

Framing AIDS as an Economic Development Challenge

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THE GLOBAL IMPACT OF HIV/AIDS has devastated millions of lives and has resulted in major reversals in health outcomes in a number of countries.¹ By 2009, an estimated 33 million people were living with HIV, 1.8 million died in that year, and 16 million young people had lost at least one parent because of the epidemic.² Compounding the challenges posed by the epidemic is the fact that it is distributed unevenly geographically, with 70 percent of people living with HIV/AIDS located in Africa, and 44 percent (14.6 million) in just 12 African countries with a combined population of 224 million people (3 percent of the global total).³

The serious health impacts of the epidemic, combined with the fact that many people living with HIV/AIDS are located in low-income countries, have also motivated concerns that the epidemic is undermining development more generally, reinforcing the economic disadvantages of these countries. These concerns, in turn, have strengthened the impetus behind the global policy response to HIV/AIDS. The available evidence on the economic development impacts of HIV/AIDS thus fulfills a political role. In this setting, “policy” and “analysis” can be interpreted as interdependent—the supply of analytical work underlining the economic development impacts of HIV/AIDS feeds the needs of policy and advocacy, while the needs of policy and advocacy create a demand for supportive analytical work.

The paper sets out with a discussion of how major international policy documents have adopted and built on statements on the adverse economic development impact

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of HIV/AIDS. This is contrasted with an analysis of the available studies of the impact of HIV/AIDS on economic growth and studies addressing the implications of HIV/AIDS for the affected households and for poverty more generally. This review finds that the literature in both areas is unconvincing. Empirical evidence of the growth impacts of HIV/AIDS is weak, and there is some evidence of policy-induced bias among studies modeling the growth impacts of HIV/AIDS. While some data are available of the immediate impacts of HIV/AIDS on affected households, the evidence on the impacts over time and across households, and thus the understanding of the impacts of HIV/AIDS on poverty, is much weaker. The paper concludes by a discussion of casting HIV/AIDS as an economic development challenge, placing more emphasis on increased economic and health risks, and makes some points on better aligning the response to HIV/AIDS with the international development agenda.

Presenting HIV/AIDS as an Economic Development Challenge

The perception of HIV/AIDS as an economic development challenge is important not only in gaining a full understanding of the impacts of the disease, but also in soliciting political and financial support for the response to the epidemic. Sir George Alleyne, Director Emeritus of the Pan American Health Organization (PAHO), underlines the “role of health as an instrument for human development” in “persuading finance ministers to spend money.” UNAIDS Executive Director Michel Sidibé emphasizes the need to “link HIV to the broader international health and development agenda, as represented by the MDGs [Millennium Development Goals] ... to sustain and accelerate progress in the next phase of the global response to AIDS.”⁴

The impact of HIV/AIDS has commanded a prominent place in the international development agenda, especially over the last decade. The United Nations Millennium Declaration of 2000, as part of the agenda to create an environment “which is conducive to development and to the elimination of poverty,” resolved to halt and reverse “the spread of HIV/AIDS, the scourge of malaria and other major diseases that afflict humanity,” and “to provide special assistance to children orphaned by HIV/AIDS.”⁵ The 2006 UN Political Declaration states “that in many parts of the world, the spread of HIV/AIDS is a cause and consequence of poverty, and that effectively combating HIV/AIDS is essential to the achievement of internationally agreed development goals and objectives, including the Millennium Development Goals.”⁶ The 1999 World Bank HIV/AIDS strategy listed “advocacy to position HIV/AIDS as a central development issue and to increase and sustain an intensified response” as one of its four pillars.⁷ The 2005 World Bank HIV/AIDS Strategy states that “once seen as a health emergency, AIDS is now recognized as a broad, long-term development issue,” and the 2008 *Agenda for Action* focuses on “mainstreaming HIV/AIDS

activities into broader national development agendas as a critical aspect of economic growth and human capacity development.”⁸

