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## **Realizing the Demographic Dividend: Is Africa any different?<sup>1</sup>**

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### **Abstract**

The demographic transition creates a window of opportunity during which economies may benefit from a temporary increase in the working age share of the population. While many economies have already enjoyed these benefits, they remain a promising opportunity for much of Sub-Saharan Africa. We show in this paper that Sub-Saharan Africa adheres to the same principles as the rest of the world with respect to the determinants of economic growth, including particularly the effects of demographic change. Assuming a policy and institutional context that is conducive to economic growth, most Sub-Saharan countries have the potential to reap a sizable demographic dividend.

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## **Introduction**

Because people's economic behavior varies at different stages of life, changes in a country's age structure can have significant effects on its economic performance. Nations with a high proportion of children are likely to devote a high proportion of resources to their care, which tends to depress the pace of economic growth. The effects are similar if a large share of resources is needed by a relatively less productive segment of the elderly. By contrast, if most of a nation's population falls within the working ages output per capita will be high all other factors being equal.

As countries move through the demographic transition from a high fertility and high mortality to a low fertility and low mortality equilibrium, the size of the working age population mechanically increases. This can create virtuous cycles of economic growth commonly referred to as the "demographic dividend". Bloom, Canning and Sevilla (2003) explore this concept of the demographic dividend in detail and compare the variation in the age distribution across countries and regions.

Less developed countries have a large proportion of their population in the younger age groups as fertility rates are high and life expectancy is low. More developed countries have lower fertility rates and higher life expectancy and thus a large proportion of their population is at higher ages. Lee (2003) and Weil (1999) examine the projected demographic transition and the effect of this transition on economic outcomes respectively. While most regions around the world are evolving through the demographic transition Africa stands as an outlier. Fertility rates are high and falling only slightly and life expectancy is actually falling in some countries due to the impact of HIV/AIDS. Given these trends Bongaarts and Bulatao

(1999) have argued that Sub-Saharan African countries are not likely to earn the demographic dividend. We draw a more differential picture for Sub-Saharan Africa, and present a positive outlook for those countries with the right set of institutions in place.

The goal of this paper is to test whether the determinants of growth in general, and the effects of demography in particular, are different in Africa than for the rest of the world. We show that most Sub-Saharan countries have the potential to reap the benefits of the demographic dividend, but that solid institutional settings will be imperative for its realization. Lee, Lee and Mason (2006) along with Bloom *et al.* (2003) acknowledge the ineffectiveness of the demographic transition in realizing the demographic dividend when quality institutions are not in place. We refer to institutions as a general term to include rule of law, efficiency of the bureaucracy, corruption, political freedom and expropriation risk, openness (political system, trade barriers, black market premium), freedom of political representation and freedom of speech. Despite this list of measures that we capture in the institutions measure, a broader measure would include infrastructure (health care systems, schooling, roads, transport), and a formal labor market with unions and laws protecting both employees and employers.

Without the right policy environment, countries will be too slow to adapt to their changing age structure and, at best, will miss an opportunity to secure high growth. At worst, where an increase in the working-age population is not matched by increased job opportunities, they will face costly penalties, such as rising unemployment and perhaps also higher crime rates and political instability. With no policies in place to provide for rising numbers of old people, many will face destitution in their final years. Having a larger, healthier and better-educated workforce will only bear economic fruit if the extra workers

can find jobs. Solid institutions that can gain the confidence of the population and markets alike may help countries to reap the potential benefit created by their demographic transition.

Poor rule of law discourages investment as contracts are not reliably enforceable. Corruption and inefficient bureaucracy create difficulties and uncertainties in establishing enterprise or gaining and maintaining employment. The lack of political freedom and high expropriation risk lead to short sighted behavior and undermine long term investment. Thus, a poor institutional environment critically affects the potential gains from the demographic transition.

A healthy degree of flexibility in labor markets is also vital if a country is to accommodate a burgeoning working-age population. Flexibility means that employers are able to rapidly expand and contract their businesses, to shift workers from one area of the business to another, and to raise and lower pay more easily. Flexibility also means a workforce that is able to adapt its working patterns as the business environment shifts. Flexibility can be difficult to sell to a workforce, as employers are commonly thought to reap the benefits while employees bear the costs. However, the provision of adequate safety nets and generous re-training programs can help persuade workers to become less risk-averse. Although recent history shows that designing and implementing effective programs along these lines is a challenging task in low- and middle-income countries, the incentives for proceeding in this direction are substantial. Many wealthy industrial countries have successful programs that provide a good starting point for thinking both conventionally and imaginatively along these lines.

