l), income from assets (Y_A), and transfer inflows from the public sector $\left(\tau_g^+\right)$ and the private sector $\left(\tau_f^+\right)$. On the other hand, outflows consist of consumption (C), investment (I) in capital, credit and land, and transfer outflows to the government $\left(\tau_g^-\right)$ and to the private sector $\left(\tau_f^-\right)$. To obtain equation (1) by rearranging terms in the basic Inflows = Outflows identity we note that saving S is set equal to investment I. Thus, equation (1) states that the difference between consumption and production, known as the lifecycle deficit (LCD), must necessarily equal age reallocations made up of asset-based reallocations and net transfers.

In the current study, we provide estimates of lifecycle deficit (LCD) made up of differences in consumption and labour income allocated by age group as well as public sector inflows and outflows.

While the LCD tables – – the Left–hand Side of equation (1) – provide a complete picture of NTA estimates, the details of the financing of the deficit is provided by the estimates of the Right–hand side variables which is beyond the context of this study.

To proceed with the estimation of LCD, we follow the following steps by Mason and Lee (2011)

• Estimation of aggregate control variables (aggregate income and consumption)
• Estimation of age allocation of aggregate control variables
• Estimation of LCD by age groups and for overall age groups

For the first step, we obtain the value of the National Income Accounts (NIA) "equivalent" of the NTA components that is important to us. These values that are consistent with the national income account are then regarded as the aggregate control that is used in the estimates. Table 1 describes the aggregate control values used in the estimation of selected variables for the 2005 LCD.

3.2   Demographic Dividend Methodology

We follow Mason and Lee (2006) and Mason (2007) to formalize the demographic dividends. This is the basis of the NTA approach to the computation of the demographic dividend which emphasizes the profiles of effective number of producers and consumers in the country. The aim is to be able to estimate a consumption consistent economic support ratio. We start by defining the GDP per capita as in equation 2 :

$$\frac{Y(t)}{N(t)} = \frac{L(t)}{N(t)} * \frac{Y(t)}{L(t)} \tag{2}$$

Where Y_t is the total output, L_t is effective number of producers, and N_t is the effective number of consumers. The equation states that GDP per capita comprises of the product of output per effective consumer as equal to output per effective producer and the support ratio (i.e. effective producers per effective consumers). The equation can be used to decompose economic growth to reveal the relationship between population growth with GDP per capita growth. Demographic dividend is defined as the growth rate of the support ratio hence we obtain the growth rates of equation 2 by taking the logarithm of both sides of equation 2 and differentiating it with respect to time (Mason and Lee, 2011). This is presented in equation 3.

$$\dot{y}_t = \dot{L}_t - \dot{N}_t + \dot{y}_t^l \tag{3}$$

Equation 3 reveals that the growth rate of output is equal to the sum of two components, which are the equivalents to the two demographic dividends time (Mason and Lee, 2011). The first dividend corresponds to the growth of the support ratio. The second component is the second dividend which is the rate of growth of productivity. In the NTA approach, the age profiles of consumption and labour income are calculated for each age in the population to give the age profiles of consumption and labour income. In the period of simulation for the demographic transition and dynamics, the associated support ratio is calculated holding the shape of the age profiles of consumption and labour income fixed time (Mason and Lee, 2011). Equation 4 gives the definition of the support ratio.

$$\frac{L(t)}{N(t)} = \frac{\sum_{a=0}^{\omega} \gamma(a)P(a,t)}{\sum_{a=0}^{\omega} \phi(a)P(a,t)} \tag{4}$$

Equation 4 indicates that the support ratio measures the effect of age structure on the capacity of a population to contribute to current production. It should be noted that given labour productivity, 1% increase in support ratio leads to 1% increase in per capita growth (Mason 2011).

3.3   Data Sources, Estimation Procedures and Limitations

The LCD is the difference between consumption (C) and production or labour income (yl). The main variables of interests then are the consumption and labour income components. In order to obtain estimates for LCD, estimates must therefore be obtained for the two variables. The main sources of data for the estimation of components of the 2005 Ghana LCD include the following:

Data for the National Income Accounts was obtained from the 2005 Social Accounting Matrix (SAM) For Ghana, published by the Ghana Statistical Services (GSS) and International Food Policy Research Institute (IFPRI) under the Ghana Strategy Support Program (GSSP) October, 2007. Other sources include the GDP newsletter from Ghana Statistical Service and the World Bank World Development Indicators. The Population data was obtained from Suggested citation: United Nations, Department of Economic and Social Affairs, Population Division (2013).

The age profile allocation was derived using the 2005 Ghana Living Standard Survey (GLSS). This is a nationally-representative survey of 8,687 urban and rural households and 37,128 household members in Ghana. It was carried out by a series of detailed household interviews conducted by the Ghana Statistical Service (GSS) over a 12-month period (September 2005 to September 2006). Detailed information was collected on demographic characteristics of respondents and all aspects of living conditions including health, education, housing, household income, consumption and expenditure, credit, assets and savings, prices and employment. This paper, however, used household-level data on household size; and individual-level data on age in years, wage income, self-employment income, level and costs of education, health status, number of visits to health facilities and costs of treatment. Table 1 provides the main process of data collection.

