Ethiopia: When does population become an economic asset?

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Abstract

The population of Ethiopia has a demonstrable potential to create a demographic window of opportunity (DWO) within which demographic dividend could be harnessed. Nevertheless, the current understanding of the possible durations of DWOs appears inadequate. This article aims to fill this gap by working out the DWOs through population projections based on rapid, slower and constant fertility decline scenarios. The 2007 Population and Housing Census data were used to construct projections. Considering favourable conditions behind changes in the age structure of the population where the pre-dominance of age group 15–64 is the key, the article established two periods (2028–2062 and 2037–2073) during which the DWOs open and close in Ethiopia related to rapid and slower fertility decline scenarios, respectively, showing that rapid fertility decline allows Ethiopia to create the DWOs earlier than slower fertility decline. It concludes that these two periods denote potential conditions to turn the population into an economic asset, although the realization of such potential depends upon the preparation and implementation of relevant policies and strategies ahead of time.

Keywords: age structure, demographic window of opportunity, demographic dividend, fertility decline, population projection

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Introduction

The experiences of countries known as the Asian Tigers (South Korea, Singapore, Hong Kong and Taiwan) demonstrate that the youth population sub-group can be translated into a useful resource that could create wealth. These experiences have ignited hope in developing countries which are overwhelmed by a growing young population (Cleland, 2012; McNicoll, 2006; Mason, 2001; 2005). A demographic phenomenon that creates wealth often results from changes in the age structure of the population in which, in a given time, the younger generation decreases in number compared to the working-age generation. Such a situation heralds the emergence of a demographic window of opportunity (DWO) that takes place because of inherent fertility/demographic transitions (Joe et al., 2015; Kasprowicz and Rhyne, 2013; Sofie, 2012; van der Ven and Smits, 2011; Pool, 2007; Economic Commission for Africa – ECA, 2001; Bloom et al.,2000). The possibility of DWO informs countries to take appropriate actions in a timely fashion to harness the demographic dividend (World Economic Forum, 2014; Bloom et al., 2011; Lee and Mason, 2006; Bloom and Canning, 2005; Ross, 2004; Bloom et al., 2003).

As coined by Bloom and Colleagues (2003), demographic dividend (DD) refers to the potential economic growth, also called economic payoff, usually realized in a relatively short period of time, once a DWO is open. During this time the ratio of dependents (young and old) to the working-age group becomes low, which creates the potential to raise output and saving per capita thereby leading to improvements in human capital and economic growth (Mason et al., 2016). Nonetheless, DD is a onetime historical phenomenon (ECA, 2013; van der Ven and Smits, 2011; Mason, 2003).

Since DD could be realized in the context of the above-noted complex situations, an accurate understanding of the nature of the DWO and what is required to attain it are important parts of the development agendas of countries. In this regard, two related questions need to be considered: (1) When does an appropriate population age structure that can create DD emerge? (2) What conditions are necessary to attain the appropriate age structure of the population? The answer to the first question relates to the period when the DWO opens and closes, where the population is dominated by age group 15–64 as compared to the two other age groups (0–14 and 65 and above). The answer to the second question concerns the extent to which development processes contribute to a reduction in fertility that makes certain the domination of age group 15-64 over the other two age groups of the population. Both questions and their related answers concern issues of translating the emerging population age-mix into economic and social wealth.

Congruent with the above conception, Ethiopia has been recording a declining fertility rate for the last two decades; total fertility rate (TFR) has declined from 5.5 children per woman in 2000 to 4.6 children per woman in 2016 (CSA and The DHS Program ICF, 2016). As is often the case, a decline in fertility rates is preceded by a decline in mortality rates. In this latter case, it is sufficient to mention a decline in the under-five mortality rate in Ethiopia from 116 deaths per 1,000 live births from 2002 to 2006 to 67 deaths per 1,000 live births from 2012 to 2016 (CSA and The DHS Program ICF, 2016). Based on the decline in TFR and mortality rates, Ethiopia could be located as being between the end of the second stage and the beginning of the third stage of demographic transition (World Bank, 2007; Weikert and Quincke, 2012). This location is characterized by a greater reduction in deaths than of births and an increase in the size of the Ethiopian population that is dominated by the young (Canning, 2011; Dyson, 2010; Bongaarts, 2009).

The evolving demographic precedent has both short-term and long-term consequences. In the short-term, it requires enormous resources to develop education and health sectors - including goods and services - needed by young people, which impact savings, investments and economic growth as well as family welfare. In the long-term, it creates a large number of educated and healthy young citizens that can engage in the production and consumption of goods and services which in turn allows for increased savings and investments, and thus for a growing economy. This process encapsulates a defined period of the DWO within which the DD could be created. Based on such an understanding, this article attempts to establish possible periods of the DWO on the basis of population projection for Ethiopia. It relied on the changing proportions of the three broad age groups (0-14, 15-64 and 65 and above) as indicators drawn from the results of population projection.

Currently Ethiopia is the second most populated country in Africa, after Nigeria. The population is dominated by the young age category (0–14) (World Data Atlas, 2017). As a result, the Ethiopian population is defined as inordinately youthful, which implies that it will keep on growing in the coming decades, making the country one of the world's demographic giants (Ashford**,** 2007). In fact, the United Nations (2015) projection shows that Ethiopia will be the 10^{th} most populous country in the world by 2050 and 9^{th} in total by 2100. Due to the large size and proportion of the population in reproductive ages (15–49) and the resulting power of population momentum, its demographic future is characterized by an increase in the total size of the population, even if fertility falls (Blue and Espenshade, 2011; Edmonston, 2006).

Under the current demographic circumstances it is proposed that Ethiopia should make crucial development efforts through proactive planning and committed leadership in order to benefit from the growing working age population. Through such efforts, the existing perception that considers large populations in general and young ones in particular as problematic could be changed and replaced by a belief that population is a resource that can be translated into economic value. In this context, understanding the DWOs that will take place in the coming decades is important for guiding Ethiopia's development efforts. Accordingly, this article attempts to establish two periods of DWOs under rapid and slower fertility decline scenarios. The article has six sections: following the introduction, the second section presents theoretical issues while the third section discusses data sources and methods of data collection; the fourth and fifth sections describe Ethiopia's conditions as favourable for the creation of DWOs, and the projection results; the final section constitutes discussions and conclusions drawn from the evidence and projection results.