The economic development impacts of HIV/AIDS are also reflected in major publications of international organizations with a more specific health focus. The 2001 World Health Report states that “the HIV/AIDS epidemics has [*sic*] lowered economic growth and is reducing life expectancy by up to 50% in the hardest hit countries,” and that “in many countries HIV/AIDS is now considered a threat to national security.” The 2003 World Health Report notes that “a recent World Bank study predicts that South Africa will face ‘complete economic collapse . . . within three generations’ if the country does not take effective measures to combat AIDS.” The 2004 World Health Report, which focuses on the challenges posed by HIV/AIDS, observes that “in many countries, the cumulative effects of the epidemics could have catastrophic consequences for long-term economic growth and seriously damage the prospects for poverty reduction.”⁹

UNAIDS addresses the macroeconomic impacts of HIV/AIDS in the 2004 and 2008 editions of the *Report on the Global AIDS Epidemic*.¹⁰ The 2004 report notes that “the best available evidence suggests that HIV is likely to reduce economic growth in high-prevalence countries by 0.5% to 1.5% over 10–20 years . . . —an impact that is notable but not catastrophic.” It emphasizes, however, “that the epidemic is deepening poverty” and that “given the heavier burdens borne by poor households, HIV also widens inequality within societies.” The 2008 report summarizes that the macroeconomic impact of HIV/AIDS in high-prevalence countries is “seemingly modest, with these countries losing on average between 1% and 2% of their annual economic growth.” As “the effect of AIDS on gross domestic product [GDP] growth is approximately matched by the impact on total population over the same period,” [...] “the epidemic’s impact on per-capita gross domestic product is relatively small—and even positive in some of the scenarios considered.” Instead, UNAIDS concludes that the significant macroeconomic impact of the epidemic could be the impact on government budgets, as both the impact of and response to the epidemic absorb scarce fiscal resources.

In summary, the evidence on the economic impacts of HIV/AIDS has played an important role in establishing HIV/AIDS as an international development issue of the first order. At the same time, it is plausible that the policy needs of the international response to HIV/AIDS have contributed to shaping the research agenda in this area. The remainder of this paper discusses the available evidence on the development impacts of HIV/AIDS (focusing on economic growth and poverty), against the background of the evolving development policy agenda.

Calibrating the Impacts of HIV/AIDS on Growth

A considerable number of studies have calibrated the impacts of HIV/AIDS on GDP or GDP per capita.¹¹ While these models differ in the details, the logic is similar: HIV/AIDS reduces the rate of population growth, the savings rate declines because of the costs of care and treatment, and productivity subsequently declines because increased mortality and morbidity disrupt production processes. Ultimately, GDP grows more slowly, largely because of reduced population growth. Regarding the impacts of HIV/AIDS on GDP per capita, the picture is less clear. While productivity losses and a decline in savings and investment would reduce GDP per capita, increased mortality and reduced population growth would raise GDP per capita, because the economy's productive assets are shared among fewer people. Overall, the majority of growth studies suggest that HIV/AIDS has a small negative impact on GDP per capita.¹²

The fact that much of the literature on the growth impacts of HIV/AIDS originates at the World Bank is worth noting. As this analytical work directly feeds into the World Bank's policy objective of "advocacy to position HIV/AIDS as a central development issue," this raises the possibility of some institutional bias. This potential bias has been illustrated by Jeffrey Lewis, an economist employed by the World Bank, who contributed to the analytical work on HIV/AIDS and growth, and who pointed out to the author that it was important to show that HIV/AIDS reduces GDP per capita, because otherwise the findings would not be considered credible.

That such an institutional bias exists in the literature is empirically plausible. Studies of the growth impact of HIV/AIDS originating at the World Bank find that GDP per capita declines, including two studies showing large and persistent declines in growth.¹³ In contrast, studies not affiliated with the World Bank, including a number of substantial studies originating in South Africa, as well as one of the most substantial academic contributions by Alwyn Young, frequently find that GDP per capita increases.¹⁴ Generally, the differences in the growth estimates and projections can be attributed to the authors' assumptions about the impact of HIV/AIDS on productivity, which are frequently ad hoc or based on microeconomic evidence that does not easily translate to the macroeconomic scale.