Table 1. Process of Data Collection

S/N	Variable	Micro data analysis	Macro data needed
1	Lifecycle Deficit	Calculated as difference between No 2 and No 12	Not applicable
2	Consumption	Calculated as addition of No 3 and No 7	Not applicable
3	Public Consumption	Calculated as addition of No 4, No 5 and No. 6	Not applicable
4	Public Consumption, Education	Age profile of student enrolment in government schools	Government financial statistics (GLSS)
5	Public Consumption, Health	Age profile of spending in government health facilities	Government financial statistics (GLSS)
6	Public Consumption, Other	Total government expenditure divided by population	Government financial statistics (GLSS)
7	Private Consumption	Calculated as addition of No 8, No 9 and No. 10	Government financial statistics (GLSS)
8	Private Consumption, Education	Age profile of spending by individuals on education	Sectoral distribution of GDP
9	Private Consumption, Health	Age profile of spending by individuals on health	Sectoral distribution of GDP
10	Private Consumption, Others	GLSS	Sectoral distribution of GDP
11	Labour Income	Calculated as addition of No 13 and No 14	Not applicable
12	Earnings	Age profile of earnings of employees	Compensation of employees (GDP)
13	Self-employment Labour Income	Age profile of earnings of self-employed persons	Operating Surplus

Table 2. Aggregate Control For 2005 Lifecycle Deficit For Ghana (Billions Of Cedis)

	Cedis	Cedis
Lifecycle Deficit		43, 658.70
Consumption		93, 922.00
Public Consumption		14, 889.00
• *Education*	3, 871.14	
• *Health*	2, 270.57	
• *Other*	8, 747.29	
Private Consumption		79, 033.00
• *Education*	2, 906.65	
• *Health*	1, 108.52	
• *Other*	75, 017.83	
Labour Income		50, 263.30
• *Compensation of Employees*	35, 692.60	
• *Self-employed Income*	14, 570.70	

4.   Results

The age profiles for consumption and labour income are presented and subsequently used to construct the lifecycle deficits. We first present the profiles for consumption (private and public) as well as the labour income profiles. Finally, the lifecycle deficit and Ghana's first demographic are presented.

4.1   Public Consumption

We present in Figure 1 the public consumption profiles which consist of public consumption on education, health and other. Other public consumption accounts for 58.7 percent of total public consumption whilst public consumption on education and health account for the remaining 41.3 percent. This notwithstanding, the shape of public consumption is influenced by both education and health. Whilst the shape of the public consumption for up to age 20 is influenced by public consumption on education, that after age 20 is influenced by the shape of public consumption on health. Other public consumption category which includes all public expenditures aside those on education and health such as the provision of defense and community amenities among others are assumed to be allocated equally among all age groups. This corresponds to 400,000 Cedis (GH¢40) for all age groups (see Figure 1).

The public consumption profile for education reveals extremely large transfers to the younger population. As evident public consumption on education increases sharply from age 3 peaking at age 12. It then declines sharply until age 26 where it exhibited a gradual decline until age 40. Such a pattern of expenditure shows that the bulk of government expenditure on education is allocated to the lower levels of education, such as primary and secondary education. This result is not surprising as it is consistent with public consumption profile in several other countries like Kenya (Mwabu et al., 2011).

The result for public consumption on health is, however, surprising as it indicates that government rather cares for the working age population than the younger and the elderly population. Public health expenditure rises gradually for earlier years till age 38 and then declines until age 55. It rises again and remains almost stable until age 78 and then declines again. The public health consumption profile of Ghana is a bit similar to that of Kenya; the only difference is that the latter has its public health consumption as relatively higher for very young children (Mwabu et al., 2011). The results achieved here are unanticipated but are possible for the following reasons. Government unflinching support in controlling some diseases including HIV/AIDS, tuberculosis and guinea worm in Ghana
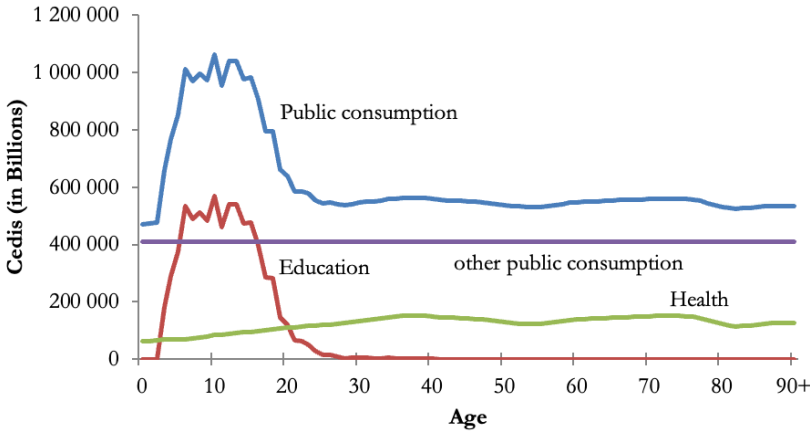
Source: Authors' estimates