Theoretical issues

It is imperative to clarify the theoretical issues of DWO and DD and their possible overlap or difference. Entry into the DWO is facilitated, as noted, mainly by a decline in fertility rates which are the outcome of family planning services and contributions made by the social and economic sectors. It seems obvious that Ethiopia's observed fertility decline in the recent past, as a whole, suggests that institutions and sectors involved in delivering family planning services have shown some level of enhanced capacity, which in turn demonstrates a potential to translate the DWO into tangible economic gains. In this context, the definitions of the DWO and DD seem to overlap. In essence, the two are different in that DWO designates the duration when the age structure of the population is appropriate enough to generate DD, whilst the DD denotes the actual economic gains obtainable during the period of the DWO. The term 'obtainable' indicates

the conditional nature of obtaining economic benefit from DWO simply because countries may or may not be able proactively to undertake the required action.

In this article, the DWO issue is located within the population and development framework and thereby within demographic and fertility transitions. DWO will open at one point in time as an inevitable consequence of economic and social transformation of societies and countries (Lee 2003), and create a changing age structure that often boosts economic gains and facilitates a renewed form of the old debates between population growth and development (World Economic Forum 2012). It appears that the notions of creating the DWO and generating DD have increasingly become the focal point of the renewed debate (Ministry of Finance and Economic Development (MoFED), 2010; World Economic Forum, 2012; Damien and Meles, 2012).

The period of DWO covers some decades during which the proportion of the working-age population increases significantly and this leads to direct and indirect opportunities that could increase per capita output, demonstrating the fact that population age matters. When the proportion of the working-age population increases, it is natural that the dependency ratio will decline and create favourable conditions for economic growth and development (Ahmed et al., 2016; Canning et al., 2015; Bhagat, 2014; Gudaganavar and Gudaganavar, 2014). This demographic condition is a precursor to the opening of the DWO. A reduced dependency ratio can also affect per capita output through intermediate channels that include savings, investments, and improved quality of human capital through health and education (Gribble and Bremner, 2012a; 2012b; Royan and Sathar, 2013;Williamson, 2013). It is evident that lower fertility and mortality rates are associated with higher human capital investment per child besides raising labour productivity (Lee and Mason, 2010), while low fertility rates without low mortality rates lead to higher per capita consumption because of human capital accumulation (Lee and Mason, 2009). The initial situation, seen in terms of declining fertility and mortality rates, which leads to what economists call population bonus or population dividend, seems to be emerging in Ethiopia (Ashford 2007).

The timing of the DWO and the mechanisms through which economic gains are realized from the population differ across countries (Lee and Mason, 2006). As pointed out by van der Ven and Smits (2011), the DWO is open for various countries of sub-Saharan Africa and North Africa (and the Middle East), it is beginning to close for the East Asia region, Latin America and the Caribbean, and it has already closed for developed countries.

The approaches deployed to locate the time period when the DWO opens and closes have some variations, as observed in the literature. Jackson (2011) attempted to locate the period of DWO between the times when the potential support ratio begins to increase and when it begins to decrease *vis-à-vis* the two age groups of the dependent population. This approach underlines that DD begins to flow corresponding to the increase in the potential support ratio (population aged 15–64/population aged 0–14 + aged 65^{+} years) and ends when this ratio begins to decline. Although it indicates the dominance of the working-age population over the two dependent age groups through the ratio, the approach does not show in concrete terms the much-needed proportions of the three age groups and related time periods of DWO. It also gives the impression that the flow of DD does not stop when the potential support ratio begins to decline; DD keeps on flowing until this ratio falls beyond a given threshold.

On the other hand, Komine and Kabe (2009) noted that the period of DWO begins when the potential support ratio falls continuously, indicating only the opening duration of the DWO, while Cheung and colleagues (2004) indicated the period to be when the ratio is less than 0.5.

According to Reher (2011), the window of opportunity for economic and social change is ideally a period that lasts 30 years, beginning from the time fertility rates start declining. With the aims of estimating "the timing and length of windows for advance investment (investment prior to having economically favorable age structure) and windows with economically favorable age structure", Choi (2016:62) showed the DWO periods to be when the demographic situation of countries experiences "the low dependency ratio window." However, Choi looked to have utilized "an arbitrary cut-off 60 per 100 to define a low dependency ratio window" to represent "a period with economically favorable age structure" (pp. 66–7). Such a location of the DWO, as Reher acknowledged, is not only arbitrary but leaves room for rebuttal.

Contrary to the above, following the United Nations (2004) and Bloom et al (2003), this article sought to pursue relatively easy-to-understand and well-defined proportions of the three broad age groups of the Ethiopian population. In this case, the DWO opens when the proportion of youth (aged 0-14) falls below 30%, working-age adults (aged 15–64) becomes higher than 60%, and elderly (aged 65 and above) falls below 15% of the total population of the country. Naturally, the proportion of the youth falls faster than the elderly as time goes on, though both scenarios allow the proportion of the working-age group to increase rapidly. Moreover, a country in which the percentage of the population younger than 15 has fallen below 30% of the total population has a fertility rate below that of three children per woman (United Nations, 2011); in order to open the DWO, countries need to reach a fertility rate of below three children per woman (Leahy, 2012), and Ethiopia recorded a contraceptive prevalence rate (CPR) of 33.8% by 2014 (PMA2020, 2014). Countries with an average fertility rate of three children per woman, noted Leahy (2012), have a CPR of 60%, that aptly demonstrates that Ethiopia needs to effect change over a period of time (about 10 years) given the observed average increase of CPR by 2% per year (Gizachew and Zelalem, 2014).

The length of the period of DWO depends on the speed of demographic transition, which in turn depends on the pace by which fertility rates fall. Therefore, understanding the DWO is essential in order for Ethiopia to prepare proactively the required groundwork that accelerates the pace of fertility decline and creates the desired DWO to harness DD.