Overall, the analytical literature calibrating the growth effects of HIV/AIDS offers little guidance, beyond agreeing that reduced population growth translates into reduced GDP growth. The direction of the impact of HIV/AIDS on GDP per capita is unclear and the relevant literature appears politicized to an extent. More stylized analytical models attempting to capture the long-term effects of increased mortality (i.e., by discouraging investments in education) tend to find larger negative impacts

on growth and GDP per capita and to illustrate the longer-term development risks arising from a health shock like HIV/AIDS, but cannot easily be interpreted and tested in terms of available economic data.¹⁵

HIV/AIDS and Growth: the Empirical Evidence

The UNAIDS Report on the Global AIDS Epidemic of 2008 points out that “estimating the epidemic’s macroeconomic effects is complicated by the fact that high-burden countries have been undergoing important changes at the same time that they have been experiencing HIV. These changes include globalization, fluctuations in prices for commodities, political upheaval, civil and international conflict, and other humanitarian crises.”¹⁶ Similarly, Arbache finds that economic growth in countries with high HIV prevalence has slowed down relative to economic growth in sub-Saharan Africa.¹⁷ Such a comparison, however, also reflects adverse trends in a number of countries with high HIV prevalence that are arguably not related to HIV/AIDS. For example, the escalation of the HIV epidemic took place at about the same time as the onset of the economic crisis in Zimbabwe and the slowdown in growth driven by the expansion of mining in Botswana.¹⁸

A number of empirical studies go further and attempt to assess the links between HIV and economic growth, though with mixed results. Mahal finds a negative but insignificant impact of accumulated AIDS cases on growth. Lovász and Schipp find a negative link between growth of GDP per capita and HIV prevalence, which, however, is not robust to changes in modeling assumptions. Papageorgiou and Stoytcheva find a statistically significant, but very small negative impact of HIV on economic growth.¹⁹

Studies following an indirect approach, linking growth and life expectancy (or mortality), and the latter to HIV/AIDS, appear more successful in finding a negative impact of HIV/AIDS on growth. For example, McDonald and Roberts point to a link between HIV/AIDS and infant mortality, and subsequently, between infant mortality and growth.²⁰ For sub-Saharan Africa, their estimates imply that in a country with an HIV prevalence rate of 10 percent, growth of income per capita slows down by 1.2 percent initially, and as a result the impact on growth is highly persistent. This two-step approach is problematic, however, as causal interpretations of the correlation between growth and life expectancy or mortality have long been discredited in the literature on economic growth. Deaton, for example, concludes that the correlation most likely reflects “the importance of factors such as education and the quality of institutions that affect both health and growth.”²¹ Using this approach to estimate the growth impacts of HIV/AIDS is even more problematic, as this additionally relies on an assumption that the health shock caused by the HIV/AIDS epidemic, with a

very particular mortality profile, plays out in a way that is equivalent to variations in mortality observed for different reasons.

Academic publication bias, favoring significant findings, may also play a role in coloring the empirical evidence on the growth impacts of HIV/AIDS. The published studies estimating the growth impacts of HIV/AIDS directly produce negative, but barely significant results, and the study by Papageorgiou and Stoytcheva, arguably the most thorough study available from an econometric perspective, did not get published in a refereed journal, presumably because they did not find a substantial impact of HIV/AIDS on growth. Thus, it is quite possible that the published studies are located on one end of a scale that, on the other hand, includes plausible approaches that yield insignificant but un-publishable findings.

HIV/AIDS and Poverty

The most direct impacts of an HIV infection are those on people living with HIV/AIDS, their families, and surviving dependents. In addition to experiencing illness and death, income losses caused by illness and death and the costs of care and treatment affect material living standards of household members. While some empirical evidence is available regarding the impact of HIV/AIDS on affected households, the impacts of the epidemic on poverty are not well understood.

The impact of HIV/AIDS on poverty and inequality broadly depends on three factors: the distribution of HIV infections across socioeconomic categories, especially in relation to income and wealth; the consequences of an HIV infection across socioeconomic categories, both from a medical perspective and an economic perspective; and the changes in the income distribution caused by the epidemic.

Regarding the first factor, only indirect evidence is available. HIV incidence (i.e., new infections) cannot normally be measured directly. Instead, researchers rely on data on HIV prevalence (the number of people living with HIV/AIDS).²² For example, Justin Parkhurst summarizes the data from demographic and health surveys including HIV testing data, finding that HIV prevalence tends to be higher for wealthier households in 11 of the 14 countries covered.²³ However, if HIV/AIDS-related mortality among people in low wealth quintiles is relatively high, prevalence data understate the impact of HIV/AIDS in these categories. There are some reasons to believe that this may be the case. The medical literature suggests a link between disease progression and nutrition, and it is plausible that survival rates and access to treatment are higher among wealthier population groups. The evidence on the distribution of HIV infections across population groups therefore is not clear-cut.