Comparing key economic and demographic statistics of the Sub-Saharan African countries to the rest of the world (ROW) highlights the particularity of the region. Given these structural differences, it is not clear whether the African countries follow the global growth dynamics. Sachs and Warner (1997) find that the determinants of economic growth in Africa are no different from those for the rest of the world. Moreover, they find that the lack of openness and poor economic policies are at the root of Africa's dismal economic performance within the 1965-1990 sample period they use. Since the publication of the Sachs and Warner (1997) article, many African countries, such as in Mali, South Africa, Niger, Mozambique, Cameroon, Madagascar, and Uganda, have improved their institutional quality, and fertility rates in many African countries have begun to fall, potentially initiating the demographic transition.

However, despite some recent decreases, fertility rates in many African countries remain high relative to the rest of the world. There are various reasons for high fertility. With limited financial infrastructure in rural areas offering little incentive or means to save, children are still viewed as insurance against old age. They are also a key source of labor. Furthermore, and despite medical advances, infectious disease is still widespread, particularly in rural areas, so cultural norms and policies encouraging high fertility in order to achieve desired family sizes (such as child fosterage, polygyny and the distribution of land according to family size) are changing only slowly.

In the last 40 years Africa has faced a series of prolonged and debilitating wars. Wars not only kill and injure soldiers and civilians alike; they also destroy infrastructure and social structures, thus destroying the foundation on which the demographic transition can be of benefit to the economy.

Another aspect of the problems facing Sub-Saharan Africa is the prevalence and virulence of infectious diseases. Despite some impressive health gains over the last century, malaria, HIV/AIDS, and TB are just three of the big killers that are not yet successfully controlled. Malaria and HIV alone currently account for 3-4 million of Sub-Saharan Africa's roughly 10 million annual deaths. HIV is particularly prevalent in Sub-Saharan Africa, where many countries have ten or more people living with HIV for each person who has already died from the disease. Between 1985 and 1995, more than 4 million Sub-Saharan Africans died of AIDS. By 2005 it was estimated that fifteen million more deaths had occurred, with 70% of the world's new infections and 80% of AIDS deaths in Sub-Saharan Africa.

Furthermore, in addition to children and the elderly as dependents, many will be suffering the ravages of HIV in adulthood. Heterosexual sex is the dominant means of transmission, and the majority of people dying of AIDS are between 20 and 59 years of age. In other words, it is a disease that particularly hits those who should be economically productive, and threatens not only health, but also the economic stability and potential of a country.

Despite the long list of challenges to be faced, our outlook on economic growth in Sub-Saharan countries over the next 20 years is rather positive. Given our past estimates of economic growth, current institutional settings and demographers' population forecasts, we argue that Ghana, Ivory Coast, Malawi, Mozambique, and Namibia have a very high potential to profit from the demographic dividend over the next 20 years. Our growth outlook is also very positive for South Africa and Botswana as current regional leaders in terms of

their institutional quality, even though their prospects for profiting from a demographic dividend over the next two decades are rather small.

Senegal, Cameroon, Tanzania, Togo and Nigeria are projected to have very strong growth of the share of the working age population, but still suffer from institutional deficiencies. Given the importance of institutional quality as a catalyst for converting growth of the working age share into a demographic dividend, it is hard to tell the degree to which these countries will be able to gain from the demographic dividend.

In the section that follows we explain the model and data used to identify whether the determinants of economic growth are different in Sub-Saharan Africa compared to the rest of the world. Then we decipher the role of institutions coupled with the demographic transition that can lead to a realization of the demographic dividend. We then use projections of the growth of the working age share to identify which countries stand to benefit from the demographic dividend. In the last section of the paper we discuss the results and provide conclusions.

### **Model, Data and Empirical Results**

Our empirical strategy consists of three parts. In the first part of the empirical section, we estimate the basic relation between demography and economic growth. Denoting income by  $Y$  and the total population by  $P$  we can express output per capita as

$$\frac{Y}{P} = \frac{Y}{WA} \frac{WA}{P} \tag{0.1}$$

where  $WA$  is the number of working age people. Taking logs



$$y = \log \frac{Y}{P}, z = \log \frac{Y}{WA}, w = \log \frac{WA}{P} \quad (0.2)$$

we can express the steady state level of income per capita as

$$y^* = z^* + w = \beta x + w, \quad (0.3)$$

where  $x$  is the matrix containing the variables determining steady state income per working age person. Following Barro and Sala-i-Martin (2003) economic growth occurs as each country converges from its initial position to its steady state. In our case, this is conditional on the variables  $x$  and  $w$ , so that growth in every period is given by:

$$\Delta y = \lambda(y^* - y_{-1}) = \lambda(\beta x + w - y_{-1}) \quad (0.4)$$

The steady state determines the end of period equilibrium of the economy and can change during the growth period considered. Let us suppose that we can write a structural model as:

$$x = \alpha_1 x_{-1} + \alpha_2 w + \alpha_3 y, w = \gamma_1 x + \gamma_2 w_{-1} + \gamma_3 y \quad (0.5)$$

