Estimating the First Demographic Dividend in Senegal: The National Transfers Account Approach

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Research Article

ABSTRACT

Aim: To estimate the first demographic dividend in Senegal and discuss the conditions to enjoy it.
Study Design: Cross-sectional study.
Place and Duration of Study: Dakar.
Methodology: We implemented the national transfers account (NTA) system that allow estimating what each individual gets at each age of the lifecycle. The calculations are based on two mains surveys conducted in Senegal several years ago, namely the "Enquête de Suivi de la Pauvreté au Senegal" (ESPS-2005) and the "Enquête 1-2-3".
Results: We came with estimations of individual needs for consumption and labor income, first demographic dividend as a contribution in income growth and our calculations indicate that Senegal is in a period of enjoying its first demographic dividend.
Conclusion: In order to take advantage from the population structural change due to demographic transition, Government has to implement structural reform aiming at improving worker's productivity and creating more job opportunities.

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1. INTRODUCTION

The link between demography and economy is of interest for many reasons. Malthus had already understood that it was a stake to not take into account the demography question. Nowadays, when economists deal with gross domestic product or others aggregates of wealth, they use to normalize it by the size of population even if this measure is biased for measuring or comparing the wealth of individuals or nations.

However, it is not easy to get individuals measure of what each people gets through its life and how he use it. This situation can be explained by the fact that most of the household surveys for expenditures, income or health assessment are designed to produce aggregate data at the household level. Therefore, getting individuals data becomes particularly uneasy and a challenge for statisticians and economists.

The system of National Transfers Account (NTA) has been designed with the purpose to measure how those at each age acquire and use economic resources. Indeed, people stipulate material needs (consumption of food, health care, housing, etc.) during whole lifecycle. However, everybody doesn't make money so a question arises for those who don't generate income: how are they doing to achieve their material needs? This gap between the needs and the resources suppose that take place some mechanisms of shifting money from one age group to another. This feature is common to all societies and is called the economic lifecycle. It is quantified in the NTA framework by comparing consumption and labor income.

The influence of demography is strong in the NTA approach. In fact, the surplus generated by the workers who earn labor income is shifted towards the young and the elderly who are retired. Especially, in Senegal, the social security system is weak and concerns a small part of the elderly and so it is, in overall, for the social protecting mechanisms. As indicated by the support ratio, people rely a lot on the workers who cannot save enough money to invest and support the economic growth. The demographic transition that occurs in the world is characterized by the decline of fertility, the improvement of health care and the increase of life expectancy has many implications. The purpose of the first demographic dividend is to assess how the demographic transition affects the growth.

There is a lot of literature on demographic trends and their economic impact, but the evidence for the link between the growth impacts of the working age ratio is more limited.

A pioneer paper of Bloom and Canning (2004) is a landmark contribution. They conclude working on a panel of countries from 1965 to 1995 that the potential for a dividend exists but that it is realized mainly when incentives are in place to exploit that potential.

Also, several papers find the link between economic national aggregate (savings, output, productivity) rates and demographic structure;

- Fry and Mason (1982), Higgins (1998), and Kelley and Schmidt (1996),
- Person (2002) find the link between demographic structure and, respectively, output and productivity is USA,
- Bloom, Canning and Malaney (2000) and Mason (2001) conclude that East Asia's economic high performance was connected with a major age structure transition,
- Bloom, Canning and Sevilla (2002) find that much of Africa's relatively poor economic performance can be linked to a lack of the virtuous circle which comes from a transition.

The aim of this paper is to estimate the first demographic dividend in Senegal and to discuss the conditions to enjoy it. The first part present the national transfers account framework and the concept of demographic dividend. The focus is on the economic lifecycle which is enough for calculating the first dividend. The second part present the data used for estimations and an overview of the Senegalese population with some key demographic and economic features. The third and last part provides the estimates and discusses the conditions to enjoy the dividend.

2. METHODOLOGY

2.1 An Overview of the Economic Lifecycle in the National Transfers Account Framework and the First Demographic Dividend

2.1.1 The economic lifecycle and the national transfers account

Mason, a leader in the NTA world, explains that the purpose of National Transfer Accounts is to measure at the aggregate level the reallocations of shift of economic resources from one age group to another. These reallocations occur because at part of ages, individuals consume more than they produce. At part of ages individuals produce more than they consume. The NTA system documents the means by which the young and the old, those with lifecycle deficits, draw on the lifecycle surplus generated during the prime working ages or by those with lifecycle surplus.