Figure 1. Age Profile Of Per Capita of Public Consumption Expenditures, Ghana, 2005, Current Prices

in recent times has increased its expenditure on health. For instance, report on HIV prevalence among pregnant women in Ghana in 2005 indicates that the rate among individuals between ages 20 and 49 years constitute about 20.3 (GHS, 2010). Between 45 and 49 years, the prevalence rate was 5.0, the highest amongst the different age intervals. The median prevalence rate in Ghana in 2005 is 2.7% and the peak age group is 35 to 39 years for males and 30 to 34 years for females (GHS, 2007). The treatment of opportunistic diseases from AIDS has been found to be expensive and thus places considerable strains on the delivery of health care services in Ghana. The cost of antiretroviral treatment for just one AIDS patient would be quite substantial. If the affected population is typically adults, then public health expenditure for the adult group increases. Again, in 2005, the National Health Insurance Scheme has been instituted in Ghana and hence, the treatment of some common diseases which hitherto would be borne by an individual was now borne by the government. These reasons possibly could explain the profile of public health expenditure in Ghana in 2005.

4.2   Private Consumption

The private education profile shown in Figure 2 indicates that there is no private education consumption below ages 3 and after age 42, and thus it is pronounced between ages 3 and 34. Private education rises quite steadily, albeit with fluctuations until age 17 where it peaks. More students enroll in government secondary schools and this explains the relatively gentle profile since the public schools at this stage is deemed quality in Ghana. However, beyond age 17, private education consumption fluctuates, albeit with a decreasing trend between the ages of 25 and 42. The reason could be that, persons who hitherto do not have the requisite qualifications found it necessary to upgrade by doing some short courses. However, after age 42, there is no private education consumption.

A comparison of the peaks of expenditure for private and public education shows that the per capita government expenditure on education exceeds that of private. While the private education consumption peaks below 400,000 billion cedis, the public education consumption peaks above 500,000 billion cedis. Even the per capita public expenditure on basic education, i.e., for ages below 16, exceeds that of the private. This result reveals potential inefficiency in the public education sector because students from private basic schools perform much better than those in the public schools. Thus, improving the quality of education in the public sector may not necessarily require increased public expenditure on education but reorganization and redistribution existing resources in a way that ensures efficiency in resource utilization.
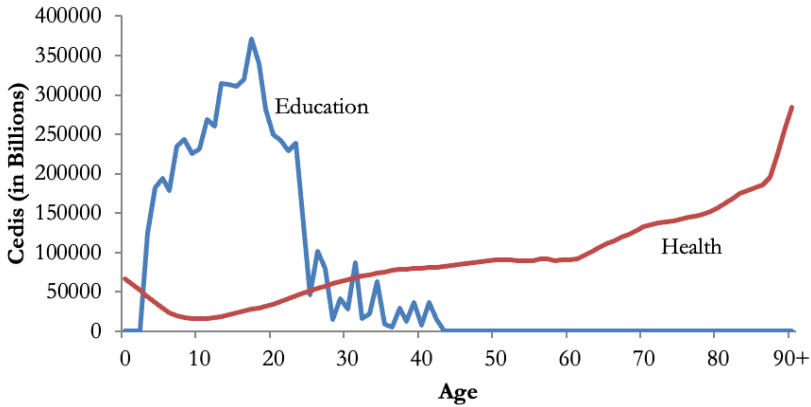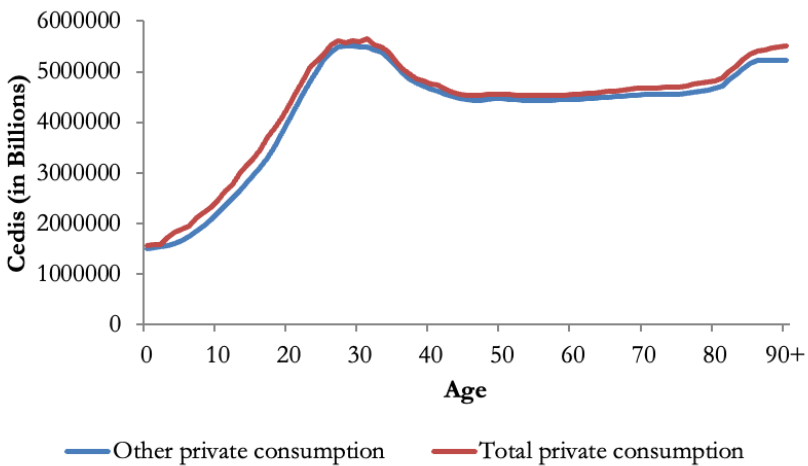
Source: Authors' estimates

Figure 2. Per Capita Private Education and Health Consumption: Ghana, 2005

Private health consumption profile also shown in Figure 2 indicates that, private health consumption increases swiftly after age 60. Children below age 5 are more susceptible to diseases and hence consume more health care than older children. Private health consumption starts increasing gently after age 11 until age 60 where the depreciation in health status would have been pronounced, and hence warranted a sharp increase in private health expenditure. The shape of the private health consumption curve is similar to that of Germany which falls steadily till age 5 and then rises sharply at age 80 (Kluge, 2011). The age difference here reflects the much longer life expectancy for Germany relative to Ghana.