Data sources and methods of data collection

The article is based primarily on the Ethiopian Population and Housing Census 2007. This is because of the fact that Ethiopia has not carried out a population census since 2007. This national data is utilized to project Ethiopia's population to 2100 which is the basis for identifying the periods when DWOs will be open and closed. Other required data/indicators were also generated from previous censuses such as that of 1984 (CSA, 1991); 1994 (CSA, 1999); and from Inter-censual Population Survey 2012 (CSA, 2013) reports. The remaining data were gathered from the Demographic and Health Survey 2000 (CSA and ORC Macro, 2001); 2005 (CSA and ORC Macro, 2006); 2010 (CSA and ICF International, 2012); 2016 (CSA and The DHS Program ICF, 2016); Labour Force Survey (CSA, 2006); and the Performance Monitoring and Accountability 2020 (PMA2020, 2014) reports. These datasets are used to complement the 2007 census data and to make clear the projected periods of the DWOs.

Spectrum Computer Software Model developed by the Futures Group International with modules that can perform many population-based projections and, in particular, its *Demproj* component that projects the population for an entire country or region by age and sex, based on assumptions about fertility, mortality, and migration (The Johns Hopkins University and Henry Mosley, 2005), was used to make population projections. Changes in the proportion of the three

age groups of the population (0-14, 15-64 and 65 and above) were used to establish each period of the DWO.

Assumptions

To make population projections, assumptions were made regarding expected changes in some indicators that include total fertility rate (TFR), life expectancy, migration, and labour force participation rate (LFPR*).* As has been mentioned, Rapid Fertility Decline (RFD), Slower Fertility Decline (SFD), and Constant Fertility Decline (CFD) scenarios were assumed to make population projections. The adjusted total population of July 1st, 2007 (census year) disaggregated by age was used as a baseline population for projection. This projection extended over 93 years (2007-2100).

Most assumptions were based on the World Population Prospects related to Ethiopia (United Nations, 2015), unless specified otherwise. To measure fertility and fertility scenarios, TFR is used to denote the average number of children a woman would bear if she survives all her childbearing (or reproductive) years (15–49). This is a better measure of fertility behaviour than the crude birth rate since it is not affected by the age structure of the population. For the purpose herein, under RFD scenario, TFR is assumed to decrease from 5.2 children per woman in 2007 to 2.1 children per woman in 2025 (replacement level fertility), and to 1.32 children per woman in 2100. Under SFD scenario, TFR is assumed to decrease from 4.4 in 2014 to 1.82 in 2100. Under CFD scenario, TFR of 4.4 children observed in 2014 is assumed to continue throughout the projection period for the purpose of benchmarking the two scenarios; hence this scenario is not used to set out the DWO for the country.

Considering the life expectancy totals of 54 years for male and 58 years for female by 2007, the assumptions utilized for projections increase to 71.2 and 75.9 years by 2045, and 76 and 80 years by 2100, for male and female respectively. On the other hand, net-zero international migration was assumed in the projections due to its small size and insignificant effect as well as to the lack of reliable migration data.

The value for LFPR for the year 2007 was interpolated from the value of the 2005 labour force survey (CSA, 2006), while the actual value was taken from the year 2013 (CSA, 2013). During the projection period, the LFPR of young people aged 10–14 is expected to decrease, as this group of the population is expected to engage full-time in schooling instead of continuing its involvement in productive activities. Based on this expectation, the LFPR of this group is assumed to decrease to 25% and 21% in 2045, and to 10% and 5% in 2100, under RFD and SFD scenarios respectively. The LFPR for male and female populations aged 15–64 years is assumed to increase to 87.3% and 75.8% in 2045, and to 92% and 85% in 2100, under the two scenarios respectively.

Ethiopia's favourable conditions in creating the Demographic Window of Opportunity

Establishing a clearer understanding of the circumstances influencing the timing and length of the DWO is vital. These include favourable demographic and socio-economic conditions as well as related indicators that help identify the year when Ethiopia enters the DWO. There is little doubt that Ethiopia will continue to possess one of the fastest growing populations in the world. The total size of the population has increased from approximately 40 million in 1984 to 73.9 million in 2007, an increase of 33.9 million people in just 30 years (Central Statistical Authority/Agency (CSA), 1991; 1999; 2010). The average growth rate of Ethiopia's population was 2.6% between 1994 and 2007 and 2.31% in 2013 (CSA, 2013). Assuming that the

population continues to grow by an annual average of 2.31% (one of the assumptions often made in population projections), the population will double every 30.01 years. As indicated earlier, this reaffirms the Population Reference Bureau's (PRB) projection that the country could become one of the demographic giants of the world by 2050 (PRB, 2004).

As mentioned elsewhere, the age structure of the Ethiopian population has been changing over time. For instance, the youth aged 0–14 constituting about 45% of the total population in 2007 is projected to decline to a 16% share by 2062 while the elderly accounting for 3% of the total population in 2007 is projected to increase to a 14% share by 2062, due in part to rapid fertility decline scenarios (CSA, 2010; Figure 5). It is notable that these changing proportions of the three age groups influence the periods when the DWOs open and close. Moreover, a declining trend in the percentage proportion of youth leads to a fall in the young age dependency ratio and the proportion of the elderly group that increases in size slowly leads to a steady rise in the old age dependency ratio. As a whole Ethiopia will continue recording a declining total dependency ratio creating not only favourable conditions for opening the DWO but also in increasing savings both at micro and macro levels (Admassie, 2015; United Nations, 2015; World Bank, 2007).

Ethiopia has been implementing family planning services for a long period of time and has experienced a meaningful change in contraceptive prevalence rate (CPR), which is the proportion of married women of reproductive age using contraception per 100 women of reproductive age. CPR increased from 4% in 1990 to 33.7% in 2014, a 29.7 percentage points rise in 24 years, as shown in Table 1.

Table 1 Trends in contraceptive prevalence rate and unmet need for family planning services, Ethiopia, 1991–2014

Indicators	Duration in Years				
	1991	2000	2005	2011	2014
Contraceptive prevalence rate	4	8.1	14.7	29	33.8
Unmet need for family planning	-	36	34	25.6	18.8

Source: CSA and ORC Macro (2001; 2006); CSA and ICF International (2012); and PMA2014/Ethiopia (2014)

However, there remains a significant unmet need for family planning services. According to MacQuarrie (2014) and Robey and Bhushan (1996), this neglected group includes all fecund women who are married or living in union and thus presumed to be sexually active but are not using any method of contraception, and who either do not want to have any more children (unmet need for limiting births), or want to postpone their next birth for at least two more years (unmet need for spacing births). The neglected group also includes all pregnant married women whose pregnancies are mistimed or unwanted. According to the 2011 Ethiopian Demographic and Health Survey (EDHS), the unmet need for contraception decreased to 25.6% in 2011 from its high level of 36% in 2000 (Table 1). Contraceptive prevalence which was achieved in a relatively short period of time directly contributed to a notable decline in fertility rates in Ethiopia (World Bank, 2007; Ramsay, 2014). According to Yared (2012), the average number of births averted per woman as a result of contraception (contribution to fertility decline), amounted to 1.68 per woman in 2011.