The evidence regarding the uneven consequences of an HIV infection across households is stronger. Available household surveys illustrate the economic burden

arising from income losses and the costs of care and treatment. Booysen shows that the income of households affected by HIV/AIDS tends to deteriorate relative to non-affected households.²⁴ The economic burden of disease appears to be disproportionately large for poorer households.²⁵ Gustafsson-Wright, Janssens, and van der Gaag highlight lack of health insurance as a key reason why the economic consequences of HIV/AIDS are more severe for poor households.²⁶ The longer-term repercussions for surviving dependents are less well understood, partly because households may dissolve following the death of the household head. Available studies on the consequences of mortality in general (that is, not necessarily HIV/AIDS-related) point to reduced consumption in the years following a death and as a consequence of funeral costs.²⁷ Orphans tend to live in poorer households than non-orphans and could be at a disadvantage in terms of access to education.²⁸ In summary, it seems clear that the economic consequences of HIV/AIDS are more severe for poor households.

This, however, does not automatically mean that HIV/AIDS increases the extent of poverty. The most important gap in the understanding of the link between the microeconomic impacts of HIV/AIDS and poverty regards the distributional implications of HIV/AIDS even for households not directly affected by the epidemic. The macroeconomic literature suggests that the adverse impacts of HIV/AIDS on productivity and savings are at least partly reversed by an increase in the capital-labor ratio, as productive assets are shared among fewer people.²⁹ Especially in an economy based on physical capital and natural resources, rather than human capital, this means that deaths translate into additional employment opportunities for survivors, and that the income losses in households affected by HIV/AIDS correspond to income gains elsewhere. Therefore, it is not possible to draw inferences from household level effects of HIV/AIDS for poverty in general.

In summary, while the poverty impacts of HIV/AIDS play an important part in positioning HIV/AIDS as a complex development issue, the implications of the epidemic for poverty are not well understood. The evidence from household surveys suggests that the economic consequences of HIV/AIDS compound the consequences of poverty for households affected by the epidemic, and that HIV/AIDS causes poverty in some of these households. However, to understand the consequences of HIV/AIDS for poverty, it is necessary to fill two knowledge gaps. First, it is necessary to arrive at a better understanding of the socioeconomic profile of HIV incidence. Second, it is necessary to understand the economic consequences of HIV/AIDS across the population, including the economic opportunities that arise (frequently outside households affected by HIV/AIDS) as individuals take up employments which have been vacated by people who have died as a consequence of HIV/AIDS.

HIV/AIDS and Economic Development

The body of evidence cited here brings us back to Sir George Alleyne's predicament, namely, the need to highlight the "role of health as an instrument for human development" in "persuading finance ministers to spend money." This leads to the question: Why is it that the evidence on the impacts of HIV/AIDS on economic development outcomes is so weak, even though the evidence on the impacts on the individual level is so obvious? The focus on GDP per capita in assessing the state of economic development rests on two premises. First, GDP per capita is a fairly good proxy for the state of development in general, due to the fact that the populations of wealthier countries tend to be healthier and better educated. Second, if a particular policy results in an increase in GDP per capita, it is generally possible to make everyone better off, by measures that directly or indirectly redistribute the gains. However, both of these premises are violated in the context of HIV/AIDS.

First, HIV/AIDS has dramatically compromised the link between GDP per capita and health outcomes. Life expectancy in Botswana, at 54 years in 2008, was about the same as in Ethiopia (with GDP per capita in Ethiopia at one-sixteenth of Botswana's), and life expectancy in Swaziland (46 years, with GDP per capita at US\$2,800) was in the same bracket as that of the Central African Republic (47 years, US\$460) or Afghanistan (44 years, US\$400).³⁰ Compared with the losses in life expectancy caused by HIV/AIDS (estimated at 14 years in Botswana, and 18 years in Swaziland), the estimated losses (or gains) in GDP per capita are trivially small.³¹