Then we can derive the reduced form

$$\Delta y = \lambda(y^* - y_{-1}) = \delta_1 x_{-1} + \delta_2 w_{-1} + \delta_3 y_{-1} \quad (0.6)$$

where the reduced form coefficients  $\delta$  are combinations of the structural coefficients from equations (0.7) and (0.8). Taking five year growth rates as our dependent variable we first estimate a standard growth model as described in equation (0.9) for the full sample of countries. In a second step, we divide our sample into Sub-Saharan and non Sub-Saharan countries, and test whether there are significant differences in the estimated coefficients.

In the second part of the empirical section, we use the estimated coefficients in combination with population forecasts from the United Nations to gauge the magnitude of the demographic dividend in Sub-Saharan countries over the coming 20 years.

## **The Data**

We use a five year panel covering the years 1960 to 2000. We limit our data set to those countries where all explanatory variables are available, which leaves us with a sample of 85 countries, out of which 19 are located in the Sub-Saharan zone<sup>2</sup>. We then use our estimates for out-of-sample economic growth projections using an extended set of countries.

Data on national income are from the Penn World Tables mark 6.2, data on working age share from the United Nations' World Population Prospects 2004. We add additional variables from different data sources: schooling data are from Barro and Lee (2000), life expectancy from the World Development Indicators (World Bank 2006), ethnic fractionalization data from Alesina, Devleeschauwer, Kurlat and Wacziarg (2003), and institutional quality data from Knack and Keefer (1995), Sachs and Warner (1997), Wacziarg and Welsh (2003) and the World Bank (2007)

In Table 1, we provide separate descriptive statistics for Sub-Saharan countries and the rest of our sample (which we refer to as rest of the world or ROW). Pronounced differences are visible across all dimensions.

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<sup>2</sup> For a full list of countries, please see appendix.

The average income per capita in Sub-Saharan countries over the sample period was US\$ 1,850, and the average annual growth rate a bleak 0.5% per year. Comparing this to the average income of US\$ 9,393 and an average growth rate of 2.3% for the rest of the world<sup>3</sup> portrays a rather bleak picture of the average Sub-Saharan economic development over the last decades. The differences between Sub-Saharan countries and the rest of our sample are visible across all explanatory variables typically applied in growth regressions: on average, Sub-Saharan countries display significantly lower levels of schooling and life expectancy, have poorer institutions, higher degrees of ethnic fractionalization, a lower degree of openness, and have a higher chance of being land-locked and in a tropical zone than the average non Sub-Saharan country in our sample.

**Table 1: Descriptive Statistics Sub-Samples**

| Variable                             | Sub-Saharan Countries |       |           | Non-Sub-Saharan Countries |       |          |
|--------------------------------------|-----------------------|-------|-----------|---------------------------|-------|----------|
|                                      | Obs.                  | Mean  | Std. Dev. | Obs.                      | Mean  | Std. Dev |
| Year                                 | 124                   | 1985  | 10.6      | 486                       | 1983  | 11.2     |
| GDP per capita                       | 124                   | 1850  | 1760      | 486                       | 9393  | 7348     |
| 5 year growth in GDP per capita      | 124                   | .026  | .229      | 486                       | .116  | .136     |
| Openness                             | 124                   | .209  | .409      | 486                       | .591  | .492     |
| Institutions                         | 124                   | 19.47 | 4.60      | 486                       | 26.25 | 7.62     |
| Ethnic Fractionalization             | 124                   | .728  | .141      | 486                       | .336  | .224     |
| Landlocked                           | 124                   | .395  | .491      | 486                       | .078  | .269     |
| Tropical                             | 124                   | .916  | .242      | 486                       | .388  | .460     |
| Average years of schooling           | 124                   | 2.29  | 1.55      | 486                       | 5.72  | 2.76     |
| Life expectancy                      | 124                   | 48.74 | 7.15      | 486                       | 68.41 | 7.91     |
| Working Age Share                    | 124                   | 51.63 | 2.71      | 486                       | 59.67 | 6.14     |
| Growth in Working Age share (5 year) | 124                   | .001  | .019      | 486                       | .014  | .024     |

<sup>3</sup> Note that the economic growth figures are five year averages.

