One size fits not: a typology of African countries to guide investments in the demographic dividend

Abstract

A one-size-fits-all raft of recommendations has largely underpinned advice for African countries to benefit from the demographic dividend. The recommendations fail to adequately capture significant variations in demographic and socio-economic outcomes in Africa and hence fail to provide contextualized recommendations. Using human development data from the World Bank database, our principal component and cluster analyses identifies four groupings that could guide investment actions. Two groups are composed of mainly Upper-middle and High-income countries in North and Southern Africa, and Small Island states with generally lower total fertility rates (mean TFR of 2.3 and 3.0 for Group 1 and 2 respectively). The third has mainly low or middle-income countries with a mean TFR of 4.9. The last group has outliers with very high fertility (mean TFR of 7.0) and low human capital. Regression analysis identified TFR, total dependency ratio, and mean years of schooling as the key determinants for national wealth.

Background and rationale

Population projections by the United Nations estimate that the world will reach 10 billion people by 2055 and more than 95% of this growth will happen in low and middle-income countries (United Nations Department of Economic and Social Affairs, Population Division, 2017). Of the 2.45 billion people expected to be added to the global population by 2055, more than 1.4 billion (57%) will be added in Africa and by 2063, there will be more than 3.2 billion people living in Africa. Decades of very high fertility in Africa, coupled with rapidly declining child mortality have led to high population growth rates (currently averaging 2.5% per annum). As a result, the age-structure of many African countries has a high percentage of people under the age of 25 years (average of 60% in 2015, compared with 41% globally). Such youthful population, if healthy, skilled, and gainfully employed can be a catalyst for accelerated social and economic development, a phenomenon referred to as a demographic dividend.

The past decade has occasioned rejuvenated interest on the demographic transition in Africa and the potential of African countries to benefit from the demographic dividend. As a result, there is increasing demand by policymakers in the continent and development partners for investment solutions that could lead to this dividend. A good example of this comes from the African Union (AU). In response to emerging evidence and the discourse on the possible contribution of the demographic dividend to social and economic development in Africa, the AU through the *Assembly Decision/AU/Dec.601(XVII)* dedicated its theme of the year 2017 to "Harnessing the Demographic Dividend through Investments in Youth" with a roadmap to guide member states to realize the same during the AU Assembly at the 27th Ordinary Session in Kigali 2016. This was followed up by an AU Assembly decision during the July 2017 Heads of State Summit in Addis Ababa calling upon "all Member States to redouble efforts towards the full implementation of the AU Roadmap on Harnessing the Demographic Dividend in 2017 and beyond, including country launches with clear commitments, creation of demographic dividend profiles and the development of country-specific roadmaps that feed into national development plans, bearing in mind the need for an institutional mechanism for coordinating the activities under the roadmap".

These decisions mark an important milestone by decision-makers at the highest level in Africa recognizing the important role population dynamics and the demographic transition in particular has in the trajectory of their countries' socio-economic development trajectories. It is also a culmination of a focus in recent years on the prospects of countries in Sub-Saharan Africa harnessing the demographic dividend given the demographic transition trends in the region from both the scientific community and development actors (May and Turbat, 2017; Groth and May eds., 2017; Canning, Raja and Yazbeck eds., 2015).

However, the policy action recommendations, as contained in the AU roadmap for example, are often very generic. A one-size-fits-all raft of recommendations for African countries has been premised on the experience of East and South East Asia countries. The recommendations are generally derived from what these countries did to transform from early demographic transition and low-income countries in the 1960s to thriving upper-middle and high-income countries today. In reality, these recommendations fail to adequately capture the significant variations in demographic transition and economic well-being of Africa countries and hence fail to provide refined recommendations that would help them to harness the dividend.

Can a set of human development indicators be used to develop a typology of African countries? Can the typology be used to inform policymakers and development partners on which pillars of the demographic dividend they can prioritize their investment actions in a contextualized rather than a one-size-fits-all manner?

Objectives and methods

Our objectives are:

a) To characterise countries according to pillars of the DD (Education, health, economy, TFR). Such grouping can be useful to identify actions for groups of countries instead of a generic Africa-wide approach.
b) Explore the factors associated with national wealth as measured by Gross National Income (GNI) per capita, being the most important factors to focus on for countries to increase their national wealth.

Our analysis plan includes the following steps:

1. Collate human development data from World Bank database
2. Run Principal Component Analysis (PCA) [with all variables, minus GNI per capita which is the dependent variable in regression]
3. Examine the components and interpret
4. Conduct cluster analysis – choice of number of clusters 4
5. Explore regression of GNI against selected variables (e.g. TFR, Dependency ratios, etc).