Additionally, both GDP per capita and poverty rates can be very misleading indicators of the development impacts of HIV/AIDS. If the impact of HIV/AIDS is concentrated among poorer segments of the population, then GDP per capita increases and poverty rates decline because the number of poor individuals declines relative to the size of the population overall. These improvements, however, mask an increase in inequality and a deepening in the deprivation of poorer segments of the population (with economic disadvantages compounded by higher risks to the prospect of leading a long and healthy life). Finally, the second premise behind using GDP per capita as an indicator for the state of development—that, following an increase in GDP per capita, everyone could be made better off by suitable redistributive policies—is violated if the increase reflects a change in the composition of the population. HIV/AIDS, however, through increased mortality, does affect the composition of the population, and the losers (loss of life) cannot be compensated by the survivors who on average might be better off. In sum, economic growth and GDP per capita are unsuitable indicators of the impacts of HIV/AIDS, as they average across the population, whereas the repercussions of HIV/AIDS for poverty and inequality arise from the increased risks to income and especially health on the

individual level.

Conclusions


Our discussion highlights the important role that the economic impacts of HIV/AIDS have played in building and reinforcing the momentum behind the international response to HIV/AIDS. In contrast, we find that the available evidence on such impacts is weak, and does not fully support the use made of it in policy statements. In addition, some policy statements appear to make selective use of the available evidence, while the HIV/AIDS policy agenda appears to drive some of the available analytical work.

This disconnect reflects a desire to highlight the economic development consequences of HIV/AIDS, “persuading finance ministers to spend money,” on one hand, and a mismatch between the characteristics of the impact of HIV/AIDS and the most commonly used economic development indicators (GDP per capita and poverty rates) on the other hand. While GDP per capita and poverty rates are aggregate indicators, the principal impacts of HIV/AIDS are the increased risks to the prospect of living a healthy and prosperous life, reducing living standards even if GDP per capita remains broadly unchanged.

The disconnects between the HIV/AIDS policy agenda and the available evidence on the economic development impacts of HIV/AIDS, apart from damaging the policy objectives of raising awareness (and funding) for HIV/AIDS programs, also have adverse implications for the effective design of HIV/AIDS programs. This regards, in particular, the impacts of HIV/AIDS across households and the distributional impacts of HIV/AIDS programs.

First, to effectively support households and communities facing a severe HIV epidemic, it is necessary to better understand the impacts of increased premature mortality among adults for the affected households, those left behind, and the affected communities. The available evidence largely measures short-term effects of HIV/AIDS on affected households and fails to capture longer-term implications (especially as households may dissolve following the death(s) of household heads). Moreover, in order to capture the implications of HIV/AIDS for poverty, it is necessary to measure the losses and gains across households, including the opportunities that arise if individuals take up employment opportunities vacated by people who have died.

Second, as the increase in access to treatment extends the average lifespan of people with HIV/AIDS, it modifies and mitigates the impacts of HIV/AIDS on the affected households. While “over the past decade the AIDS response has played a major role in producing better health outcomes for people in developing countries,” little is known about the distributional implications of access to treatment.³² Specifically, improved access to treatment has the potential to exacerbate economic

inequalities, if access to treatment replicates existing inequities in access to health services or crowds out non-HIV/AIDS health services. In the interest of credibly “linking HIV to the broader international health and development agenda,” as postulated by Michel Sidibé, it is necessary to place more attention on the distribution of the benefits of HIV programs and their implications for access to health services across population groups.³³ 