Other private consumption, shown in Figure 3, portrays a steady rise in the early stages of the working age peaks at ages between 22 and 36 and stabilizes around age 40. This is however, not surprising because people are likely to establish their households and families and hence incur higher social expenditures like marriages.
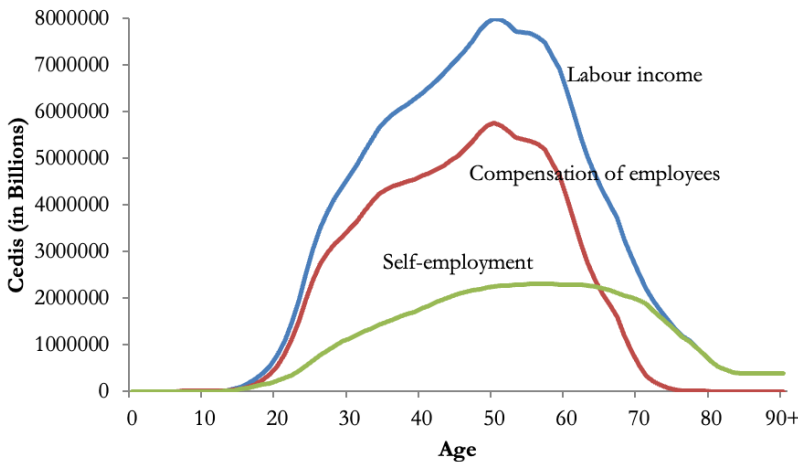

Source: Authors' estimates

Figure 3. Per Capita Other and Total Private Consumption: Ghana, 2005

4.3   Labour Income Profiles

Figure 4 shows the income profiles for wage earners and self–employed income earners in Ghana in 2005. The figure indicates that the compensation of employees (earnings) profile starts at age 6 and rises sharply until age 27 and thereafter rises gently and maintains its pace until it peaks at age 50. The rate of decline in the earnings profile is, however, relatively swifter than its rise, as it ends at age 82. This is indicative of the compulsory retirement of formal workers around age 60. Also, some individuals voluntarily retire from the labour force possibly due to health reasons. The result is consistent with the life expectancy in Ghana which was 61.04 in 2005 (United Nations, 2013). The Self–employment income starts at age 6 and rises slowly with age, and peaks at age 57. Self–employment labour income suggests that there is no retirement from work in the informal economy (Anyidoho Steel, 2016). Also, the younger ages in the labour income profile suggests the prevalence of child labour or a relatively high proportion of economically active children in Ghana. This is not surprising though, since in the rural areas of Ghana many children are actively engage in agricultural activities. However, in the urban areas, a significant proportion of children are engaged in some form of petty trading whiles others are engaged in running errands in hotels and restaurants (GLSS, 2005).
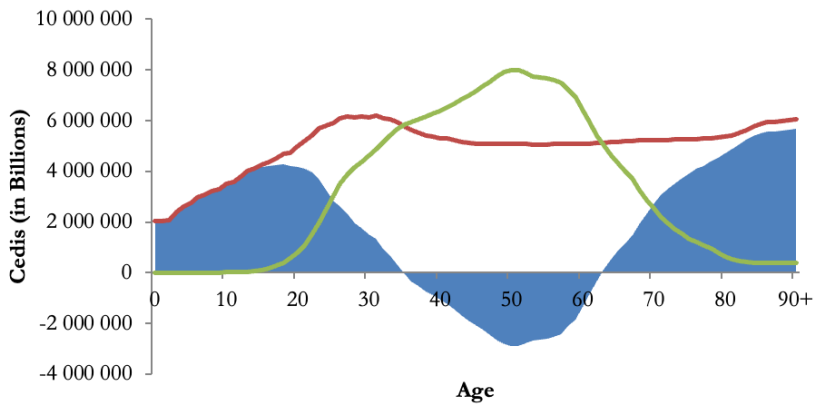

Source: Authors' estimates

Figure 4. Per Capita Profiles of Labour Income: Ghana, 2005

The earning and self–employment profiles also indicate the high participation rate in the labour force. The Ghana Living Standard Survey (fifth round) data estimates the labour force participation rate in 2005 to be approximately 70 percent or seven out of every ten Ghanaians in the labour force were economically active. Thus, the steep profiles at the older ages suggests the comparatively, young adults' involvement in the labour force is higher than their older counterparts. This is also in accordance with expectation.

4.4   The Lifecycle Deficit

The lifecycle deficit (Figure 5) is also displayed along with labour income and consumption. Essentially, we obtain a surplus for the working-age adults and a deficit for the dependent age groups – children and the elderly. This is in accordance with theoretical expectation. Comparatively, the lifecycle deficit is smaller among children than among the elderly, which is expected. However, the deficit for young adults starts to drop quite sharply after age 20 when individuals have started earning income but not sufficient to outweigh their consumption. In Ghana, the lifecycle surplus starts at age

35 and ends at age 62 (i.e., the surplus window lasts for 27 years). Thus, Ghanaians aged between 35 and 62 earn more income than they consume. It also indicates that individuals become self-sufficient at age 35, that is, where consumption is exactly equal to labour income. In other words, the per

Source: Authors' estimates

**Figure 5.** Age Profile Of Per Capita Lifecycle Deficit: Ghana, 2005

capita lifecycle profile explains the unemployment situation in Ghana, as it is relatively difficult for the youth to chance on well earning job which consequently would allow them to be self-governing in achieving their consumption needs. Incidentally, our result is similar to the profile of South Africa for which their lifecycle surplus lasts for 27 years (i.e., 33 – 60 years). Again, the lifecycle deficit in Ghana reaches its minimum at age 50. Thus, the difference between the mean consumption and mean labour income is greatest at that age.