Preliminary findings

We conducted a principal component analysis (PCA) and cluster analysis to develop a typology of African countries according to pillars of the demographic dividend. We

identified four distinct groupings that could be useful to identify policy and investments actions to earn the demographic dividend instead of a generic Africa wide approach (see Figure 1 and Table 1). The first two groups are composed of a set of 12 mainly Upper-middle and High-income countries in North and Southern Africa and Small Island states with generally lower total fertility rates (mean TFR of 2.3 and 3.0 for Group 1 and 2 respectively). The third group is a large cluster composed of 37 states that are mainly low or middle-income and have a mean TFR of 4.9. the last group is composed of 2 states with very high fertility (mean TFR of 7.0) low human capital. The mean years of schooling in this group is only 2 years compared to 8.6, 7.0, and 4.7 for groups 1, 2 and 3 respectively.

Table 1: Country groupings from PCA

Country groupings		Gross National Income 2015 2011PPP$	Mean school years	Life expectancy at birth 2015	Female labour force participation rate	Male 15+ labour force participation rate	Average annual growth rate 2010 15	Total fertility rate 2010 15	Underfive mortality rate 2015	Under five stunting percentage
Group 1.00. Countries: Tunisia, Libya, South Africa, Mauritius, Botswana	Mean	13,849.9	8.6	68.7	43.9	73.3	0.9	2.3	25.0	19.5
	N	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	Std. Deviation	2,904.2	1.4	7.5	19.4	8.2	0.8	0.5	15.6	9.0
Group 2. Countries: Seychelles, Algeria, Egypt, Morocco, Gabon, Cabo Verde, Namibia	Mean	12,791.5	7.0	71.1	38.9	71.8	1.7	3.0	30.2	15.9
	N	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	Std. Deviation	6,533.0	1.7	4.3	17.4	9.0	0.6	0.7	13.1	5.2
Group 3.00. Countries. The rest of Africa excluding Groups 1,2,4.	Mean	2,956.3	4.7	59.0	65.1	78.1	2.6	4.9	79.7	33.2
	N	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
	Std. Deviation	3,538.5	1.6	4.8	16.6	7.9	0.6	0.8	25.6	8.2
Group 4.00. Countries: Niger, Chad	Mean	1,440.2	2.0	56.9	52.1	84.3	3.7	7.0	117.1	41.5
	N	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Std. Deviation	778.8	0.5	7.1	16.8	7.2	0.5	0.9	30.5	2.2
Total	Mean	5,314.8	5.3	61.6	58.9	77.0	2.4	4.5	69.0	29.8
	N	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0
	Std. Deviation	5,886.5	2.1	6.9	19.5	8.3	0.9	1.3	33.3	10.5

We also explored factors associated with national wealth (Gross National Income per capita) using regression analysis to recommend sectoral investment action to increase national wealth. Using a selection of variables on education, fertility, maternal mortality, child mortality, stunting, public expenditure on health, and urbanization (backward selection), isolated only three variables: total fertility, total dependency ratio, and mean years of schooling (R^2=0.71).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	15370.891	4053.381		3.792	.000
	Total fertility rate 2010-15	2726.236	869.526	.603	3.135	.003
	DepRatio2010	-228.154	41.581	-1.055	-5.487	.000
	Mean school years	1095.261	301.345	.392	3.635	.001

a. Dependent Variable: Gross National Income 2015 2011PPP$

Figure 1: Map country groupings

References

Canning, David, Sangeeta Raja, and Abdo S. Yazbeck, eds. (2015). *Africa's Demographic Transition: Dividend or Disaster?* Africa Development Forum series. Washington, DC: World Bank. doi:10.1596/978-1-4648-0489-2. License: Creative Commons Attribution CC BY 3.0 IGO