Notes

1. The paper has benefitted from comments by Karen Grépin, Eric Lamontagne, and Susan C. Watkins, who do not necessarily agree with all of its findings.
2. UNAIDS, *2010 Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2010).
3. UNAIDS, *2010 Report on the Global AIDS Epidemic*; United Nations Population Division, *World Population Prospects: The 2008 Revision* (New York: United Nations, 2009).
4. George Alleyne, “Health and Economic Growth: Policy Reports and the Making of Policy,” in *Health and Growth*, eds. Michael Spence and Maureen Lewis (Washington DC: World Bank, 2009); and Michel Sidibé, Crisis, “Opportunity and Transformation: AIDS response at a crossroads,” speech delivered at UNAIDS Programme Coordinating Board, 23 June 2009.
5. United Nations General Assembly, *Resolution adopted by the General Assembly, No. 55/2: United Nations Millennium Declaration* (New York: United Nations, 2000).
6. United Nations General Assembly, *Resolution adopted by the General Assembly, No. 60/262: Political Declaration on HIV/AIDS* (New York: United Nations, 2006).
7. World Bank, *Intensifying Action Against HIV/AIDS in Africa: Responding to a Development Crisis* (Washington DC: World Bank, 1999).
8. World Bank, *The World Bank’s Global HIV/AIDS Program of Action* (Washington DC: World Bank, 2005); and World Bank, *The World Bank’s Commitment to HIV/AIDS in Africa: Our Agenda for Action, 2007–2011* (Washington DC: World Bank, 2008).
9. WHO, *World Health Report 2001* (Geneva: WHO, 2001); WHO, *World Health Report 2003* (Geneva: WHO, 2003); and WHO, *World Health Report 2004* (Geneva: WHO, 2004).
10. UNAIDS, *2004 Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2004); and UNAIDS, *2008 Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2008).
11. For surveys covering this literature in more detail, see UNAIDS, 2008 Report; or UN Department of Economic and Social Affairs, *The Impact of AIDS* (New York: United Nations: 2004).
12. For a summary of findings, see UN Department of Economic and Social Affairs, *The Impact of AIDS*, Table 18.
13. See UN Department of Economic and Social Affairs, *The Impact of AIDS*, for a survey of relevant papers. Authors affiliated with the World Bank while conducting analytical work on the growth impacts of HIV/AIDS include Clive Bell, John D. Cuddington, Shantayanan Devarajan, Jeffrey D. Lewis, Mead Over, Tejaswi Raparla, and James. Three studies showing particularly largely growth impacts of HIV/AIDS are: Channing Arndt and Jeffrey D. Lewis, 2001, “The HIV/AIDS Pandemic in South Africa: Sectoral Impacts and Unemployment,” *Journal of International Development* 13: 427–49; Clive Bell, Shantayanan Devarajan, and Hans Gersbach, “The Long-Run Economic Costs of AIDS: A Model with an Application to South Africa,” *World Bank Economic Review* 20, no. 1 (2006): 55–89, and Rene Bonnel. Two studies by Sackey and Raparla (quoted as World Bank 2001a, and 2001b in UN Department of Economic and Social Affairs, 2004) are outliers among World