The measurement of an individual consumption relies on the works of Lee (1994), Lee et al. (2005), Mason and Lee (2009). These papers have developed the NTA, a system of accounts that provide us with a mean of introducing age into national accounts.

The first remark is that people are facing consumption needs but they don't always have income to satisfy their needs. As an example, children consume education, health, housing, food, etc. but they don't generate resources. How are they doing? They receive transfers from people who earn an income. This discrepancy between the consumption and the income reflect the life cycle model.

The NTA define the lifecycle deficit as the difference between consumption and labor income. The lifecycle deficit, LCD(a) measures the total demand for age reallocations as the difference between the value of goods and services consumed by members of an age group, C(a), and the value of goods and services produced by members of an age group, Yl(a). Age groups with a lifecycle deficit, LCD(a)>0, support their surplus consumption by generating age reallocation inflows. Those with a lifecycle surplus, LCD(a)<0, generate age reallocation outflows.

Considering children and elderly, the LCD is generally positive meaning that their consumption is upper than their income so they need transfers.

According to the NTA, financing the LCD is achieved through a reallocation system. The age reallocation framework distinguishes the economic form of reallocations, asset reallocations and transfers, and the implementing institutions, public and private.

Table 1. A classification of National Transfers Account Reallocations

	Asset based Reallocations		Transfers
	Capital and Property	**Credit**	
Public	Public infrastructure	Public debt	Public education
		Student loan programs	Public Health care
		Money	Unfunded pension plans
Private	Housing	Consumer credit	Familial Support of children and parents
	Consumer durables		Bequests
	Factories		Charitable
	Farms		Contributions
	Land		
	Inventories		

Source: Adapted from Lee 1994

Two economic forms of age reallocations can be distinguished as asset reallocations and transfers. Asset reallocations consist of all flows associated with the accumulation and dis-accumulation of financial and real assets. Age groups achieve asset reallocation outflows in two ways: by saving, i.e., acquiring an asset, or by paying interest on accumulated debt. Age groups generate asset reallocation inflows by dis-saving, (i.e., disposing of an asset), and by earning returns on their accumulated assets in the form of profits, property income, and interest income. Assets reallocations come in two forms - investment (capital reallocation) and inter-temporal exchange - that differ in their macroeconomic effects and inter-generational features. Investment is the only form of age reallocation that contributes directly to economic growth. Other forms of reallocations do not lead to an increase in total economic resources. Inter-temporal exchange involves the trade of an economic resource in one period with compensation in one or more future periods. Exchange does not create aggregate wealth. An increase in the assets of one age group is always balanced by the decline in assets of other age group.

A transfer is an age reallocation for which there is no explicit quid pro quo or no contract. Transfers can flow in either direction -- from parents or taxpayers to children, for example, or from adult children and taxpayers to the elderly.

The individual is the fundamental analytic unit in NTA. All transactions are treated as flowing to and from individuals and are classified on the basis of the age of those individual. Public and private institutions mediate these transactions. Public reallocations are social mandates embodied in law and regulation and implemented by local, regional, and national governments. Private reallocations are voluntary or contractual transactions among individuals, households, firms, and charitable organizations.

The household plays a prominent role in private age reallocations. Virtually every society reallocations to children are dominated by intra-household transfers, and in many countries the elderly live with and are supported by their adult children. Moreover, many assets are

held by households rather than by individuals. Even when assets are held by individuals, household surveys rarely provide such information.

Several conventions have been adopted to attribute to individuals transactions that are between or within households. First, all intra-household transfers are assumed to be between the household head and household members. Second, private inter-household transfers are assumed to be between household heads. Third, all household assets are assumed to be held by the household head. Thus, all asset reallocations are attributed to the age group to which the household head belongs.

Calculating the consumption needs, NTA take into account public consumption. The consumption needs (private or public) are effectively consumed by people so there should be satisfied. The NTA Flow1 identity explained this dichotomy. On its one hand, the resource needs are calculated as the LCD and in its second hand, the equation shows how the LCD is financed (transfers by public or private system, asset-based reallocations). So in our case, the LCD provides us with information on the resources needed to satisfy consumption needs.