The infant mortality rate (IMR), though still one of the highest in the world, decreased from 77 per 1000 live births in 2005 to 59 in 2011; and the child mortality rate (CMR) decreased from 123 per 1000 live births in 2005 to 88 in 2011 (CSA and ORC Macro, 2001; 2006; CSA and ICF International, 2012). Such trends in the decreasing rate of the death of infants and children have apparent effects in reducing fertility, enhancing household welfare, improving the national economy, and contribute to the opening of the DWOs.

Results of EDHS conducted since 2000 revealed that the Ethiopian maternal mortality ratio (MMR), that had remained one of the highest in the world, had decreased slightly from 871 per 100,000 live births in 2000 to 673 in 2005, but increased to 676 in 2011 (CSA and ORC Macro, 2001; 2006; CSA and ICF International, 2012). This evidence implies that the Ethiopian health institutions and other stakeholders have made inadequate efforts and failed to improve maternal health. A later estimate, however, indicated better results: an MMR of 353 in 2015 (United Nations, 2015). Furthermore, life expectancy at birth increased from 57 years in 2005 to 62.2 years in 2013 (CSA, 2013). In conclusion, on the basis of the changing trends in selected demographic indicators, it can be argued that Ethiopia has favourable conditions that may lead to the opening up of the DWO.

Results

Projected periods of the demographic window of opportunities

In light of the preceding results of projections of the three age groups, the DWO in Ethiopia opens and closes during two periods of time based on the two fertility scenarios, RFD and SFD. Under the RFD scenario case, the DWO opens in 2028 and closes in 2062 (Figure 1). The DWO will open and close earlier taking a shorter period due mainly to the expected RFD scenario.

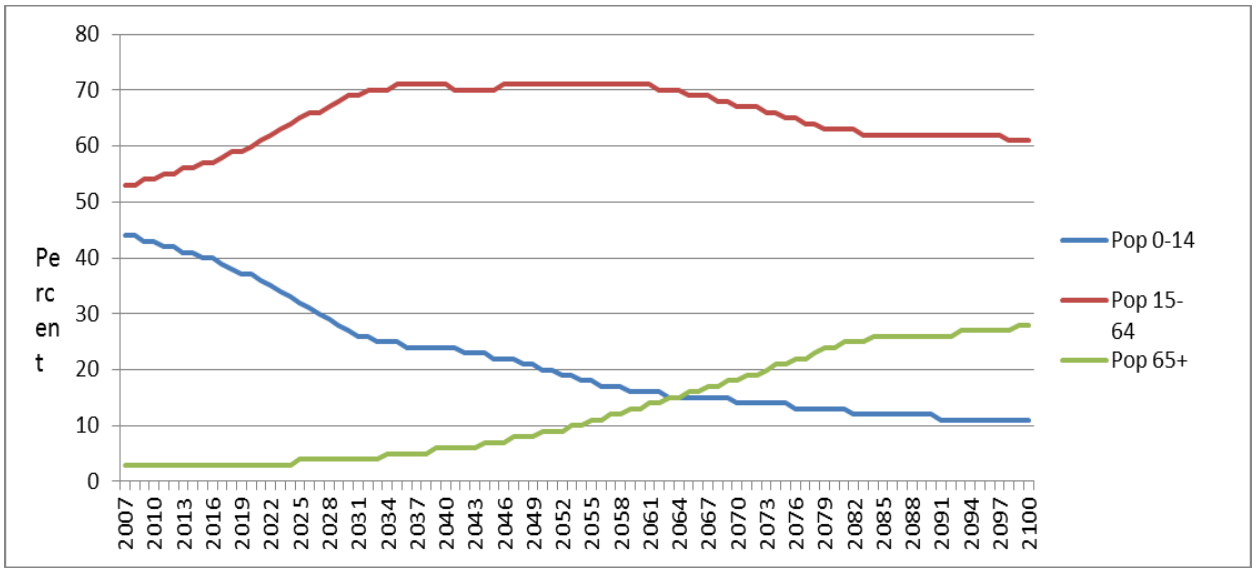


Figure 1: Population by the three broad age groups and period of the demographic window of opportunity (2028-2062) under RFD scenario, Ethiopia

Source: Projection Results.

Whilst under the SFD scenario case, the DWO opens in 2037 and closes in 2073 (Figure 2), which is a longer period of time compared to the RFD scenario.