Figure 6 also presents the aggregate deficit calculated by multiplying the per capita lifecycle deficit by the population in each age group. The profile indicates a colossal deficit for the young dependent persons in Ghana. This reiterates the importance that needs to be attached to the youth in the Ghanaian population. The GLSS V data shows that more than one third (35.3 percent) of the working population of Ghana falls within the 15 and 24 age bracket; the age cohort internationally recognized as the youth population (GSS, 2008).

The youth population in Ghana is, however, officially defined to include persons between the ages of 15 and 35 years. According to the GLSS V data, this group constitutes 62 percent of the working population. The large share of the youth in the working age population does not only reflect the youthful nature of Ghana's population but also the fact that the population growth rate among the youth is more than the national population growth rate. The aggregate lifecycle deficit profile suggests the need for policies geared towards making the youth more productive than mere dependents which would eventually inhibit growth.

### 4.5   Ghana's First Demographic Dividend

We have shown in the preceding section the lifecycle deficit which makes it possible for us to estimate the first demographic dividend for Ghana. This is determined by the support ratio. The support ratio is the ratio of the effective number of producers to the effective number of consumers (United Nations, 2013). It is computed as the inverse of the dependency ratio. The support ratio has remained the standard tool for analyzing the economic effect of changes in the population age structure. In other words, it shows how workers must support non-workers. For example, a support ratio of 0.5 means that each worker is, on average, supporting himself or herself plus one other consumer.
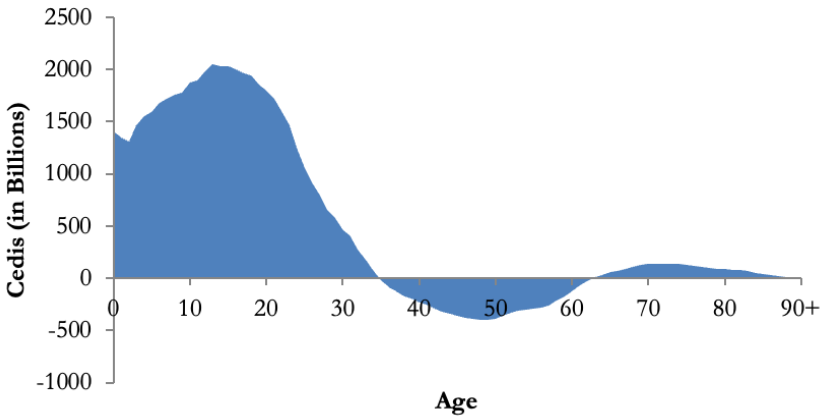
Source: Authors' estimates

Figure 6. Age Profile of Aggregate Lifecycle Deficit: Ghana, 2005

Figure 7 shows the support ratio of Ghana from 1950 – 2050. The figure indicates that, between 1950 and 1983, workers had to struggle to support more people. In contrast, beyond 1983, the support ratio saw a tremendous improvement which implies that each effective worker is supporting fewer effective consumers. This potentially frees up resources that can be used to raise per capita consumption, increase saving, or both and hence leading to the enjoyment of the first demographic dividend.
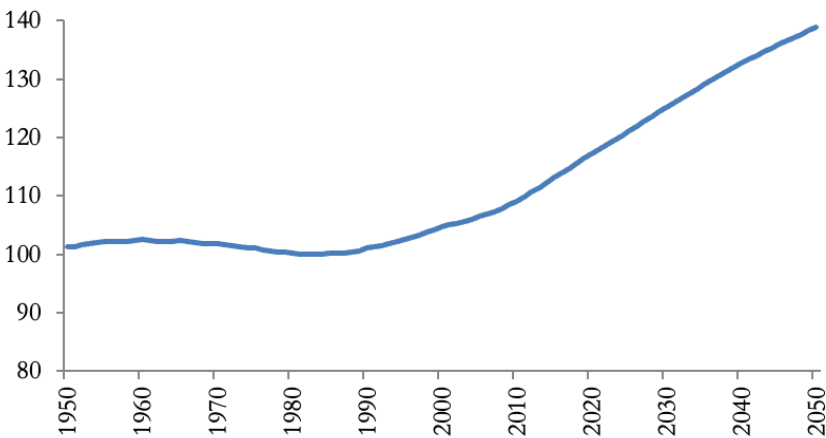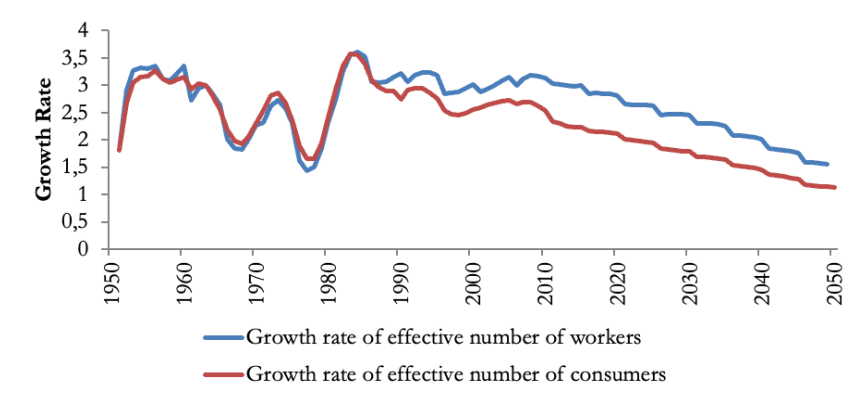