2.1.2 The first demographic dividend

Behind the first demographic dividend the overall question is the influence of age structure on growth. How, why and at which extent age structure influence economic growth?

The analysis starts with the decomposition of per capita income between labor productivity and support ratio: $\dfrac{Y}{N} = \dfrac{Y}{L} * \dfrac{L}{N}$ with Y representing income, L the labor force and N the population. In terms of growth, the equation states that $gr(\dfrac{Y}{N}) = gr(\dfrac{Y}{L}) + gr(\dfrac{L}{N})$ meaning that the growth of per capita income is the sum of the productivity growth and the support ratio growth. This equation shows why age structure can influence growth through the support ratio.

To understand how age structure influences the growth, let's consider a country like Senegal where workers support their families and relatives. Indeed, in that case the support ratio will negatively influence growth. If the labor force grows faster than the total population, the support ratio will contribute positively to the growth. If $gr(\dfrac{Y}{L}) = 0$ meaning that there is no productivity growth, the equation shows that $gr(\dfrac{Y}{N}) = gr(\dfrac{L}{N})$ meaning that the per capita income growth depends only on the support ratio growth and, in the case that total population grows faster than labor force the per capita income growth could be negative. The support ratio growth can also be viewed as a rough approximation of the probability to

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[1] $C(a) - Yl(a) = Y^a(a) - S(a) + \tau^+(a) - \tau^-(a)$ where $\tau^+(a)$ and $\tau^-(a)$ are the transfers received and paid, $S(a)$ is the savings and Y^a is the asset income

To deal with this issue, we used another survey that has been especially designed to capture information on income using a three stages approach. The data on income comes from 1-2-3 survey at Dakar in 2001. The first stage of the survey provides general information on the households (age, health, house, etc.). The second stage targets the employment and income and drawn his sample on the basis of the first stage results. The third stage is similar to an expenditures survey. This survey was conducted at the same time in 7 countries in western Africa. Their main limitation was their extent. They only covered the main town. In Senegal the main town, Dakar, weights for about 90%[2] of the activities. For our calculations, we assumed that the income structure revealed by the survey holds for all the other regions. Such assumption is likely to alter the final labor income profile. We are aware of that issue but these data are the only one available on income. One can ask why we did not use this survey to calculate the consumption profile as it also provided data on consumption. In fact, the age profile structure calculated from this survey is really different from the age profile calculated on the basis of a national survey like ESPS-2005.

A more recent survey "Enquête Pauvreté et Structure Familiale" "Survey on poverty and household structure" (ESPF 2007) was conducted in 2007. But, up to now his results are not available and so his dataset. Our calculations must be replaced using this new dataset once it would be available. We are also aware that we could have a problem due to the use of two dataset from two different years. We could argue that the global price index remained stable between 2001 and 2004 but again we need to care about that issue by using a deflator. Definitely the oncoming dataset will allow us to be less careful about all those issues raised here. One important features of ESPF is that it addresses the issues of transfers paid and received. It would be very useful to construct the second side of the NTA identity flow.

We also used the age profile from the United Nations (UN) projection as weights for adjustment to macro-control.

2.2.1.1 Lifecycle deficit (LCD)

LCD is calculated as total consumption minus labor income. Consumption is composed of private and public parts. Private consumption comprises private education, health and other consumption and so on for public consumption (Dramani and Ndiaye, Senegal, Unpublished results during NTA training in Mombasa in June 2009).

Private consumption (CF)[3]

We used ESPS-2005 which data are at household level. According to the NTA age feature, we needed to allocate several aggregates on consumption expenditures at the individual level namely private education consumption (CFE), private health consumption (CFH) and private other consumption (CFX).

Private education consumption (CFE)

We used a regression method to allocate to each individual his education consumption. Basically, this means that we calculated the share of education consumption by age. The

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[2]Reports of the "Enquête de balayage (2007)", conducted for updating data on modern sector (not informal) in Senegal, by Agence Nationale de la Statistique et de la Démographie (ANSD).
[3]The abbreviation comes from final consumption in the system of national account (SNA-1993). Final consumption is generally achieved by household.

methodology is common in the NTA network (the household education expenditures is regressed on the number of person enrolled at each age group in each household). We also used information on the attendance at school in the calculations and we didn't smooth this age profile as one knows that it is age sensitive.