Most importantly for the purpose of this paper, the average working age share of the total population is 8 percentage points lower in Sub-Saharan countries than in the rest of the world, with the average growth rate of the being close to zero over the sample period.

### **Part I: Estimating the Demographic Dividend**

We start by estimating the basic growth model outlined in section 2. To capture different steady states across countries, we introduce an extended set of control variables, including, institutional quality, ethnic fractionalization, schooling, life expectancy and two dummy variables that indicate whether a country lies in a tropical zone and is landlocked. The main variables of interest are the log of the size of the working age population (WAS) as well as its growth.

The main results are summarized in Table 2 below. In column 1, we estimate our basic model with OLS. Out of the set of control variables our measures of institutional quality, life expectancy and ethnic fractionalization appear to have the most significant effect on growth. The lagged level of income enters with a negative and highly significant coefficient, consistent with our basic convergence assumption. As to the demographic variables, our results strongly confirm our priors: both the level of the working age share and its growth enter the growth equation with a positive and highly significant sign.

The negative and non-significant effect of schooling is orthogonal to our prior. We try alternative specifications where we interact the schooling variable with institutional

quality and growth of the working age share — without different results. One possible explanation for the insignificance of schooling in our empirical work may be measurement error in the schooling data. Another explanation may lie in the high degree of collinearity in the data; the correlation between initial income, initial life expectancy and institutional quality are all larger than 0.75.

To control for the interdependence of the growth in working age share and economic growth, we use instrument for the growth in working age share in columns 2 and 3 of the Table. The instrument we use is lagged growth in WAS, which works well as a predictor of WAS growth due to the slow moving character of the variable, and can be considered predetermined in the main equation. As shown in column 2 of Table 2, the IV estimates on the growth in working age share are significantly larger than the ones obtained by OLS. This could reflect measurement error, or may be interpreted as evidence for a negative causal effect from economic growth to the growth in WAS.

In column 3, we test whether the positive growth effects of the demographic dividend are conditional on the institutional quality of a country as suggested by Bloom and Canning (2003); our results strongly confirm this hypothesis. Interacting the growth in working age population with institutional quality, we find the interaction term to have a positive and highly significant effect, while the growth in working age share itself is no longer significant. This is an important result, as it implies that only countries featuring high institutional quality are able to receive a demographic dividend. The estimated size of the institutional effect on growth is large. Taking a non Sub-Saharan country with an average growth of working age population (0.014), a two standard deviation increase in institutional quality (15.2) increases economic growth by about 2% per year. Three quarters of this effect is due to the direct effect

of institutions on growth; one quarter, or half a percent growth per year, is due to the interaction of institutions with the growth in the working age share.

Given the strong differences between Sub-Sahara and ROW, one may question the applicability of this basic result to the Sub-Saharan region, and argue that Sub-Saharan countries follow different patterns. To test this hypothesis, we separately estimate the model specified in column 3 for the two sub samples, and test whether the estimated coefficients differ significantly between the two sub samples. We perform both Wald tests for each single coefficient being the same across sample, and a Chow test for all coefficients being the same across the two samples. The results of this test are displayed in the last column of Table 2. According to our analysis, the coefficient on initial GDP per capita is the only one significantly different across samples. The absolute value of the coefficient on initial GDP is higher in Sub-Saharan Africa than the rest of the world, implying more rapid income convergence in this region. For all other variables, the null hypothesis of equal coefficient can not be rejected at standard confidence intervals.