Source: Authors' estimates

Figure 7. Economic Support Ratio, Ghana 1950 – 2050

Figure 8 shows the growth rate of effective producers and effective consumers. The figure reveals that, the growth rate of effective producers and effective consumers peaked at 3.60 percent in 1984 and 3.58 percent in 1983 respectively. They both fluctuate until around 2009 and then decline continuously until 2050 at a growth rate of under 3 percent.
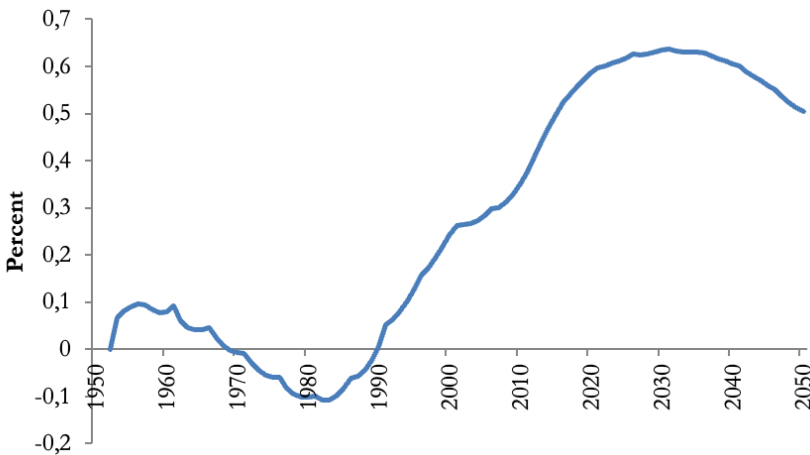
The first demographic dividend in Ghana is shown in Figure 9 which is drawn from the difference between the growth rates of the number of effective producers and effective consumers. As shown in the figure, the country started experiencing the first demographic dividend since 1990 and it is

Source: Authors' estimates

Figure 8. Growth Rates Of Effective Consumers, Effective Producers And Support Ratio, Ghana, 1950-2050

expected to peak in 2031. Our results differ from the findings of some African countries like Nigeria and Senegal whose demographic dividend started periods after the year 2000. This is not surprising since the periods after 1983 in Ghana have seen positive growth rates in per capita GDP which hitherto had a much fluctuating with negative rates. Since 2000, per capita GDP growth rates have steadily increased (World Bank, 2013) and currently Ghana is classified as a lower middle income country after rebasing of the National Accounts to reference year of 2006 (GSS, 2011). Indeed, the dividend is expected to last beyond the year 2050.

Source: Authors' estimates

Figure 9. First Democratic Dividend, Ghana, 1950-2050

5. Discussion and Policy Implications

Declining fertility levels imply that the proportion of the working population will rise relative to the population of children who earn little or no labour income. And a growing working-age population relative to the dependent population that requires support is one essential contributor to economic development. The results of this study reveal that, in Ghana, people do not become autonomous until age 35. Thus, young dependency delays into an unexpected age of 34 in Ghana while on average

old-age dependency starts after age 62. Our results support the proposition of collectivist cultures which emphasize family and work group goals above individual needs or desires (Cherry, 2016). Thus, a young employed adult spends much on the extended family which delays his or her ability to become self-sufficient. The lifecycle surplus in Ghana spans over a relatively short period of 27 years. The implication is that economic development is thwarted despite the potential of the productive working population.

Another implication of our results is that, since the early 1990s, the demographic dividend for Ghana has remained positive and will stay as such until 2050. Similar to the results of Nigeria (Olaniyan et al., 2012), the dividend is expected to peak around 2031. However, the difference between our results and that of Nigeria is the early start of the dividend in Ghana relative to the latter. A possible explanation could be due to the higher fertility rate in Nigeria. Incidentally, Ghana's first demographic dividend is expected to last for about four decades. Thus, Ghana is currently almost halfway through the period of positive first demographic dividend. The fact that life expectancy in Ghana has been growing, though slowly, suggests that people are living longer and healthier. An important outcome is how to maximize the benefits of the demographic dividend, which can be used to increase consumption, raise current living standards, and some be invested in human and physical capital or strengthen institutions that consequently would lead to sustained higher economic growth (Mason and Lee, 2006).