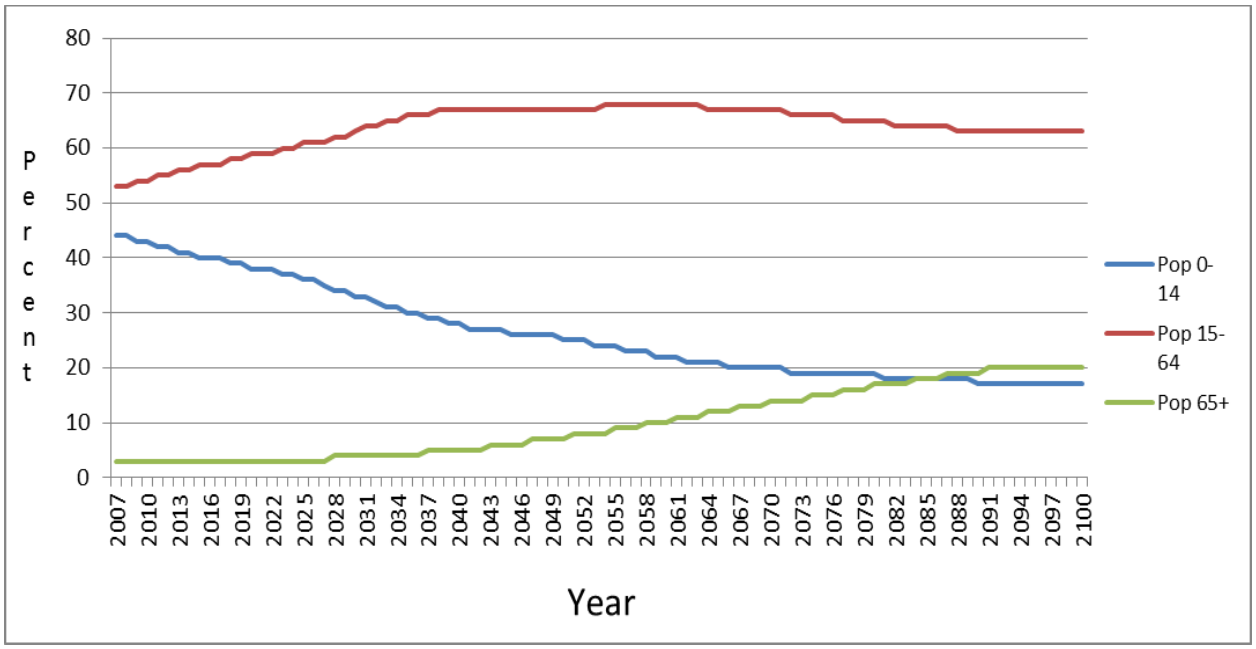
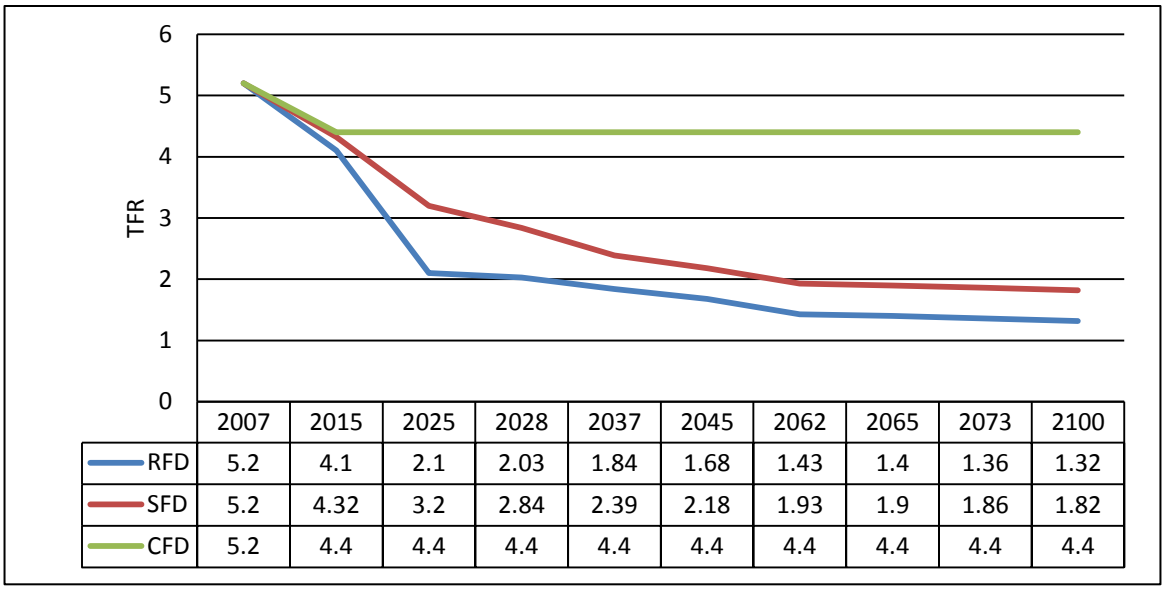


Figure 2: Population by the three broad age groups and period of the demographic window of opportunity (2037-2073) under SFD scenario, Ethiopia.
Source: Projection Results.

On the other hand, corresponding changes in TFR are also projected to show the relationships between the TFR and the periods of the DWOs, and in particular when the windows open and close (Figure 3).



	2007	2015	2025	2028	2037	2045	2062	2065	2073	2100
RFD	5.2	4.1	2.1	2.03	1.84	1.68	1.43	1.4	1.36	1.32
SFD	5.2	4.32	3.2	2.84	2.39	2.18	1.93	1.9	1.86	1.82
CFD	5.2	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4

Figure 3: **Projected total fertility rate, Ethiopia, 2007-2100**.
Source: Projection Results.

With a focus on the three broad age groups and selected years, including the opening and closing years of the DWOs under RFD and SFD scenarios, it appears the proportions of the three age

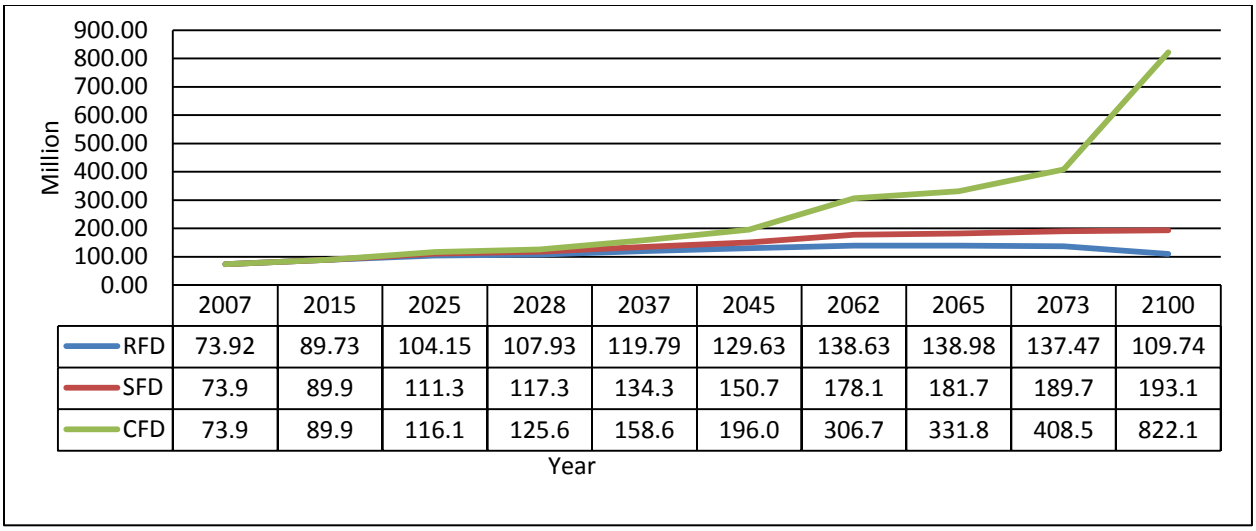
groups would change over time with a steady decrease in the proportion of the youth, an increase in the proportion of the elderly, and an initial increase followed by a decrease in the proportion of the working-age population under both scenarios. Table 2 shows the specific years when DWOs would open and close and the proportions of each age group during these years under the two fertility rate decline scenarios. For instance, the DWO will open and close when age group 0-14 constitutes 29% (2028) and 16% (2062) of the total population under RFD scenario, and will open and close when it reaches 29% (2037) and 20% (2073) of the total population under SFD scenario. Similar explanations hold true for the remaining two age groups (see bold figures in Table 2).