Private health consumption (CFH)

We used three different methods for allocating the health consumption. The first one is a regression method similar to the method used to allocate education. It shared the household health consumption according to the number of person in an age group and a utilization variable ("1" if you have been consulted by a doctor). The results weren't good. The queue of the profile showed that the consumption of the elderly was decreasing and was smaller than the others when one expect to find a "J-shape" profile.

The second method is also a regression method but quite different. It is based on the assumption that health consumption depends on the number of user at the age group, the age, the squared age and the cubic age. That feature was supposed to give a "J-shape" profile but it didn't work again.

Finally, we used the utilization rate given by the survey data and calculated as a probability to use hospital services and we obtained the consumption at individual level by age using this key. After that, we smoothed this profile using the Friedman program available on R-software.

Private other consumption (CFX)

To allocate the private others consumption, we used an equivalent scale widely used in the NTA network[4.] We smoothed the profile with the Friedman program.

After calculating the per capita profile for private consumption for education, health and others, we adjusted them with the macro-control from National Account and after that we draw the per capita profile for total consumption.

Public consumption

The public consumption is composed of education, health and others consumption. The national account provided us with the total public consumption (final public consumption) which is our macro-control. We needed to break it into education, health and others. For this purpose, we used the structure given by the shares of the three main non-market final products namely public administration activities, education and formation and health. As it is assumed by national statisticians, we supposed that these three products are the most important in terms of public consumption (common assumption in national accounting in Senegal). Then we used those shares to break the macro-control.

Public education consumption (CGE)

After breaking up the public consumption macro-control, we now have the macro-control for public education consumption. Having the enrollment rate by level (primary, secondary, tertiary and others) coming from the ESPS 2005 survey and also the public cost of a student

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[4] See appendices for details on the equivalent scale used in the program 1

enrolled at each of those levels, we multiplied the enrollment rate by the population at each age group, so we got the effective enrolled population at each age. Then we multiplied it by the unit cost. We found the total consumption by age. We also have the public cost per student in others category apart from primary, secondary and tertiary level. We summed up this per capita other consumption with the per capita of primary, secondary and tertiary public consumption. Finally, we adjusted this per capita profile using the macro-control.

Public health consumption (CGH)

We distinguished the pure public consumption and a more private part of public health. The pure public health was allocated by dividing the corresponding amount by the total population. The more private (budget functioning, medicines, etc.) part was allocated using the private health consumption profile.

Public other consumption

We divided the total other consumption by the population assuming that everybody consume the same amount of other public expenditures.

Labor income

The total labor income is composed of two parts: the labor income earnings and the labor income of self-employment[5]. The labor income earnings are available at individual level. The questionnaire distinguishes the persons that earn salaries from the persons that don't earn salaries. The data used came from Enquête 1-2-3 at Dakar in 2001.

Labor income earnings (YLE)

The YLE age profile was calculated by tabulating as the information was available at individual level.

Labor income self-employment (YLS)

According to the category of the workers, we could identify the workers which are not wage-earners and then we calculated a first estimation of their income (YLS) as the 2/3 of YLE which is the income of the wage earners. Indeed, the amount reported is a kind of YLE. Making the assumption that this YLE, that is in fact a mixed income for the not wage-earners, is composed of 2/3 of YLS, we then obtained YLS by multiplying this mixed income by 2/3. It is a first approach to calculate YLS.

The NTA method proposes an alternative method to calculate YLS. A second YLS age profile was derived from the YLE age profile using an allocating method. Firstly, the sample was broken into wage-earners and self-employed according to the category to which the workers belonged. To allocate it by age, we used the wage-earners profile and the assumption that self-employment labor income is 2/3 of the labor income earnings. For the wage-earners, a mean wage is calculated by age. For the others, this variable was set equal to zero initially. The mean wage-workers were summed up within the household leading to a non-weighted mean wage-worker (hhwage-worker). In a second time, the non-workers income is also summed up leading to the household total labor income of self-employment

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[5] A question allows to distinguish who is self-employed or not

(hhYLS). Finally, the new YLS was calculated as (mean wage-worker/hhwage-worker)*hhYLS*2/3.

We smoothed separately the earnings and the self-employment income and then we calculated the total per capita labor income.