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Analysis annex

Results of PCA and Cluster Analysis

Communalities

	Initial	Extraction
Human Development Index 2015	1.000	.890
Life expectancy at birth 2015	1.000	.866
Mean school years	1.000	.813
Gini coefficient 2010-15	1.000	.746
Gender Development Index 2015	1.000	.756
Maternal mortality rate 2015	1.000	.698
Adolescent birth rate 2015	1.000	.703
Percent females 25+ with secondary education	1.000	.897
Percent males 25+ with secondary education	1.000	.854
Female labor force participation rate	1.000	.822
Male 15+ labor force participation rate	1.000	.660
Average annual growth rate 2000-5	1.000	.742
Average annual growth rate 2010-15	1.000	.820
Total fertility rate 2000-5	1.000	.962
Total fertility rate 2010-15	1.000	.952
Under-five mortality rate 2015	1.000	.837
Public health expenditure (% of GDP)	1.000	.792
Under five stunting percentage	1.000	.690
Percent children 12months+ vaccinated against measles	1.000	.730
Youth unemployment % (15-24)	1.000	.748
Mobile users per 1000	1.000	.731
Urban population rate 2015	1.000	.683
DepRatio2010	1.000	.916

Extraction Method: Principal Component Analysis.

Component Score Coefficient Matrix

	Component				
	1	2	3	4	5
Human Development Index 2015	-.080	-.015	-.025	.125	.095
Life expectancy at birth 2015	-.056	-.243	-.168	.144	.072
Mean school years	-.069	.187	.008	.109	-.006
Gini coefficient 2010-15	-.032	.349	.012	-.139	-.037
Gender Development Index 2015	-.047	.221	-.214	-.031	.215
Maternal mortality rate 2015	.064	.072	.164	-.038	-.119
Adolescent birth rate 2015	.063	.057	.091	.082	.321
Percent females 25+ with secondary education	-.066	.207	.035	.205	.048
Percent males 25+ with secondary education	-.059	.210	.051	.256	-.048
Female labor force participation rate	.046	.248	-.243	.085	-.032
Male 15+ labor force participation rate	.035	-.022	-.321	.156	-.103
Average annual growth rate 2000-5	.068	-.017	.029	.168	.227
Average annual growth rate 2010-15	.072	.050	-.010	.119	.302
Total fertility rate 2000-5	.084	.032	.011	.044	.168
Total fertility rate 2010-15	.080	.015	.038	.072	.302
Under-five mortality rate 2015	.070	.092	.190	-.016	-.094
Public health expenditure (% of GDP)	-.029	.064	-.056	-.468	.198
Under five stunting percentage	.058	.074	-.200	-.079	-.191
Percent children 12months+ vaccinated against measles	.041	.111	.237	.099	-.431
Youth unemployment % (15-24)	-.054	.049	.161	-.245	.279
Mobile users per 1000	-.064	-.023	.079	.142	.320
Urban population rate 2015	-.056	-.052	.218	.135	.098
DepRatio2010	.079	.066	-.019	-.019	.253

Extraction Method: Principal Component Analysis.

Component Scores.

Interpretation
First PC – reflects traditional African pattern –high values of this PC→ high fertility, high mortality; low values of this PC→ low levels of education, low gender equality.

Second PC – high values reflect high levels of schooling for both males and females, but PC has negative values for life expectancy, implying lower life expectancy (This PC identifies the richer southern African countries)

Low values of PC1 and low values of PC2 are mostly North African countries and the islands (see Figure i).

PC 3 – reflects lower labor force participation, lower life expectancy, lower gender development index and low levels of stunting