Table 2 Proportions of the three broad age groups during the two fertility scenarios for selected years and durations when windows open and close, Ethiopia

	Broad age groups as percentage of the total population						
	RFD				**SFD**		
Year	0 –14	15–64	65+	Year	0–14	15–64	65+
2007	5	53	3	2007	44	53	3
2015	40	57	3	2015	40	57	3
2025	32	65	3	2025	36	61	3
2027	30	66	4	2036	30	66	4
2028	**29**	**67**	**4**	**2037**	**29**	**66**	**5**
2029	28	68	4	2038	28	67	5
2045	22	71	7	2045	27	67	6
2061	16	71	13	2065	21	67	12
2062	**16**	**70**	**14**	2072	20	66	14
2063	15	70	15	**2073**	**20**	**66**	**14**
2065	15	69	16	2074	19	66	15
2075	14	65	21	2075	19	66	15
2100	11	61	28	2100	17	63	20

Source: Projection Results

Under the RFD scenario, projection results show that the 2007 baseline population of 73.9 million will increase to 107.9 million in 2028 and to 138.6 million in 2062, and will decrease to 109.74 million by 2100. Compared to SFD and CFD scenarios, the total population under the RFD scenario will be lower by 9.4 and 17.7 million in 2028, and 39.5 and 168.07 million in 2062. Differences in the size of the projected total population are more pronounced when comparing SFD to CFD scenarios than when comparing RFD and SFD scenarios (Figure 4).



	2007	2015	2025	2028	2037	2045	2062	2065	2073	2100
RFD	73.92	89.73	104.15	107.93	119.79	129.63	138.63	138.98	137.47	109.74
SFD	73.9	89.9	111.3	117.3	134.3	150.7	178.1	181.7	189.7	193.1
CFD	73.9	89.9	116.1	125.6	158.6	196.0	306.7	331.8	408.5	822.1

Figure 4: Total population under three fertility decline scenarios, Ethiopia, 2007-2100. Source: Projected Results.

The growth rate of the Ethiopian population is projected to decrease from 2.6% in 2007 to 0.15% in 2062 under the RFD scenario, and to as low as -0.3% in 2073 under the SFD scenario (Table 3), which creates significant changes in the age structures of the population.

Table 3 Projected population growth rates (%) under three fertility decline scenarios, Ethiopia, 2007-2100

Year	Fertility Scenarios		
	RFD	SFD	CFD
2007	2.62	2.62	2.62
2015	2.12	2.26	2.34
2025	1.18	1.86	2.60
2028	1.18	1.66	2.59
2037	0.13	1.47	2.57
2045	0.79	1.33	2.60
2062	0.15	0.71	2.59
2065	0.05	0.65	2.58
2073	-0.30	0.44	2.56
2100	-1.17	-0.20	2.55

Source: Projection Results.

Changing age structures are important in creating the DWO and in determining the length of time the DWO will stay open. These structures are also useful in indicating the eventual emergence of the domination of the ageing group of the population that probably begins from the last quarter of the projection period. In most cases the ageing group is a dependent population whose means of subsistence is generated either from the diminishing working-age population or from pension schemes that may be established in response to the ageing phenomenon. In both cases, the changing age structures may create pressure on social life and economic development unless appropriate support mechanisms are put in place.

As shown in Figure 1, Ethiopia's DWO under the RFD scenario will remain open for 34 years (2028 – 2062), and this indicates that less than 10 years remain until the opportunity is presented. The DWO under the SFD scenario will remain open for 36 years (2037–2073) in which case the country has 18years remaining to take advantage of the situation (Figure 2). There is a difference of 9 years (2037-2028) in opening and 11 years (2073-2062) in closing the DWO between the RFD and SFD scenarios.

As noted, the proportions of the population in the three broad age groups that could lead to the creation of the DWO under the two fertility rate decline scenarios are shown on population pyramids, which also show the subsequent time durations when the windows will open and close. In the case of RFD scenario already mentioned (Figures 5), the DWO opens in 2028 and closes in 2062. The proportions of the three age groups will change as a result of a decline in fertility and subsequent shifts in the age structure of the population. The proportions of the 0-14 age group decline from 29% in 2028 to 16% in 2062 of the total population while the proportions of age groups 15-64 and 65+ increase from 67% and 4% in 2028 to 70% and 14% in 2062 of the total population, respectively. These changes in the age structure of the population are understood and expected.