We faced a problem of macro-control adjustment. Merely it was a problem of selecting the good concept of income. In our case, the gross national available income was too huge. We used the social accounting matrix (SAM) to solve this problem. As one knows, in a SAM, there is an account called "factor account" that distinguishes the returns to labor and to capital. So we used the return to labor as macro-control to adjust the per capita labor income profile. A major difficulty was the data issue. The child labor was not at all captured by the program. One could understand this issue by plotting a histogram of the age of the person that hold an employment and a histogram of age simply. The two histograms showed that the children are really undertaken in the sample. As a matter of fact, the minimum age of participation at the labor market was 16. We thought about using statistical method to address this specific issue but we did not go far away.

2.2.1.2 The first demographic dividend

The first demographic dividend is calculated as the growth of the support ratio $\frac{L}{N}$ which is computed holding the shape of the age profiles of consumption and labor income, constructed as explained above, fixed as $\frac{L}{N} = \frac{\sum \gamma(a)*P(a,t)}{\sum \varphi(a)*P(a,t)}$ where γ is the productivity by age and φ is the consumption needs by age.

2.2.2 A brief overview of the Senegalese population

ESPS_2005 estimates the number of Senegalese households to be 1,296,200 and a quarter of them are headed by women. The youth consists of the majority of the Senegalese population: around 55% of the total population is less than 20 years old while old people are less than 4% of the population (figure1).

2.2.2.1 Health

The health condition of the population improved during the last five years, according to the indicators status. More than 2/3 of the population goes to public health centers and 27% visit the private health centers. More than 5 in 100 patients go to traditional practitioners (marabout/healers). Around 2 in 3 patients are satisfied during their last visit, while 10 in 100 feel that the cost of medical treatment is too high; 4% highlight the inefficiency of treatment and 3% judge the waiting time too long. The proximity of health centers facilitates the physical access to the services and makes it easy for their use. Overall, over 60% of households can access a health service within 30-minute walk but about 1 in 4 households can gain access to a service after a one-hour walk or more. The rural area is more affected with 40 households out of 100 whereas this situation affects only 1 to 2 households out of 100 in the cities.
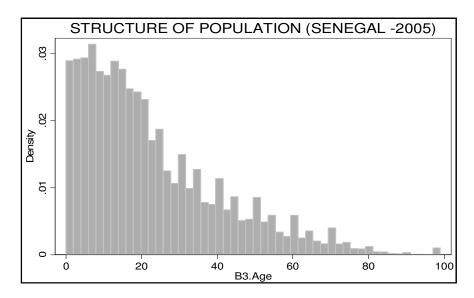
Figure 1. Structure of population (ESPS-2005)
Source: ESPS-2005, our calculations

Education

The gross enrolment rates differential variations analysis shows that the household headed by women have higher gross enrolment rate. This seems to mean that women are more conscious of the role of education for the future welfare of their children. The primary school succeeding rate is 44.1%. Roughly one child over 10 aged from 7 to 14 has already abandoned school. However, it seems that urban areas are much more concerned by this phenomenon than rural areas. About 30% of the living cases are explained by early participation to labor market or economic problem (welfare quintile) faced by households. More than 30% of the cases are explained by failure at school and absence of perspectives given by school. This figure is a call for the policy makers in charge of the educational system.

The literacy rate for adults aged 15 years and more is estimated at 41.9%. Illiteracy is more widespread among females (62%) and in rural area (68.2%). As far as primary education is concerned, the gross and net rates stand at 54.6% and 75.8% respectively. There are slightly over 5% of children ranging from 7 to 14 years leaving school according to the survey results.

2.2.2.2 Labor

As it is the case in most of the sub-Saharan African countries, the primary sector is the biggest employer. In Senegal, it employs more than half of the active population (55%). The National Survey on Children Labor, so-called Enquête Nationale sur le Travail des Enfants (ENTES), in 2005 has generated quantitative data on activities performed by children of 5 to 17 years old. Almost 20% of the 3,759,074 children interviewed had worked during the reference week. One child over four in rural area has worked; the figure is 10.4% in urban area. This situation can be explained by a social argument: the using of child labor as a vehicle for knowledge transmission and socialization is more frequent in rural area. For the permanent or usual employment (last 12 months), 36.7% of the children are concerned.

More than half of the children of rural area have worked; the figure is 12.9% in urban area. Almost 85% of 1,378,724 economically active work in agricultural sector, livestock, forestry and fishing, belonging to the primary sector. More than 75% of the children work as farmers.