**Table 2: Economic Growth and the Demographic Dividend**

| <b>Dependent Variable: 5 Year Economic Growth Rate</b> |                     |                     |                     |                         |
|--|---------------------|---------------------|---------------------|-------------------------|
|  | (1)                 | (2)                 | (3)                 | Wald Test <sup>1)</sup> |
| Openness   | 0.036**<br>(2.37)   | 0.026<br>(1.52)     | 0.018<br>(1.00)     | 1.43<br>(0.23)          |
| Institutions   | 0.006***<br>(3.36)  | 0.007***<br>(3.38)  | 0.005***<br>(2.61)  | 0.02<br>(0.88)          |
| Ethnic Fractionalization                               | -0.064***<br>(2.64) | -0.068***<br>(2.66) | -0.080***<br>(3.02) | 1.55<br>(0.21)          |
| Land Locked Country                                    | 0.005<br>(0.28)     | 0.016<br>(0.88)     | 0.013<br>(0.72)     | 0.66<br>(0.42)          |
| Tropical Country                                       | -0.007<br>(0.37)    | -0.006<br>(0.28)    | -0.005<br>(0.28)    | 2.38<br>(0.12)          |
| Avg. Years of Schooling                                | -0.007<br>(1.61)    | -0.007<br>(1.57)    | -0.008<br>(1.62)    | 0.05<br>(0.82)          |
| Life Expectancy  | 0.007***<br>(4.82)  | 0.006***<br>(3.79)  | 0.007***<br>(4.00)  | 2.00<br>(0.16)          |
| Initial GDP  | -0.117***<br>(5.29) | -0.128***<br>(5.44) | -0.130***<br>(5.51) | 3.21*<br>(0.07)         |
| Log(Working Age Share)                                 | 0.378***<br>(3.59)  | 0.540***<br>(4.64)  | 0.505***<br>(4.23)  | 0.19<br>(0.67)          |
| Growth in WAS  | 0.804***<br>(2.94)  | 1.538***<br>(3.20)  | -2.002<br>(1.02)    | 0.43<br>(0.51)          |
| Growth in WAS *Institutions                            |                     |                     | 0.139**<br>(1.98)   | 0.40<br>(0.53)          |
| Constant   | -0.919**<br>(2.30)  | -1.437***<br>(3.30) | -1.299***<br>(2.88) | 0.00<br>(0.96)          |
| Time Fixed Effects                                     | Yes                 | Yes                 | Yes                 | Chow Test:              |
| Country Fixed Effects                                  | No                  | No                  | No                  | 49.85***                |
| Estimation   | OLS                 | 2SLS                | 2SLS                | (0.00)                  |
| Sample   | Full Sample         | Full Sample         | Full Sample         | Full Sample             |
| Observations   | 610                 | 554                 | 554                 | 554                     |
| R-squared  | 0.32                | 0.37                | 0.37                | 0.37                    |

**Notes:**

Robust t statistics in parentheses

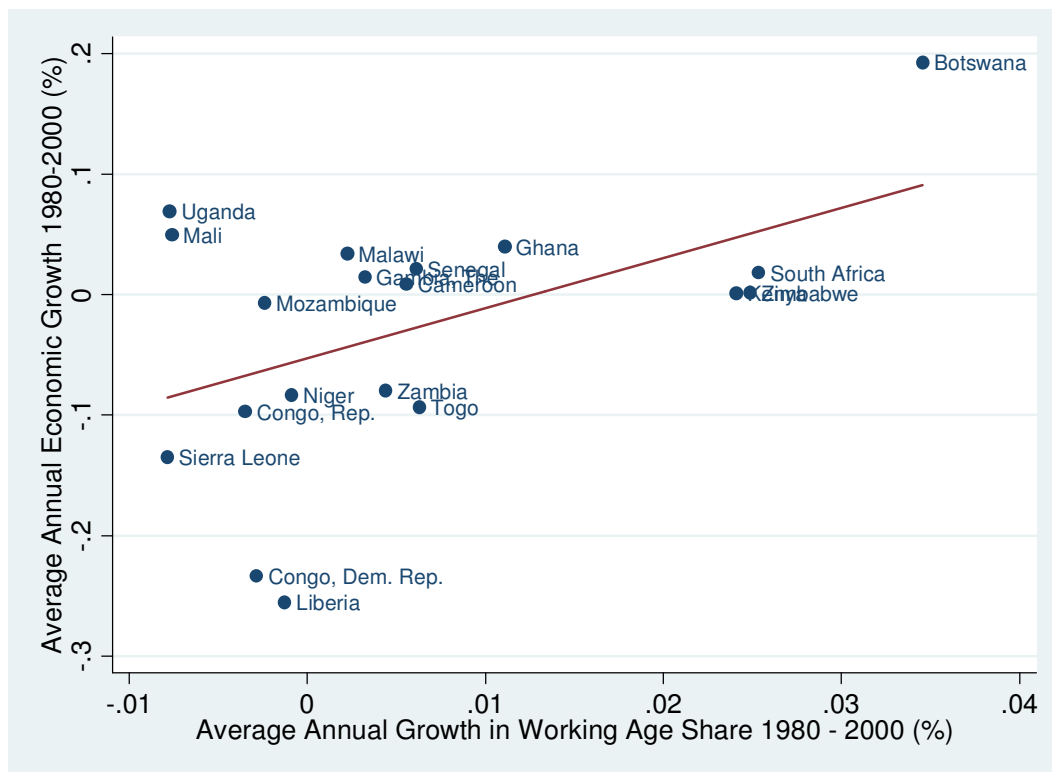
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

1) Wald test H0: Coefficient identical for Sub-Saharan sub sample and non Sub-Saharan sample. We report the chi<sup>2</sup> statistics, with p-values in parenthesis.