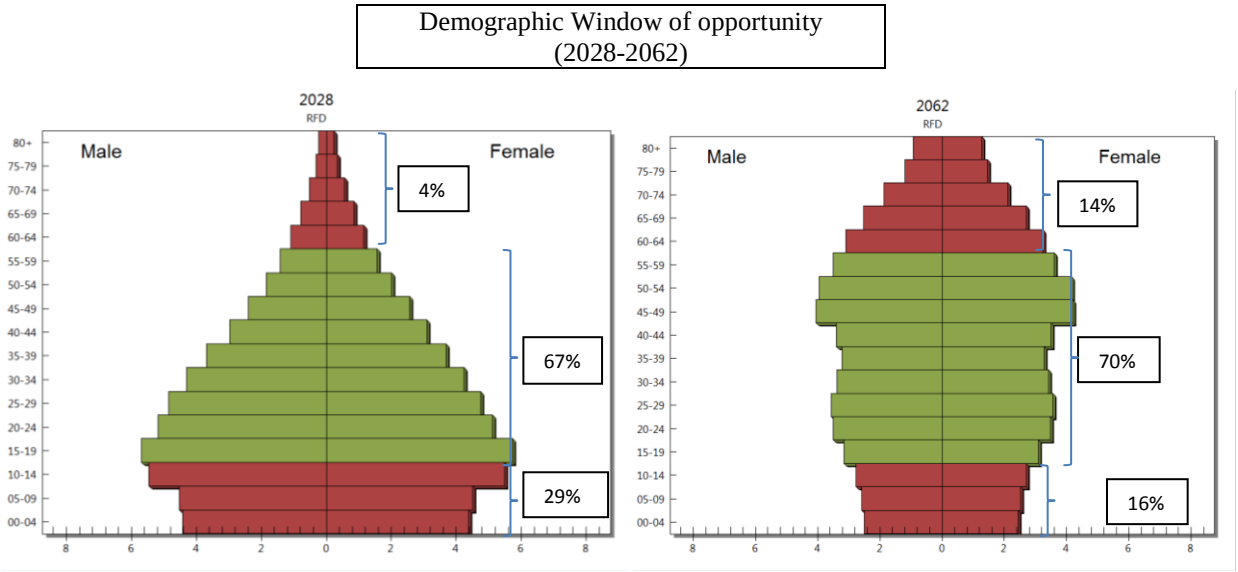


Figure 5: Proportion of the three broad age groups when the demographic window of opportunity opens and closes (2028 and 2062) under RFD scenario, Ethiopia
Source: Based on the 2007 Census Data and Assumptions about RFD scenario.

With regard to the SFD scenario, the population pyramid (Figure 6) depicts changes in the proportions of the age structure of the population which is similar to the case of the SFD scenario and the differences are seen only in the magnitudes of the age groups. However, since a decline in fertility rates is slower in this scenario, the DWO opens (2037) and closes (2073) later than in the case of RFD scenario.

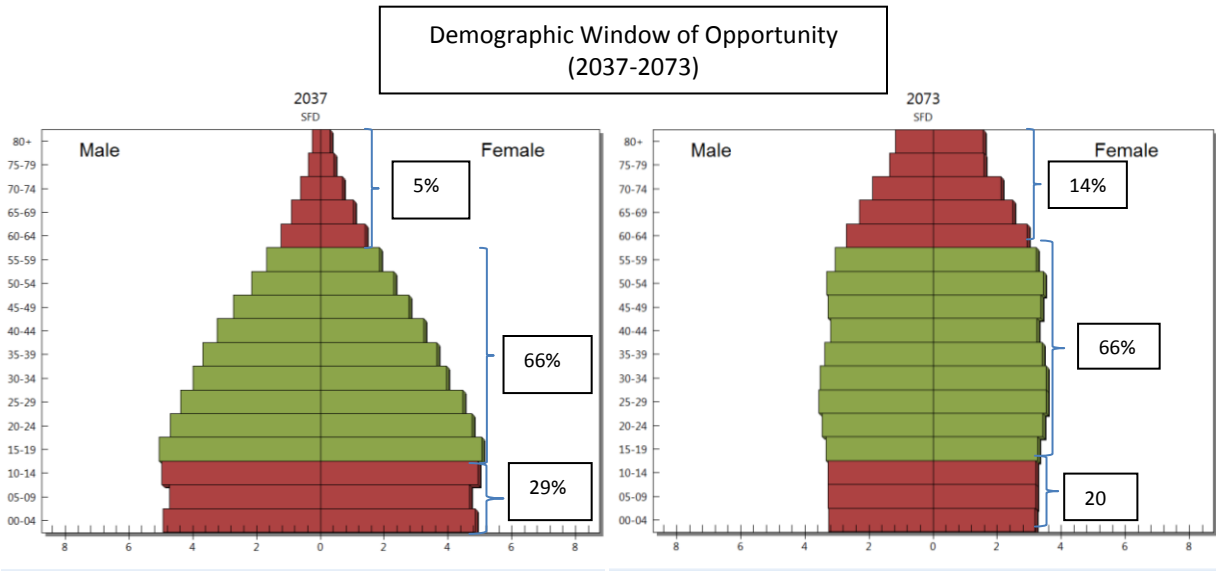


Figure 6: Proportion of the three broad age groups when the demographic window of opportunity opens and closes (2037 and 2073) under SFD scenario, Ethiopia.
Source: 2007 Census Data and Assumptions about SFD scenario.

The working-age group of the population by the year 2028 (when the window opens) and 2062 (when the window closes) under the RFD scenario will constitute 67% and 70% of the total population (Figure 5) respectively with total age dependency ratios of 0.49 in 2028 and 0.43 in 2062. The ratio for the year 2037 (when the window opens) and 2073 (when the window closes) under the SFD scenario (Figure 6) will remain as 0.52 during both years. Such a low ratio signifies a great achievement as compared to the ratio of 0.92 on the baseline population of the 2007 census. In practical terms, the lower the dependency ratio, the higher the working-age the population (aged 15-64) that can engage in economic activities and produce material goods and services for the country. If this expectation is met, the expanded population becomes an economic asset.

Discussions

The opening time of the DWO is determined by the proportion of the young (0–14) group of the population, which must be less than 30% of the total population, whereas the closing time of the DWO is established by the proportion of the elderly that must remain below 15% of the total population in combination with the proportion of the working-age population that should be more than 60% of the total population. Changes in the proportions of each age group are triggered by a reduction in the level of fertility rates that often results from the expansion of and increased access to family planning services. Fertility rates can also be reduced by development processes that improve the status of women and the working and living conditions of households and communities as a whole. In this context, the unmet need for family planning services that persists among mothers residing in underserved and remote areas of the country, where fertility rates remains high, requires particular focus to create awareness about the consequences of unwanted and unplanned pregnancies, and large numbers of children, to household health and welfare.