Figure i

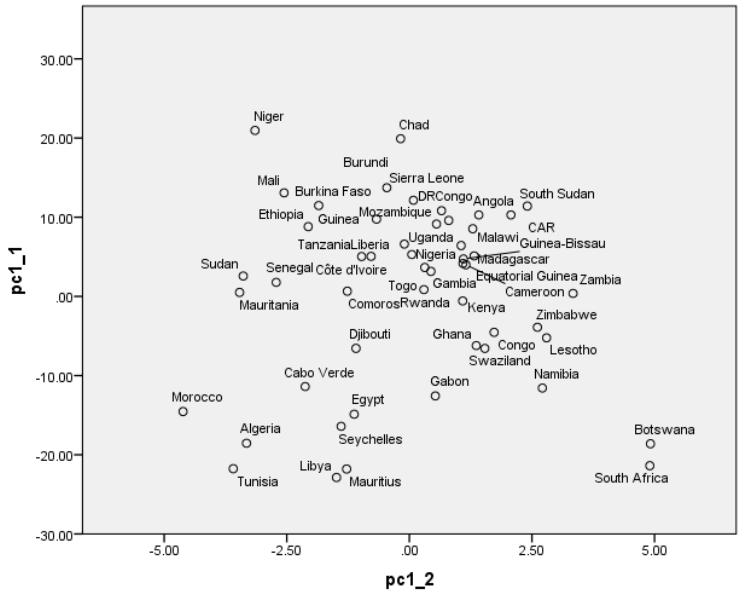


Figure ii

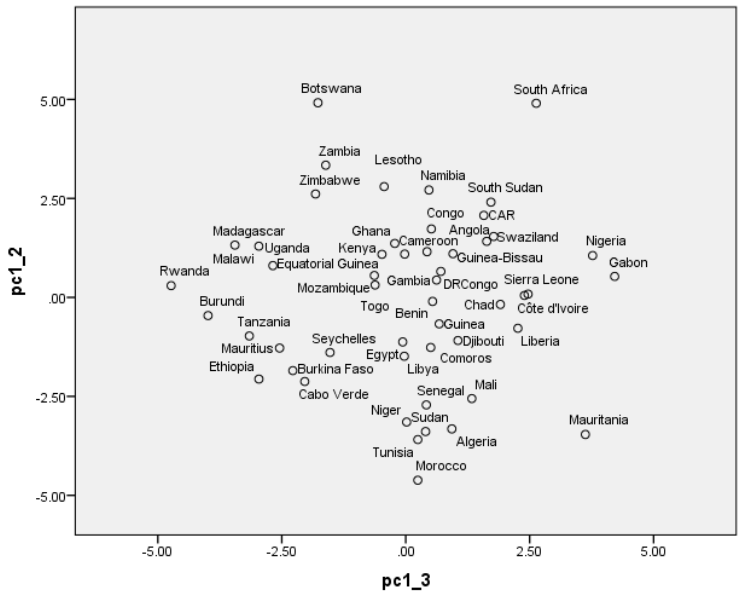


Figure iii

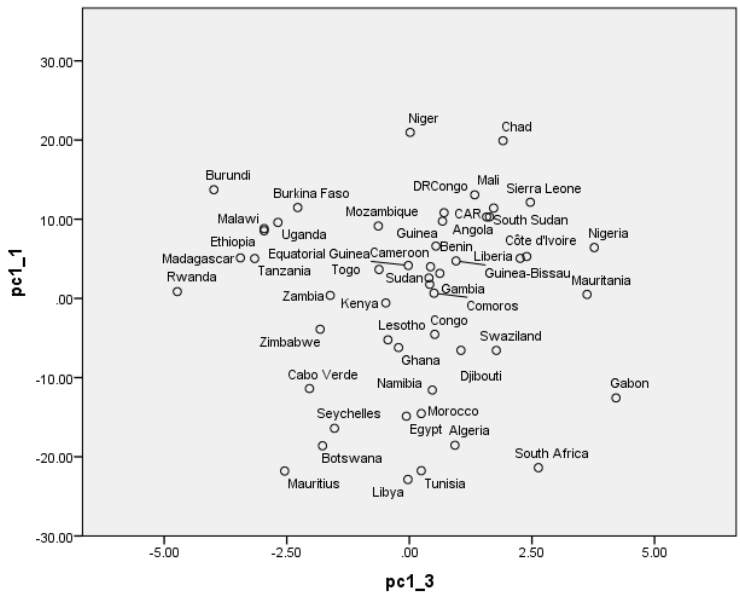
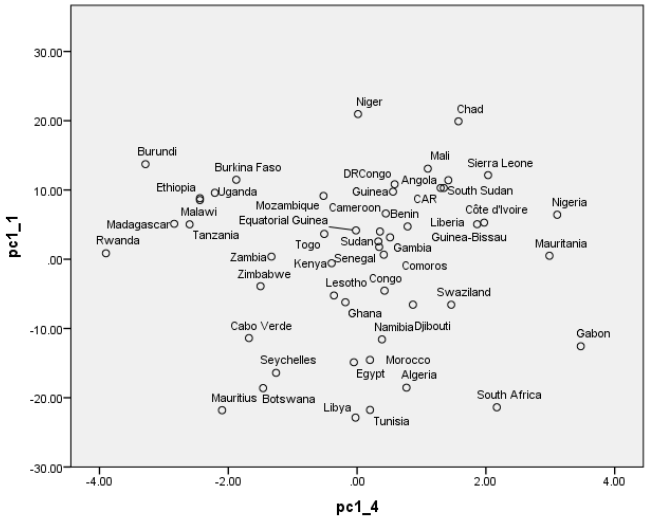


Figure iv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Cameroon
Côte d'Ivoire
Malawi
Benin
Madagascar
Equatorial Guinea
Liberia
Tanzania
Guinea-Bissau
Rwanda
Togo
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Ghana
Cabo Verde
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