ESPS_2005 measured employment trough the most recent activity, i.e., that conducted during the seven days prior to the interview. The activity rate is estimated at 43% of the active population (persons of 10 years and more). The occupation rate stands at 38.7%, which means less than 40 in 100 active people are employed. The unemployment rate is estimated to be 10% at the national level with a higher rate in urban area of Dakar region (16% against 6.3% in rural area) and among women (13.6% against 7.9% for men). About 23% of workers are in a situation of invisible underemployment, i.e., they have insufficient activity incomes, forcing them to actively seek to increase them in order to meet their needs. This job insecurity may account for the heavy dependence which is rife in the country, even though this decreased in the past five years: 100 workers take charge of 270 jobless people. The economic dependence is predominantly present in the other cities (excluding the capital Dakar) and rural area (290 jobless for 100 actively employed) where underemployment is higher (27% of the employed).

The labor productivity figure (figure 2) shows different patterns across the economic sectors. It is the lowest in the primary sector where it remains quite stable over the past three decades. The stock of capital used is expected to be relatively small. In the secondary sector, it is increasing slowly with an acceleration starting from 2000. In the tertiary sector, after a rapid decline between 1980 and 1993, the labor productivity has experienced a period of stability starting from 1994 to recent years.
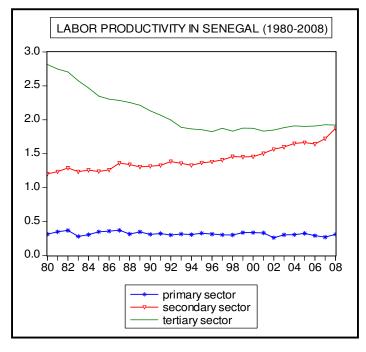

Figure 2. Labor productivity in Senegal
Source: Senegal national accounts 2008, our calculations

2.2.2.3 Consumption expenditures

The total annual consumption expenditure of households is estimated to be 3, 021 billion franc CFA. The Dakar, other cities and rural households account respectively for 43.2%, 18.7% and 38.1% of that amount. This is equivalent to an annual spending of 2, 330, 271 franc CFA per household and 249, 008 per capita. This distribution is unequal in terms of the population in the three strata considered: the Dakar city-dwellers, who represent slightly less than quarter of the total population, spend a good deal more than the rural residents who constitute around 60%.

Most of the Senegalese expenditures go into Housing and food (65.6%) with 45.6% for food and drink only. This consumption pattern, driven by food, characterized a lot of poor countries where the low income constraints households expenditures. The expenditures allocated to education are less than 1% of the household's budget. This situation is likely due to the subsidies in public school. For health, the budget's share devoted by the households is about 2.4% and is quite low, due again to public health supports.

Less than 10% of the national total expenditures is achieved by the poorest (first quintile), when the richest (last quintile) concentrated 40% of these expenditures. Globally, the purchasing power of the richest households is more or less 5 times greater than the poorest one's.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 A measure of the resources and the consumption needs

The figure 3 shows how important are private consumption in the total consumption achieved by each age group. Comparing with other African NTA countries[6], Adedoyin[7] noticed that Senegal has relatively low private education and health consumption and all countries, except Nigeria (with higher private education consumption), have high public consumption for Children. Concerning health care public spending, the comparison showed that South Africa is doing the best.

The figure 4 shows the income distribution according to the age profile. The peak is reach around 50 years of age. This feature can be explained by the fact that people did not find decent job early. The labor child is a reality in Senegal. However, the results for the young have to be adjusted by using the data of the ENTES survey on child labor.

3.1.2 The lifecycle deficit

The figure 5 and 6 show the deficit for each age group. The figure 5 indicates the per capita deficit in each age group. The per capita deficit is higher for the elderly and people generate surplus between 36 and 60. These features show how difficult is to find a decent job that allow to be autonomous in achieving consumption needs.