Hence, family planning services and their institutional basis need improvement in order to deliver effectively the necessary services aimed at fertility rate decline to the level required to

create the DWOs as early as possible. Other institutions directly and indirectly contributing to a fall in fertility rates should be encouraged to intensify their activities. Nevertheless, one needs to be cautioned that low fertility rates may unfavourably affect DD in the future (Ha and Lee 2016); additionally, due to the varying levels of fertility rates experienced by different areas, DD may not be actualized at the same time throughout a country (Abrigo et al., 2016). Moreover, although a fall in fertility rates is the initial step to change the proportions of the three age groups of the population and then open the DWO, it is not a sufficient condition to achieve the expected development benefits simply because DD is neither automatic nor easy to realize (Gichuhi and Nasiyo, 2016; UNFPA, 2015; Bloom et al., 2011).

It can be inferred from the above conditions that there are necessary preparatory works that Ethiopia needs to carry out in order to open the DWO and harness the DD (Bloom et al., 2016; Megquier and Belohlav, 2014; Rath and Behera, 2014; Chandrasekhar et al., 2006). This necessary preparatory work would also help avoid the possible liability that could occur when the disproportionately large number of young people becomes restive as a result of a shortage of better opportunities. A major part of the preparatory work relate to the expansion and strengthening of educational/training institutions, health services and employment. This is because educational/training institutions and health services play critical roles in the creation of human capital, while employment involves the created human capital in the production of economic wealth. If Ethiopia fails to carry out the preparatory work proactively it may unfortunately partly or fully miss the DWO, as was the case with Brazil (Queiroz and Turra, 2010), a situation which may reverse the opportunty of being an economic asset into a liability (Canning et al., 2015; Urdal, 2006; 2004; 2002; Jalal and RezwanaKarim, 2016).

Another important part of the necessary preparatory work to be established in order to avoid liability concerns is to strengthen the appropriate population institutions and related policies which were weakened during the last two or three decades. A notable weakness in this regard concerns the status of the National Office of Population, which was established following the promulgation of the National Population Policy of Ethiopia in 1993, and which has continually been reduced over time and is presently subordinated to the National Planning Commission of Ethiopia under the name of Population and Development Directorate (PDD). The structure and human and financial resources of the PDD seem to have constrained its role as a national population and development institution, which is partly related to a lack of strong leadership - that being one primary objective expected from the Population Council. This is because the Population Council - the highest organ of the Population Policy was planned to constitute major relevant ministries, organizations and government authorities under the chairmanship of the Prime Minister - has not been established despite being determined as necessary in the population policy document (Getachew, 2008; Transitional Government of Ethiopia, 1993). The Council was expected to make the then National Office of Population and the current Population and Development Directorate of the National Planning Commission of the country visible at the national arena, to spearhead and facilitate the implementation of the National Population Policy (Transitional Government of Ethiopia, 1993). Thus, the Population Council must be established as part of the necessary preparatory work for DWO. Additionally, a revision of the Population Policy of 1993 and strengthening of regional Population Offices that remain underdeveloped as a result of the weakness of the national level population and development institutions are required in light of the emerging population dynamics and related quest for development (Getachew, 2008), particularly in order to create DWO. Furthermore, Ethiopia needs to dispel the hitherto held negative perception by some government authorities

that a large population is a liability. As the experiences of the Asian Tigers noted elsewhere amply demonstrate, large population presents opportunities for wealth generation and these opportunities should be seized by an early focus on the necessary preparatory works.

In addition, there is a serious concern related to the present heavy child/youth (age 0-14) dependence on the small adult (age 15-64) population in Ethiopia. Obviously, the former demands enormous resources for its development and as a result there will be a net resource overflow to young people which reduces the capacity of the smaller adult (age 15-64) population to make savings and investments meant for economic growth and development. This will remain a looming concern for Ethiopia until the size of the burgeoning youth population shrinks and gives way to the working-age population which enables the country to begin benefiting from its changing age-structure. In this context there are related developments that require attention. One example is the need for well programmed family planning services and hence a reduction in fertility rates that usually play a significant role in changing the age structure of the population. The latter is a fundamental foundation in increasing the proportion of the working age population (15-64), which when supported by relevant education and skill creation becomes crucial in expanding the economy. It is an increase in the size of this 'vibrant' 15-64 age group and its engagement in the economy that makes a proportionally large population an economic asset. This is simply because age group 15-64 is a prime producer, distributer and consumer of the material goods and services that in unison drive the economy in the right direction. Thus, whether the population is an asset or not depends on the size of the working age group, its knowledge and skills.

Conclusion

Through population projections this article has established two periods of DWOs for Ethiopa: 2028–2062 under the RFD scenario and 2037–2073 under the SFD scenario. The rapid decline in fertility rates and the subsequent changes in the emerging age structure of the population are important milestones in the creation of the DWO. In order to make this early creation of the DWOs possible there needs to be a significant reduction of infant and child mortality. Similarly, continual efforts should be made to empower, educate and employ the youth and women groups of the population whose roles in creating the DWO and generating the demographic dividend are vital. Population projection suggests that Ethiopia has less than 10 years to create and enter the DWO and possibly begin obtaining the DD under the RFD scenario, which is of urgent concern because DWO opens and closes in a given period and never returns.

The key sub-population that determines the opening and closing times of DWOs is the age group 15–64 that continually increases in number as a manifestation of the demographic transition in which Ethiopia is undergoing. Moreover, results of population projection show that a rapid decline in fertility rates lead to the early opening and closing of the DWO. This justifies the importance of family planning services in the country to speed up the process of age structure changes.

As stated earlier, changes in the age structure of the population create a demographic phenomenon that leads to a decline in the young age dependency ratio that in turn reduces expenditure for education and health, thereby increasing savings both at household (micro) and national (macro) levels. This phenomenon reveals an interesting period of time in which population matters positively for Ethiopia's future economic growth and development. Nonetheless, it requires serious work both to reduce fertility rates to the required level to enter the DWO, and then proactively to prepare and empower the economically active age group (15–

64) of the population with the necessary knowledge, skills and temperament that could enhance their employability and allow the country to harness DD. In this regard, Ethiopia's engagement in formulating and effectively implementing relevant policies and strategies is not a matter of choice but of necessity in order to profit from a one-time DWO. It is under this demanding situation that an expanded population, and in particular the economically active age group - a potential resource – could be translated into realizable economic asset.

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