To enjoy the dividend, however, it is important to enlarge the working-age population and provide them with enough job opportunities. However, the main feature of the Ghanaian economy and its labour market is the informality of employment and employment relationships. For instance, in 2017 the Ghana Statistical Service estimated that about 71.3 percent of the employed are working in the informal sector (GSS, 2019). In 2017, the estimated unemployment rate was 8.4 percent (GSS, 2019). Thus, in the absence of social safety nets such as unemployment insurance and the continued weakening of the extended family support system, unemployment and underemployment are inevitable especially for young people. This situation may account for the heavy dependence and could potentially drain the dividend achieved.

Another striking feature of the labour market in Ghana is the income inequality. Income inequality as measured by the Gini coefficient has increased from 41.9 percent in 2005/06 to 42.3 percent in 2012/13, and 43.0 percent in 2016/17 in Ghana (GSS, 2018). This increase over the period implies that some groups have been left out from the benefits of growth. Thus, the World Bank estimated that the growth in the income inequality during the last decade reduced the poverty reduction impact of growth in Ghana by almost 3 percentage points. Nonetheless, poverty among the working class is still quite high despite the general decline in the incidence of poverty in the country. At the same time, Ghana achieved a sustained increase in economic performance (World Bank, 2006). The growth path in the country appears to have therefore impacted negatively on the performance of the Ghanaian labour market. This could be due to the mismatch between the skills of the labour suppliers and the needs of the labour demanders. Growth in the industry and service sectors of Ghana in recent times means that the demand for high-skilled labour has become apparently important. At the same time, the quality of these high-skilled labours seem relatively missing. Thus, investments in physical infrastructure and effective human capital are needed at the universities and schools in general to train and improve the quality of workers and to prepare them to meet the needs of firms.

Another issue worth emphasizing is the growth of the working population in Ghana. In addition to the unemployment situation, focusing on the highly skilled labour alone in the medium term could have a pernicious effect. Thus, a policy which focuses on unemployed young people seems appropriate. In recent past, the government of Ghana in collaboration with some private institutions instituted an intervention program (Ghana Youth Employment and Entrepreneurial Development Agency) to help the unemployed youth develop some skills in ICT, environment and sanitation and

security and to provide them with some earnings for a living. Currently, youth–oriented policies aimed at providing the youth with some productively entrepreneurial skills could have long term benefits in terms of generating incomes for themselves and other dependents.

To harness the dividend, recent governments have focused also on some key economic policies which are intended to drive growth. Between 1990 and 2011, the average growth rate in Ghana has been 5.4 percent. However, the average growth of the country between 2005 and 2011 was 7.7 percent (World Bank, 2013). This reveals that the prospects of the first demographic dividend are much synchronized with the observed economic growth patterns in Ghana. In 2011, Ghana was dubbed the fastest growing economy in the world and such an achievement could be linked to the dividend Ghana is experiencing and it is expected to even increase further for almost the next two decades. This feat was, however, thwarted by exogenous shocks including the recent COVID–19 pandemic. Nonetheless, prudent monetary policies, educational policies, fiscal policies inter alia, are essential in sustaining the benefits accruing from the first demographic dividend and subsequently the second demographic dividend.

6.   Concluding Remarks

This paper is a contribution to the recent estimation of demographic dividends for countries particularly in the developing world. As it was argued in the late twentieth century that, countries in Sub-Saharan Africa are unlikely to earn the demographic dividend, the paper has sought to estimate the demographic dividend of Ghana using the National Transfers Accounts approach (NTA) in 2005. This is the first attempt to estimate the demographic dividend for Ghana using this approach. At the same time, the paper provides estimates of the lifecycle deficit for Ghana in 2005 which reveal several intriguing results.

For instance, NTA shows that Ghana's demographic dividend started in 1990 and is expected to remain till 2050 peaking in 2031. Ghana's population is predominantly youthful and that those under age 35 and those over age 62 are effectively dependents. That is, they consume more than they produce in the labour market, thus general lifecycle deficits. Also, individual autonomy begins at age 35 and runs for 27 years before they become dependents again. The labour income profile suggests the high labour force participation rate. Though, participation rate in the labour market is high, incomes generated by workers are quite low relative to their consumption levels thus leading to huge deficits. Among the policies needed to enhance the benefits from the first demographic dividend, the paper proposes the investment in health, education, youth, governance and the economy.

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Conflicts of interest

The authors declare no conflict of interest.

References

African Economic Outlook, (2013) Real GDP Growth Rates, 2004-14, Available online

Anarfi J.K. and Kwankye, S.O. (n.d). Harnessing Ghana's demographic dividend: opportunities and challenges, available at https://uaps2015.princeton.edu/papers/150893

Anyidoho, N. A., Steel, W. F. (2016). Informal-formal linkages in market and street trading in Accra. African Review of Economics and Finance, 8(2), 171-200.

Ashford, L. S. (2007). Africa's youthful population: Risk or opportunity. Population Reference Bureau, Washington DC.

Bank of Ghana, (2005) Annual Report, Available online at Bank of Ghana Annual Reports

Bank of Ghana. (2011) Annual Report [online] Available at Bank of Ghana Annual Reports

Basu, A.M. (2002). Why does Education Lead to Lower Fertility? A Critical Review of Some of the Possibilities, World Development, 30(10), 1779-1790.