- Bank studies, suggesting a very small positive impact of HIV/AIDS on GDP per capita.
14. See, for example, Linette Ellis, Pieter Laubscher, and Ben Smit, "The Macroeconomic Impact of HIV/AIDS Under Alternative Intervention Scenarios (With Specific Reference to ART) on the South African Economy," Bureau for Economic Research, University of Stellenbosch, 2006; ING Barings South African Research, "Economic Impact of AIDS in South Africa: A Dark Cloud on the Horizon," ING Barings South Africa, 2000. A number of studies from Southern Africa suggest a negative impact of HIV/AIDS on GDP per capita, by adopting assumptions introduced by World Bank studies, e.g., Channing Arndt, "HIV/AIDS, Human Capital, and Economic Prospects for Mozambique," *Journal of Policy Modeling* 28 (2006): 477-489; James Thurlow, Jeff Gow, and Gavin George, "HIV/AIDS, Growth and Poverty in KwaZulu-Natal and South Africa: An Integrated Survey, Demographic and Economywide Analysis," *Journal of the International AIDS Society* 2009 12: 18, which both draw on Arndt and Lewis, "The HIV/AIDS Pandemic in South Africa: Sectoral Impacts and Unemployment"; Alwyn Young, "The Gift of the Dying: The Tragedy of AIDS and the Welfare of Future African Generations," *Quarterly Journal of Economics* 120, no. 2 (2005): 423-466.
 15. Paul Corrigan, Gerhard Glomm, and Fabio Mendez, "AIDS Crisis and Growth," *Journal of Development Economics* 77 (2005): 107-24; David A. Robalino, Albertus Voetberg and Oscar Picazo, "The Macroeconomic Impacts of AIDS in Kenya: Estimating Optimal Reduction Targets for the HIV/AIDS Incidence Rate," *Journal of Policy Modeling* 24 (2002): 195-218.
 16. UNAIDS, *2008 Report on the Global AIDS Epidemic*.
 17. Jorge Saba Arbache, "Links between HIV/AIDS and Development," in *The Changing HIV/AIDS Landscape: Selected Papers for the World Bank's Agenda for Action in Africa, 2007-2011*, eds. Elizabeth L. Lule, Richard M. Seifman, and Antonio C. David (Washington DC: World Bank, 2009).
 18. For a fuller discussion, see Markus Haacker, "HIV/AIDS, Economic Growth, Inequality," in *The Socioeconomic Dimensions of HIV*, ed. David E. Sahn (Ithaca, NY: Cornell University Press, 2010).
 19. Ajay Mahal, "Economic Implications of Inertia on HIV/AIDS and Benefits of Action," *Economic and Political Weekly* (2004): 1049-63; Enrico Lovász and Bernhard Schipp, "The Impact of HIV/AIDS on Economic Growth in Sub-Saharan Africa," *South African Journal of Economics* 77, no. 2 (2009): 245-56; Chris Papageorgiou and Petia Stoytcheva, "What Is the Impact of AIDS on Cross-Country Income So Far? A Macro Perspective," unpublished draft, July 2009.
 20. Scott McDonald and Jennifer Roberts, "AIDS and Economic Growth: A Human Capital Approach," *Journal of Development Economics* 80, no. 1 (2006): 228-250.
 21. Angus Deaton, "Global Patterns of Income and Health: Facts, Interpretations, and Policies," Working Paper No. 12269, National Bureau of Economic Research, Cambridge, MA, 2006.
 22. The presence of an infection can only be measured *after* it has occurred. For diseases with a short duration (e.g., flu), the number of current cases is a good proxy for recent infections. In case of HIV/AIDS, disease progression occurs over many years, so that the current number of people living with HIV/AIDS is not a useful indicator of recent infections.
 23. Justin O. Parkhurst, "Understanding the Correlations Between Wealth, Poverty and Human Immunodeficiency Virus Infection in African Countries," *Bulletin of the World Health Organization* 88 (2010): 519-526. An earlier paper by Mishra and others arrives at similar conclusions based on demographic and health surveys from 8 countries. See Vinod Mishra et al., "HIV Infection Does Not Disproportionately Affect the Poorer in

- Sub-Saharan Africa,” *AIDS* 21 (2007), Suppl. 7:S17–S28.
24. Frederick le Roux Booyesen, “Income and Poverty Dynamics in HIV/AIDS-Affected Households in The Free State Province of South Africa,” *South African Journal of Economics* 72, no. 3 (2005): 522-545.
 25. Malcolm Steinberg et al., “Hitting Home: How Households Cope with the Impact of the HIV/AIDS Epidemic,” Publication No. 6059, Kaiser Family Foundation, Washington, DC, 2002.
 26. Emily Gustafsson-Wright, Wendy Janssens, and Jacques van der Gaag, “The Inequitable Impact of Health Shocks on the Uninsured in Namibia,” *Health Policy and Planning* 26 (2011): 142-156.
 27. Kathleen Beegle, Joachim De Weerd, and Stefan Dercon, “Adult Mortality and Consumption Growth in the Age of HIV/AIDS,” *Economic Development and Cultural Change* 55 (2008): 299-326; Anne Case and Alicia Menendez, “Requiescat in Pace? The Consequences of High-Priced Funerals in South Africa,” Working Paper 14998, National Bureau of Economic Research, Cambridge, MA, 2009.
 28. Anne Case, Christina Paxson, and Joseph Ableidinger, “Orphans in Africa: Parental Death, Poverty, and School Enrollment,” *Demography* 41, no. 3 (2004):483-508.
 29. Keith Jefferis, Anthony Kinghorn, Happy Siphambe and James Thurlow, “Macroeconomic and Household-Level Impacts of HIV/AIDS in Botswana,” *AIDS* 22, suppl. 1 (2008): S113–S119; Gonzalo Salinas and Markus Haacker, “HIV/AIDS: The Impact on Poverty and Inequality,” IMF Working Paper No. 06/126, IMF, Washington, DC, 2006.
 30. World Bank, *World Development Indicators 2010* (Washington, DC: World Bank, 2010).
 31. Calculated based on United Nations Population Division, *World Population Prospects*.
 32. UNAIDS, *AIDS and Global Health* (Geneva: UNAIDS, 2009).
 33. Sidibé, “Crisis, Opportunity and Transformation.”