## Part II: Implications

Two main results emerge from our empirical analysis: First, the effects of demographic change on economic growth are sizeable, but contingent on good institutions. Second, the estimated relation between demographic variables and economic growth appears to be constant across samples, and thus to apply to Sub-Saharan countries as much as to any other country in the world. A closer look at the Sub-Saharan countries in our sample confirms this finding. As shown in Figure 1, the relationship between demographic developments and economic growth over the last 20 years appears quite robust. With the exception of Uganda and Mali, which showed high growth rates despite negative growth in the working age share due to excellent policy reforms, all countries with positive economic growth rates have also seen positive growth rates in their working age population.

**Figure 1: Growth in Working Age Share and Economic Growth 1980 - 2000**





What are the implications for the growth prospects in Sub-Saharan countries? Given our results, the answer to this question depends on two country specific factors: future developments in population structure and institutional quality. Institutional quality is hard to define, and even harder to measure; to provide the most complete measure possible, we display four different measures of institutional quality in Table 3 below. Column 1 shows the average combined score each country reached in the International Country Risk Guide over the period 1982-1997 (Knack and Keefer 1995). The total score is the aggregation of the scores of five different subcategories: rule of law, efficiency of the bureaucracy, government stability, corruption and expropriation risk. Column 2 shows the institutional quality measure as determined by the Polity IV project. The score ranges from -10 (worst) to +10 (best). Column 3 shows the position of each country in the World Bank's recent business environment ranking (World Bank 2007). The ranking is based on business surveys, and measures the general difficulty of doing business in a country. Column 4 shows the latest version of the openness variable originally introduced by Sachs and Warner (1997), and updated by Wacziarg and Welsh (2003). A country is considered closed if average tariff rates are above 40%, non-tariff barriers cover 40% or more of trade, black market exchange rates depreciated by 20% or more relative to the official exchange, if the country has a state monopoly on major exports, or the country has a socialist economic system. Although there is some variation in the absolute rankings, the relative position of countries looks relatively similar across the categories. South Africa, Namibia and Botswana appear to have the best institutions independent of the measure applied, while Sudan and the Republic of the Congo get the worst evaluations.

**Table 3: Institutional Development: Sub-Saharan Countries**

| Country                | ICRG Score<br>(1982-1997,<br>Avg.) | Polity <sup>1)</sup><br>Score | Business<br>Environment<br>Rank <sup>2)</sup> | Sachs-Warner<br>Openness <sup>3)</sup> | Average Ranking<br>Within Sub-<br>Saharan Group <sup>4)</sup> |
|------------------------|------------------------------------|-------------------------------|---|--|---|
| South Africa           | 28.57                              | 9                             | 29  | 1                                      | 1.25  |
| Botswana               | 27.21                              | 9                             | 48  | 1                                      | 2   |
| Namibia                | 23.8                               | 6                             | 42  | -                                      | 7.75  |
| Cote d'Ivoire          | 23.86                              | 4                             | 141   | 1                                      | 8   |
| Mozambique             | 21.64                              | 6                             | 140   | 1                                      | 8   |
| Ghana                  | 19.98                              | 2                             | 94  | 1                                      | 8.25  |
| Kenya                  | 22.28                              | -2                            | 83  | 1                                      | 8.75  |
| Madagascar             | 17.65                              | 7                             | 149   | 1                                      | 11.25   |
| Malawi                 | 20.47                              | 7                             | 110   | 0                                      | 11.5  |
| Gambia, The            | 23.08                              | -5                            | 132   | 1                                      | 12.5  |
| Niger                  | 19.96                              | 4                             | 160   | 1                                      | 13.25   |
| Gabon                  | 22.14                              | -4                            | 31  | 0                                      | 13.75   |
| Senegal                | 19.18                              | 8                             | 146   | 0                                      | 14  |
| Cameroon               | 21.87                              | -4                            | 152   | 1                                      | 14.25   |
| Ethiopia               | 17.84                              | 1                             | 97  | 0                                      | 14.75   |
| Mali                   | 12.4                               | 6                             | 155   | 1                                      | 14.75   |
| Tanzania               | 21.27                              | 2                             | 142   | 0                                      | 14.75   |
| Nigeria                | 16.11                              | 4                             | 108   | 0                                      | 15.5  |
| Uganda                 | 14.99                              | -4                            | 107   | 1                                      | 15.5  |
| Guinea                 | 19.54                              | -1                            | 157   | 1                                      | 15.75   |
| Zambia                 | 17.21                              | 1                             | 102   | 0                                      | 15.75   |
| Guinea-Bissau          | 13.62                              | 5                             | 173   | 1                                      | 17  |
| Burkina Faso           | 19.22                              | -3                            | 163   | 1                                      | 17.5  |
| Liberia                | 8.98                               | 0                             | -   | 0                                      | 19.75   |
| Somalia                | 12.06                              | 0                             | -   | 0                                      | 19.75   |
| Togo                   | 17.67                              | -2                            | 151   | 0                                      | 20  |
| Zimbabwe               | 20.57                              | -5                            | 153   | 0                                      | 20  |
| Angola                 | 17.75                              | -3                            | 156   | 0                                      | 21.5  |
| Sierra Leone           | 16.05                              | 0                             | 168   | 0                                      | 23  |
| Congo, Dem. Rep.       | 9.84                               | 0                             | 175   | 0                                      | 24.75   |
| Sudan                  | 11.96                              | -7                            | 154   | -                                      | 25.25   |
| Congo, Rep.            | 16.99                              | -6                            | 171   | 0                                      | 25.5  |
| <i>Non-Sub-Saharan</i> | 25.39                              | 3.88                          | 80  | 0.78                                   | -   |
| <i>United States</i>   | 36.25                              | 10                            | 3   | 1                                      | -   |

