FACTORS ASSOCIATED WITH VARYING OLD-AGE DEPENDENCY RATIOS IN SUB-SAHARAN AFRICA

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Understanding the trends that contribute to regionally high old-age dependency ratios (OADRs) in Sub-Saharan African countries could provide the information necessary to predict future growth in OADRs and to inform policy decisions relating to elder-care. OADRs in Sub-Saharan Africa (SSA) range from 4.5% in Zambia and Uganda to rates of above 8% in South Africa and Lesotho. In a region of the world with little provision of governmental support to the elderly, it is common for elderly persons in SSA to rely upon their working-aged family members for support. If a country's OADR is higher than those of its neighbors due to trends that deplete the number of working-aged persons (high rates of HIV mortality, for example), the implications for household compositions and elder care may be very different than if the trend is driven by low fertility rates.

In Sub-Saharan African countries with high HIV prevalence, HIV mortality disproportionately affects people between the ages of 20 and 60, reducing the sizes of the countries' working-aged populations. Other factors that could also affect SSA countries' OADRs include fertility schedules, which would affect the ratio between generations in the absence of age-specific mortality effects; the age-specific mortality rates of elderly people; trends in age-specific international migration; length of time the country has experienced an AIDS epidemic, since low prevalence rates resulting from recent high HIV-mortality rates could mask the extent to which a country has been affected by AIDS; and recent national events, such as civil wars, which may have caused unusually high mortality rates in soldier-aged males. For

the purposes of this investigation, I looked only at the relationship between OADR, HIV prevalence, and total fertility rate (TFR).

To investigate trends between OADR, HIV prevalence, and TFR, I used the most recently available data (dates of estimates varied across countries) from the CIA World Factbook for 19 Sub-Saharan African countries [CIA]. I calculated old-age dependency ratios as (P_{65+}/P_{16-59}). To investigate the degree to which HIV prevalence is related to comparatively large elderly populations, I compared national HIV prevalence rates with old-age dependency ratios for 19 Sub-Saharan African nations (Figure 1). A significant weakly positive relationship is observed between the two factors (R^2=0.3242, p=0.0109), indicating that in these countries, OADR generally increases with HIV prevalence. However, the OADR is more strongly correlated with fertility than with HIV prevalence, demonstrating a significant strongly negative relationship between OADR and TFR (Figure 2, R^2=0.5725, p=1.77x10^{-4}).

In an ordinary least squares regression of old-age dependency ratio vs. both TFR and HIV prevalence for these countries, HIV rate is no longer a significant predictor of old-age dependency ratio (R^2=0.575, TFR: p=0.00728, HIV: p=0.7644); I believe this occurs due to the strong colinearity of HIV prevalence with TFR in these countries (R^2=0.6281, p=5.22x10^{-5}). As displayed in Figure 2, all countries with HIV prevalence rates of greater than 15.2% have total fertility rates of less than four children per woman, while all countries with HIV prevalence rates of less than or equal to 15.2% have total fertility rates of greater than four children per woman. The lower fertility rates in Sub-Saharan African countries with high HIV prevalence rates could be due to a non-causal relationship (such as colinearity relating to geographic differences in the HIV prevalence and stage of demographic transition, since the southern-most countries generally have the highest HIV prevalence rates and the lowest fertility rates) or due to a causal

relationship between the two factors (in which, for example, high HIV mortality rates among reproductive-aged persons result in fewer marriages or lower reproductive rates within couples).

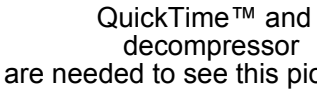

Figure 1. Old-age dependency ratio vs. HIV prevalence in 19 Sub-Saharan African countries, with fertility classification displayed for each country, 2010. (AN=Angola, BT=Botswana, BU=Burundi, CO=Congo, DRC=Democratic Republic of Congo, GA=Gabon, KN=Kenya, LE=Lesotho, MD=Madagascar, ML=Malawi, MZ=Mozambique, NM=Namibia, RW=Rwanda, SA=South Africa, SW=Swaziland, TZ=Tanzania, UG=Uganda, ZA=Zambia, ZI=Zimbabwe). Red country codes depict countries with total fertility rates of less than 4, while blue codes depict countries with TFRs of greater than 4.

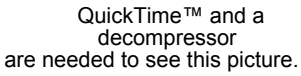

Figure 2. Old-age dependency ratio vs. Total Fertility Rate (TFR) in 19 Sub-Saharan African countries, 2010. (AN=Angola, BT=Botswana, BU=Burundi, CO=Congo, DRC=Democratic Republic of Congo, GA=Gabon, KN=Kenya, LE=Lesotho, MD=Madagascar, ML=Malawi, MZ=Mozambique, NM=Namibia, RW=Rwanda, SA=South Africa, SW=Swaziland, TZ=Tanzania, UG=Uganda, ZA=Zambia, ZI=Zimbabwe). Red country codes depict countries with HIV rates of greater than 10%, while blue codes depict countries with HIV rates of less than 10%.

Data Source

CIA World Factbook, *Angola, Botswana, Burundi, Congo, Democratic Republic of Congo, Gabon, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe*. Dates of estimates varied. Accessed March 22, 2010. https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html