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[6] Kenya, Nigeria, South Africa
[7] Adedoyin Soyibo, University of Ibadan, Nigeria team during the Fifth IZA/World Bank Conference on **Employment and Development,** May 3-5, 2010, Cape Town, South Africa
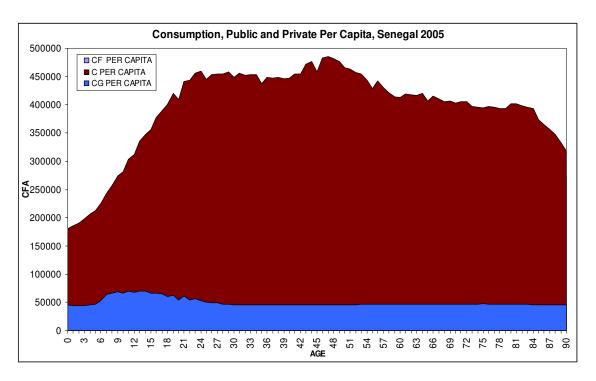
Figure 3. Profiles of consumptions per capita for Senegal
Source: ESPS-2005, our calculations

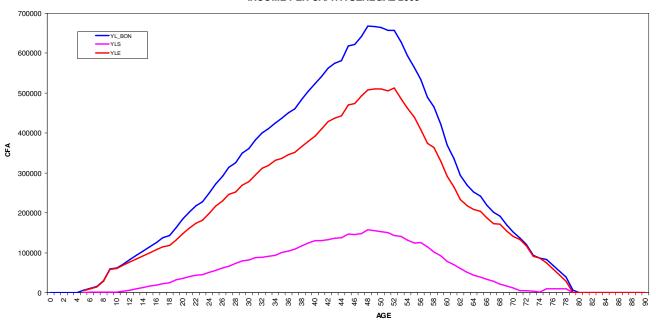**INCOME PER CAPITA SENEGAL 2005**

Figure 4. Profile of income per capita for Senegal
Source: Enquête 1-2-3 in 2001, our calculations
YLE: labor income for employee; YLS: labor income for self-employed; YL_BON: total labor income

The situation is quite similar in South-Africa with a window of 27 years of labor income surpluses (33-60 years of age). People in Kenya start generating surplus at 29 years of age but this situation is ending earlier at 55 years of age, when in Nigeria, the window is 30 years (32-62 years of age).
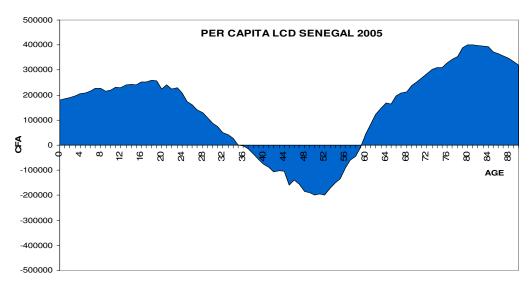

Figure 5. Profile of lifecycle deficit per capita for Senegal
Source: ESPS-2005 and Enquête 1-2-3 (2001), our calculations

The figure 6 presents the aggregate deficit calculated by multiplying the per capita deficit by the population in each age group. It shows how heavy the deficit is for the young and the dependant persons. This feature is close to the age profile that showed the importance of the youth in the Senegalese population.
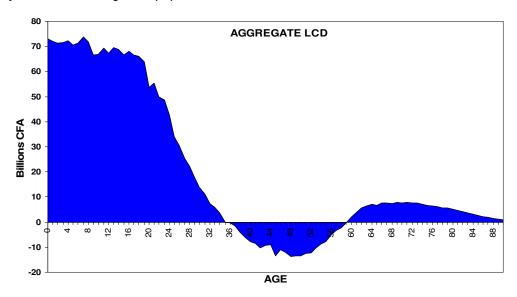

Figure 6. Profile of lifecycle deficit agregate for Senegal
Source: ESPS-2005 and Enquête 1-2-3 (2001), our calculations

3.1.3 The economic support ratio and the first demographic dividend

The economic support ratio is calculated as the inverse of the dependency ratio. It shows how workers have to support non workers. Between 1950 and 2000, the situation of workers has worsened as they had to support more and more people (figure 7). After 2000, the situation knows an improvement traducing the growth of the support ratio and then the enjoyment of the first demographic dividend.

Economic Support Ratio, Senegal 1950-2050

Figure 7. Economic support ratio for Senegal
Source: ESPS-2005 and Enquête 1-2-3 (2001), our calculations

As it is shown by the figure 8, Senegal has started enjoying his first demographic dividend since 2000. After 2025, the support ratio will decrease explaining the decline of the curve after this point.

The situation is the overall the same for the other African NTA countries. Indeed, Senegal and Nigeria started to enjoy the first dividend since 2000 while South-Africa and Kenya started earlier (between 1970 and 1980).