**Notes:**

1) Source: The Polity IV Project, <http://www.cidcm.umd.edu/polity/>. Reference year is 2000.

2) The World Bank Business Environment database. <http://www.doingbusiness.org/>. Reference year is 2005.

3) Source: Wacziarg and Horn Welsh (2003). Openness measure reflect the average score 1990 to 1999.

4.) Average ranking in columns 2-5.

To get a simple measure of a country's overall evaluation, we show the average ranking (among Sub-Saharan countries in our sample) in the four categories in column 5.

**Table 4: Forecasted Growth in the Working Age Population; Institutional Ranking**

| Country          | Working-age Share 2000 <sup>1)</sup> | Average Annual WAS Growth 2005-2015 <sup>2)</sup> | Average Annual WAS Growth 2005-2025 <sup>2)</sup> | Average Institutional Ranking <sup>3)</sup> |
|------------------|--------------------------------------|---|---|---|
| Senegal          | 52.19                                | 0.64  | 0.68  | 14  |
| Cameroon         | 53.54                                | 0.66  | 0.63  | 14.25                                       |
| Tanzania         | 52.94                                | 0.59  | 0.62  | 14.75                                       |
| Togo             | 52.39                                | 0.55  | 0.62  | 20  |
| Nigeria          | 51.76                                | 0.52  | 0.59  | 15.5  |
| Madagascar       | 52.17                                | 0.58  | 0.57  | 11.25                                       |
| Cote d'Ivoire    | 53.72                                | 0.57  | 0.56  | 8   |
| Gabon            | 53.51                                | 0.77  | 0.54  | 13.75                                       |
| Gambia, The      | 55.34                                | 0.46  | 0.52  | 12.5  |
| Sudan            | 56.18                                | 0.51  | 0.52  | 25.25                                       |
| Ghana            | 55.37                                | 0.54  | 0.51  | 8.25  |
| Namibia          | 53.09                                | 1.06  | 0.51  | 7.75  |
| Ethiopia         | 51.62                                | 0.48  | 0.50  | 14.75                                       |
| Malawi           | 50.81                                | 0.45  | 0.46  | 11.5  |
| Zambia           | 50.67                                | 0.38  | 0.46  | 15.75                                       |
| Mozambique       | 52.61                                | 0.40  | 0.45  | 8   |
| Mali             | 48.8                                 | 0.35  | 0.44  | 14.75                                       |
| Burkina Faso     | 48.65                                | 0.33  | 0.43  | 17.5  |
| Guinea           | 52.66                                | 0.26  | 0.41  | 15.75                                       |
| Kenya            | 53.1                                 | 0.04  | 0.39  | 8.75  |
| Somalia          | 53.38                                | 0.19  | 0.36  | 19.75                                       |
| Zimbabwe         | 54.09                                | 0.50  | 0.35  | 20  |
| Niger            | 49.02                                | 0.22  | 0.27  | 13.25                                       |
| Angola           | 50.52                                | 0.19  | 0.26  | 21.5  |
| Uganda           | 47.08                                | -0.03   | 0.20  | 15.5  |
| Congo, Rep.      | 50.39                                | -0.02   | 0.18  | 25.5  |
| Congo, Dem. Rep. | 50.23                                | -0.12   | 0.15  | 24.75                                       |
| Guinea-Bissau    | 50.07                                | -0.04   | 0.14  | 17  |
| Sierra Leone     | 53.95                                | 0.00  | 0.14  | 23  |
| Liberia          | 50.86                                | -0.15   | 0.07  | 19.75                                       |
| Botswana         | 58.13                                | 0.25  | 0.05  | 2   |
| South Africa     | 62.84                                | 0.09  | 0.02  | 1.25  |
| US               | 66.10                                | -0.11   | -0.25   |   |
| Non-Subsaharan   | 63.37                                | 0.24  | 0.07  |   |