Bloom, D. E., Chatterji, S., Kowal, P., Lloyd-Sherlock, P., McKee, M., ... Smith, J. P. (2015). Macroeconomic implications of population ageing and selected policy responses. The Lancet, 385(9968), 649-657.

Bloom, D. E., Canning, D., Mansfield, R. K., Moore, M. (2007). Demographic change, social security systems, and savings. Journal of Monetary Economics, 54(1), 92-114.

Bloom, D., Canning, D., Sevilla, J. (2003). The demographic dividend: A new perspective on the economic consequences of population change. Rand Corporation.

Bongaarts, J., Bulatao, R. A. (1999). Completing the demographic transition. Population and Development Review, 25(3), 515-529.

Canning, D., Raja, S., Yazbeck, A. S. (Eds.). (2015). Africa's demographic transition: dividend or disaster?. World Bank Publications.

Cherry, K. (2016). What are collectivist cultures. Very Well.[Online][Accessed on 15th December 2016] https://www. verywell. com/what-are-collectivistic-cultures-2794962 .

Fosu, A. K., Gafa, D. W. (2020). Progress on poverty in Africa: how have growth and inequality mattered?. African Review of Economics and Finance, 12(1), 61-101.

Fried, L. P. (2016). Investing in health to create a third demographic dividend. The Gerontologist, 56(Suppl_2), S167-S177.

Gaisie, S. (2005). Fertility trend in Ghana. African Population Studies, 20(2).

Ghana Statistical Service (2008, 2011), http://www.statsghana.gov.gh/

Ghana Statistical Service (2018). Poverty Trends in Ghana, 2005 – 2017, Available at Online Version

Ghana Statistical Service (2019). Ghana Living Standards Survey 7, Main Report [online], StatsGhana

Ghana Statistical Services and International Food Policy Institute, (2007) A 2005 Social Accounting Matrix (SAM) For Ghana, Breisinger C, Thurlow J. and Duncan, M, Editors, gtap.com

Gribble, J., Bremner, J. (2012). The challenge of attaining the demographic dividend. Population Reference Bureau (PRB) Policy Brief, September. Washington, DC: PRB.

ISSER, (2011), The State of the Ghanaian Economy in 2010,Online Version

Kluge, F. A. (2011). 16. Labor income and consumption profiles: the case of Germany. Population Aging and the Generational Economy, 327.

Kpessa-Whyte, M. (2018). Aging and demographic transition in Ghana: State of the elderly and emerging issues. The Gerontologist, 58(3), 403-408.

Lee, R., Mason, A. (2006). Back to basics: What is the demographic dividend?. Finance development, 43(003).

Lee, R., Lee, S., and Mason, A. (2008). "Charting the Economic Life Cycle", In Population Aging, Human Capital Accumulation, and Productivity Growth, pages 208-237, Edited by Prskawetz, A., Bloom, D. E. and Lutz, W. New York: Population Council.

Lutz, W., Cuaresma, J. C., Kebede, E., Prskawetz, A., Sanderson, W. C., Striessnig, E. (2019). Education rather than age structure brings demographic dividend. Proceedings of the National Academy of Sciences, 116(26), 12798-12803.

Mason, A., Lee, R. (2011). Population aging and the generational economy: key findings. Population aging and the generational economy: A global perspective, 3-31.

Martin, K. A. (2012, July). The demographic dividend in Bangladesh: an illustrative study. In Presentation at the 18th Biennial Conference of the Bangladesh Economic Association to be held on (pp. 12-14).

Mwabu, G., Muriithi, M.K., and Mutegi, R.G. (2011). National Transfer Accounts for Kenya: the Economic Lifecycle in 1994, Population Aging and the Generational Economy, Editors: Lee R and Mason A, 367-378.

NTA (2010). National Transfer Accounts, http://www.flickr.com/people/nationaltransferaccounts/

Obeng-Odoom, F. (2020). Property, institutions, and social stratification in Africa. Cambridge University Press.

Olaniyan, O., Soyibo, A., Lawanson, A. O. (2012). Demographic transition, demographic dividend and economic growth in Nigeria. African Population Studies, 26(2).

Oosthuizen, M. (2013). Maximising South Africa's demographic dividend. Working Paper Development Policy Research Unit, School of Economics, University of Cape Town

Singh, T. 2012: "Demographic Dividend in China: The Challenge Ahead", Institute of Peace and Conflict Studies (IPCS) Special Report No. 121, New Delhi. Available at ipcs.org

United Nations. (2013). World population prospects: The 2012 revision. New York: United Nations, Department of Economic and Social Affairs, Population Division.

United Nations. (2022). World population prospects: The 2022 revision. New York: United Nations, Department of Economic and Social Affairs, Population Division.

World Bank. (2013). Ghana Overview, http://www.worldbank.org/en/country/ghana/overview

World Bank. (2022). Ghana Overview, https://www.worldbank.org/en/country/ghana/overview1

World Bank, World Development Indicators [online] Available at http://data.worldbank.org/

Yeboah, F. K., Jayne, T. S. (2018). Africa's evolving employment trends. The Journal of Development Studies, 54(5), 803–832.