Around 2010, 0.5% of the per capita income growth will be issue from the demographic transition and around 2025, roughly 0.75%.
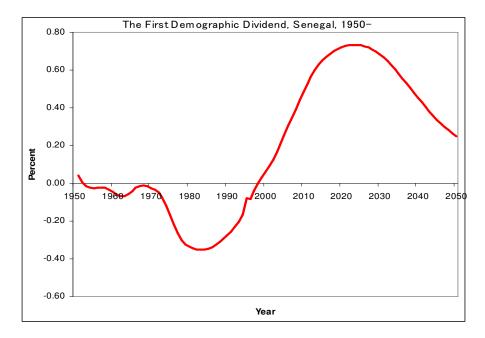
Figure 8. First demographic dividend for Senegal
Source: ESPS-2005 and Enquête 1-2-3 (2001), our calculations

3.2 Discussion: Is the Deficit Systematically Enjoyed

The calculations of the first demographic dividend rely on several assumptions like the stability of the age profile of consumption and labor income over the period. However what the reality shows could be different.

The fact that people are living longer and better (health, food, leisure, etc.) is well admitted. This means that the active population becomes bigger. However, those who earn income are those in the active population who are effectively working. So to enjoy the dividend it is important to enlarge the population of workers by providing them with enough job opportunities when the active population is growing.

The creation of job opportunities is a major problem in all societies. The official unemployment rate is around 10%[8]. This rate hides a pernicious reality. About 23% of workers are in a situation of invisible underemployment, i.e., they have insufficient activity incomes, forcing them to actively seek to increase them in order to meet their needs. This job insecurity may account for the heavy dependence which is rife in the country, even though this decreased in the past five years: 100 workers take charge of 270 jobless people.

Not only Senegal is experiencing an unemployment issue but all nations in the world are facing the same issue and everywhere Government needs resources to support policies aiming at job creation. Especially in Senegal where the weight of the informal sector around 50% is also a barrier as it is known that informal firms don't pay taxes.

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[8] As estimated by ESPS-2005

Another issue explaining the unemployment is the gap between the skills of the labor demander and the needs of the labor supplier. In Senegal as in many countries, the national university provides students with strong theoretical basics but doesn't prepare them to answer the urgent needs of the firms; so they need time for training and firms are not ready to support the costs.

The failure of university in preparing future high skilled workers has lead to the multiplication of private high schools and private universities. The main issues there are facing are the availability of teachers and the technical infrastructure for training and studying that are often out of order, old, or inexistent.

Investments are needed to change this situation if we want to improve the quality of the workers but the sources of these investments should be diversified instead of relying only on Government. In parallel of the Government efforts, the private firms should cooperate with the centers of education, training and research by providing them with funds, training opportunities, challenges, etc. The private firms could submit their problems to these centers and support the research cost.

These several issues call for a global macro-economic policy as there are a lot of interactions between the components examined here. Indeed, Government has to make important choices between investment in education, in firms (subsidies), household consumption and many other sectors, also it should take into account the indirect links. For instance, encouraging the firms by fiscal alleviation could allow them increase their investments, cooperate with the educational system, helping Government in improving in achieving its educational policy.

4. CONCLUSION

As shown in our results, Senegal is in a period of enjoying its first demographic dividend. Since 2000, Government has taken several measures going in the way of enjoying this dividend: the recruitment of agents, the improvement of tax collections and the creation of jobs with public investment in infrastructure. However, our calculations remain theoretical. There explain when the dividend is likely enjoyed and provide an estimation in that case but what is happened in reality can only be assessed by real data. In our case, the data on active population effectively working are not adapted. Indeed, there are produced using the equivalent full time and therefore they lowered the reality and the estimations of the labor productivity and the support ratio are not good.

We want to end by stressing on the necessity to design macroeconomic policy in order to answer in a global and a coherent manner the problem of generating growth and sharing it. Some strategies that can be helpful in this perspective are:

  i. encouraging private initiative;
  ii. proposing fiscal reforms to improve tax collections and especially from informal sector;
  iii. identifying priority sectors in which investment will be directed in order to improve education policies;
  iv. improving the education program by adapting their contents to the needs of the firms;
  v. And improving the productivity of the workers by investing in human capital with fiscal incentives to encourage capacity building at private scale.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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