**Notes:**

1) Fraction of the population in the age group 15-64. World Population Prospects 2004.

2) Forecast from World Populations Prospects 2005, medium scenario.

3) Average ranking within Sub-Saharan countries, see previous table.

The lower the aggregate score, the better the overall evaluation of the country's institutions, and the more positive is thus the growth outlook for the given country. Cohort specific population growth rates are calculated on a regular basis by the United Nations and published in the World Population Prospects (2004). Table 4 summarizes the forecasts for the intermediate growth scenario. Column 2 of Table 4 shows the current share of the working age population, while columns 3 and 4 show the expected growth in working age population share over the period 2005-2015 and 2005-2025, respectively. The countries with the highest expected growth in working age share are Senegal, Cameroon, Tanzania; the countries with the lowest rates are Botswana and South Africa, whose working age population is expected to grow only very moderately over the next 20 years. In the last column, we show the aggregate institutional score. Quite strikingly, the five countries with the highest expected rate of growth of working-age share are all characterized by medium to low quality institutions. The countries that do relatively well on both dimensions are Madagascar, Cote d'Ivoire, Ghana and Namibia, which are thus most likely to earn the demographic dividend.

## **Discussion and Conclusion**

The descriptive statistics in Table 1 illustrate the dismal economic, social and geographic predicament of Africa compared to the rest of the world. Current GDP per capita amounts to one fifth of that in ROW, average years of schooling are at 40% of ROW levels, and average life expectancy is 20 years lower. Moreover, the average institutional quality in Africa lags significantly behind the average in ROW. Given this pronounced lag one might argue that Africa is simply different from ROW and claim that the factors determining

economic development in Africa diverge from those of ROW. We find no evidence for this claim. Our results imply that the standard economic growth model equally applies to Sub-Saharan countries as it does to other regions in the world in general and with respect to the demographic dividend in particular.

As discussed in the introduction, the demographic transition from high fertility and low life expectancy to low fertility and high life expectancy does not guarantee a demographic dividend. A stable and transparent political and economic environment is required for individuals in the working-age population to be productive. Efficiency losses due to poor institutional quality will outweigh any gains that a high proportion of working-age population can bring. Our results show that the demographic transition does have an effect on economic growth, but only when coupled with institutional quality.

From a demographic perspective, the prospects for earning the demographic dividend and spur economic growth look good. As shown in Table 4, the United Nations predict significant increases in the working age share for close to all countries in the Sub-Saharan region. Africa stands on the cusp of the demographic transition, but good institutions will be needed to earn the demographic dividend. As of today, our results make us most optimistic for Ghana, Ivory Coast, Malawi, Mozambique and Namibia, who have done relatively well on the institutional side and significant increases in working age share coming up over the next 20 years. Cameroon, Nigeria, Senegal, Tanzania and Togo have the greatest potential for increased economic growth from a demographic point of view, but will likely have to significantly improve their institutional framework to fully reap the demographic dividend.

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## **Appendix**

### **Sub-Saharan Sample Country List**

Botswana, Cameroon, Congo(Dem. Rep.), Congo (Rep.), Gambia, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, Niger, Senegal, Sierra Leone, South Africa, Togo, Uganda, Zambia, Zimbabwe.

### **Non-Sub-Saharan Sample Country List**

Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Bolivia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cyprus, Denmark, Dominican Republic, Ecuador, Egypt (Arab Rep.), El Salvador, Finland, France, Greece, Guatemala, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Islamic Rep., Ireland, Israel, Italy, Jamaica, Japan, Jordan, Korea, Rep., Malaysia, Malta, Mexico, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela.