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Review

The impact of HIV/AIDS on labor markets, productivity and welfare in Southern Africa: A critical review and analysis

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Global estimates of the human immunodeficiency virus (HIV) epidemic as of 2007 shows that about 33 million people are living with HIV, the virus that causes acquired immune deficiency syndrome (AIDS). The international labor organization (ILO) estimates that at least 23 million workers in the prime labor force (aged15 to 49 years) are infected with HIV. More than 70% of the world's HIV/AIDS infected population lives in Africa. Within the Africa region, the Southern Africa region has the largest HIV prevalence rate. It is estimated that more than 30% of total world HIV population lives in Southern Africa. In this paper, we analyze the extent to which the HIV/AIDS pandemic impacts the labor markets, productivity and welfare in Southern Africa. We hypothesize that the pandemic can reduce the labor force and productivity, consequently leading to the deterioration in welfare and stagnation of the economy. The analysis finds out that a significant proportion of the labor force has been lost to HIV. In addition to the loss of workers due to AIDS, the cost of caring for AIDS patients is enormous and has resulted into the erosion of productivity and profitability in both the formal and informal sectors. Due to the disproportionate HIV/AIDS prevalence rate between age groups and sex, the pandemic is changing the age and sex distribution of the labor force. The average age of the labor is declining due to the early entry by young and inexperienced people into the labor force. HIV is exerting negative impact on household welfare through the loss of income initially earned by a household member that is a victim of HIV/AIDS, and that through increased medical expenses by the household on the AIDS victim, most of the household income is spent on medication other than other household needs. Some economies in the region are already facing a reduction in economic growth due to the HIV pandemic and it is observed that if efforts to prevent its spread are not intensified, such economies would face stagnation at some point.

Key words: Human immunodeficiency virus (HIV), acquired immune deficiency syndrome (AIDS), labor markets, productivity, welfare.

INTRODUCTION

Consensus in the international community has grown over the past decade about the significance of HIV/AIDS and the threat it poses on economic growth and development. While the impact of the pandemic is being felt in all countries affected, it is expected that the impact will be more profound in Southern Africa countries where the majority of AIDS cases occur. In response to the crisis, the last few years have seen a proliferation of attempts by both governments and non-governmental institutions to create policy frameworks that are supposed to guide interventions related to HIV. Most countries in Southern Africa now have national policies on HIV/AIDS. The success of such policies, however, depends on a

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Abbreviations: HIV, Human immunodeficiency virus; **AIDS,** acquired immune deficiency syndrome.

Table 1. Global summary of HIV/AIDS statistics and features by the end of 2006.

Region	Adult and children with HIV (million)	Adults and children newly infected (million)	Adult prevalence (%)	Percent HIV adults who are women (%)	New HIV infections as a percentage of existing HIV cases (%)
Sub-Saharan Africa	28.10	03.40	8.4	55	12.10
North Africa and middle east	00.44	00.080	0.2	40	00.02
South and South East Asia	06.10	00.80	0.6	35	13.11
East Asia and Pacific	01.00	00.27	0.1	20	27.00
Latin America	01.40	00.13	0.5	30	09.29
Caribbean	00.42	00.06	2.2	50	14.29
East Europe and Central Asia	01.00	00.25	0.5	20	25.00
Western Europe	00.56	00.03	0.3	25	05.36
North America	00.94	00.04	0.6	20	04.79
Australia and Ne. Zealand	00.01	00.00	0.1	10	03.33
Total	40.00	05.00	1.2	48	12.50

Source: UNAIDS (2007).

number of factors, among which the political will is the key. Within the region, some countries such as Uganda, recorded significant successes in the fight against HIV, while the situation worsened in countries, such as the Republic of South Africa (RSA) and Botswana.

Understanding the current and potential impacts of HIV/AIDS on labor markets, productivity and welfare is an important step towards developing impact mitigation strategies. It is important to understand the impact of HIV/AIDS on labor markets because labor is a crucial factor in the production process. Well functioning labor markets are important for improving productivity and productivity has a direct bearing on welfare. Disruptions in labor supply, for example, have a direct bearing on production and therefore, understanding how HIV/AIDS impacts on labor markets is of significant importance. It is also important to understand the relationship between HIV/AIDS prevalence and productivity because productivity is a major component of competitiveness, and competitiveness is a financial counterpart to comparative advantage, both of which have policy implications.

The HIV/AIDS pandemic has both short-term and long term impacts. It is important to understand how both impacts can be mitigated to ensure economic and political stability. The short term impact are felt instantly as a result of the illness or death of the victim, while the long term impacts take time to be noticed. Both forms of impacts are related to labor markets, productivity and welfare. The impact of AIDS to the Southern African economy could be enormous, to the extent that the development prospects of the region surely depend on how successful, governments will be in combating the pandemic.

While some research has been done to quantify the impact of HIV/AIDS on labor market, productivity and welfare, little has looked at the inter-linkages that occur among the three and how they eventually impact the macro economy. Most literature tried to look at the impact of the pandemic on the three mentioned sectors in isolation. The purpose of this article is therefore to provide a more detailed understanding of the impact of HIV/AIDS and its linkage to labor markets, productivity and welfare, and through a conceptual framework shows how the HIV pandemic can determine the direction of an economy. In this paper, we present an analytical review of HIV/AIDS and the significance of the problem in selected countries in Southern Africa.

OVERVIEW OF HIV/AIDS

Global overview

As indicated in Table 1 which shows the global pattern of HIV prevalence, it is estimated that about 40 million people in the world are infected with HIV. The sub-Saharan Africa has the highest number of people living with HIV (about 28 million people) as well as the highest prevalence rate (8.4%). The epidemic continues to spread around the world. Estimates from the Joint United Nations Program on HIV/AIDS (UNAIDS) track the epidemic in time and in different parts of the world. Of the 14 000 new infections which occur every day, 95% occur in developing countries, 2000 are in children under 15 years of age and about 12,000 are persons between 15 and 49, half of which are 15 to 24 years old. The number of new infections as a percentage of existing infections is highest in East Asia and the pacific region (27%), and in the Eastern Europe and Central Asian region (25%). There exists a wide variation in the proportion of adults with HIV that are women. In sub-Saharan African countries, the majority (55%) of those living with AIDS are women.

Table 2. Estimated adults living with HIV/AIDS in Southern Africa.

Country	Men (aged 15-49)	Women (aged 15-49)	Total adults (aged 15-49)*	% of total adult population*	Children (aged 0-14)	Total adults and children
Angola	130,000	190,000	320,000	5.5	37,000	350,000
Botswana	130,000	170,000	300,000	38.8	28,000	330,000
Lesotho	150,000	180,000	330,000	18.0	27,000	360,000
Malawi	340,000	440,000	780,000	15.0	65,000	850,000
Mozambique	370,000	630,000	1,000,000	13.0	80,000	1,100,000
Namibia	90,000	110,000	200,000	22.5	30,000	230,000
South Africa	2,000,000	2,700,000	4,700,000	20.1	250,000	5,000,000
Swaziland	61,000	89,000	150,000	33.4	14,000	170,000
Zambia	410,000	590,000	1,000,000	21.5	150,000	1,200,000
Zimbabwe	800,000	1,200,000	2,000,000	33.7	240,000	2,300,000
Total	3033,000	3152,900	2090	24.4	1091,000	2301,100

Source: UNAIDS 2001 and 2002a.

Table 3. Average life expectancy in Southern African countries (age in years).

Country	Before AIDS	2010	% reduction in life expectancy
Botswana	74.4	26.7	64.11
Swaziland	74.6	33	55.76
Zimbabwe	71.4	34.6	51.54
Namiba	68.8	33.8	50.87
Zambia	68.6	34.4	49.85
Malawi	69.4	36.9	46.82
South Africa	68.5	36.5	46.72
Lesotho	67.2	36.5	45.68
Mozambique	42.5	27.1	36.23
Angola	41.3	35.0	15.25

Source: US census bureau (2000).

HIV/AIDS in sub-Saharan Africa

HIV/AIDS killed 2.3 million Africans in 2001. The estimated 3.4 million new HIV infections in sub-Saharan Africa in the past year mean that 28.1 million Africans now live with the virus (UNAIDS, 2001). In sub-Saharan Africa, the epidemic is primarily a heterosexual epidemic with more women than men infected. In the worst affected countries, steep drops in life expectancies are beginning to occur most drastically in sub-Saharan Africa, where four countries (Botswana, Malawi, Mozambique and Swaziland) now have a life expectancy of less than 40 years (UNAIDS, 2002).

Though Sub-Saharan Africa heads the list as the region with the largest annual number of new infections, the HIV incidence appears to be stabilizing. As shown in Table 2, the region has a lower number of new infections (12%) compared to other regions with more than 12% infection rate. The reduction in the annual number of new infections in the region is attributed to the effective prevention measures in some countries which have enabled people to reduce their risk of exposure.

HIV/AIDS in Southern Africa

The Southern African region has the highest prevalence of HIV in the sub-Saharan African region. As indicated in Table 3, the percentage of total adults' population that is living with HIV/AIDS in Southern Africa is about 24%. This is higher than the prevalence rate of 9% for the whole Africa region, and 8% for the sub-Saharan Africa region. All the countries with prevalence rates of more than 20% are situated in Southern Africa. Botswana, Zimbabwe and Swaziland top the list with prevalence rates of more than 30%. Other Southern African countries with high prevalence include Namibia (22.5%), Zambia (21.5%) and South Africa (20.1%).

DEFINITIONS OF CONCEPTS AND FRAMEWORK OF ANALYSIS

Definitions

Labor market

We adopt a definition by Kane (2003) which defines labor market as a market in which labor is sold and bought. Labor is supplied by households and demanded by firms. At national level, we have two key types of labor markets, namely, the local labor market and the national labor market. The national labor market is a market in which most job search by employers and firms take place on a

national level such as top management positions in large corporations and other high paying jobs. Usually you have few employers and employees in the market.

A local labor market is a market in which most job search takes place at a local level such as farm laborers or some jobs. Local labor markets exist when there are many employers and employees in most geographical regions. Labor market definitions can be narrowed by limiting the industries, occupations, or geographical area covered. In this paper, we will consider labor markets in terms of national geo-political boundaries within the region of Southern Africa. The labor force consists of all non-institutionalized individuals aged 16 or above who are either working or actively seeking work. Those who choose to be full-time students, or retire, or withdraw from the labor force for child-rearing purposes, or who give up looking for work are not counted as part of the labor force.

Productivity

We define productivity as the measure of output derived from a standard unit of input. It is an indicator of efficiency in the producer's use of the input. Total factor productivity is the amount of output produced per unit of total factors of production. Factor productivity refers to the productivity by unit factor of production. For example, labor productivity is the quantity of output per time spent on numbers employed. It can be measured in, for example, U.S. dollars per hour.

Welfare

Brainy dictionary defines welfare as well doing or well-being in any respect. It is the enjoyment of health and common blessings of life, exemption from any evil or calamity. Lopez (1994) defined welfare as comprising, consumption, human development and environmental sustainability and their quality, distribution and stability. Often, per capita income growth and welfare improvement go hand in hand. The most commonly used indicators of welfare are access to good education, employment, medical services and good nutrition. In microeconomic theory, it is generally assumed that the goal of the economic behavior of households is to maximize their welfare or to maximize the individual welfare of the household members. Instead of welfare, the terms "satisfaction" and "well-being" can be used, or the typical economic term "utility". Satisfaction and utility are two terms economists use to describe the overarching goal of households Wolfgang Strengmann-kuhn (2000). Thus HIV/AIDS affects the utility function of a household. The impact of HIV/AIDS on the poor is more severe than on rich, in that the poor have more difficulties in smoothening their consumption in bad times. HIV creates an economic crisis that degrades their human and natural assets.

Incidence and prevalence of HIV

Incidence is defined as the rate at which new cases occur in a population, in a specified period while prevalence is the proportion of a population identified as cases to have HIV in their body at a particular point in time.

Framework of analysis

As mentioned earlier, this paper focuses on the interrelationship among three core concepts; labor market, productivity and welfare in relation to HIV/AIDS. The relationship is shown in Figure 1.

The household is the primary victim of HIV/AIDS infection. But households on the other hand, are the main supplier of labor in the market. Households endow the labor resources of a country. So when somebody gets infected or dies of HIV, it primarily affects the total labor endowment of the household. For household, the effects are multilevel and multifaceted. It has been seen that the crisis of HIV/AIDS locates itself amongst the economically active population as it disproportionately affects those who are in their most sexually active, reproductive and economically productive years (Vass, 2002). Therefore, if the main income earner, generally the adult male of the family gets infected, the whole household gets affected. Firstly, the cost of medical care and transport for the infected person creates an extra pressure on the household income. Sometimes a household has to take over care of children of deceased relatives. Other members divert their time from income generation to care for patients. In order to cope with the situation, other member (s) of the household, generally women may enter into the labor market. It also may cause pull out of children from the school to save their fees and most likely, they would introduce themselves in the labor market as child labor. Therefore, from the household point of view, there will be primary decline in the labor supply but eventually, it could be supplemented by women and children of the household.

The concept of labor market comes into being in terms of supply and demand of labor. As a result of increased mortality rates among adults, the quality and quantity of the labor force will decline. Since the mortality rate is higher among the productive population, it is assumed that the HIV infected population will be covering a good proportion of the highly skilled, experienced labor force. Thus there will be a shortage in the supply of skilled labor force. The total capacity of the system for example, private firms and public offices will be impaired in producing the expected output. AIDS also can lower the school age population, reduce the share of the population

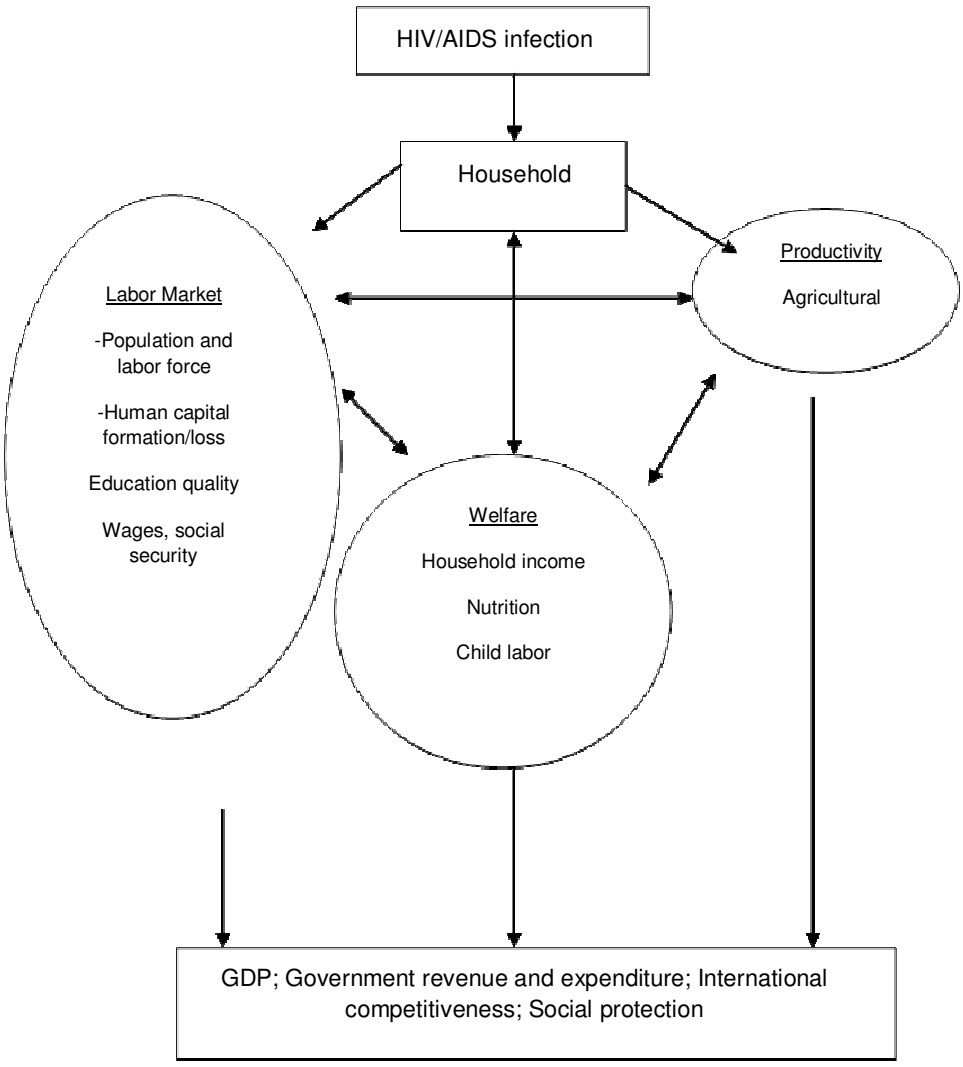

Figure 1. Interrelationship among labor market, productivity and welfare.

that seeks to attend school, the capacity of the management of education system and thus it will reduce the rate of human capital accumulation. This fall in overall workforce lowers the productivity of the firm, household and nation as a whole which eventually will lead to lowering income of individual and national level. As shown in Table 4, the progression of HIV/AIDS in the labor force implies that an initial wave of HIV infection will be followed after some time by increased AIDS morbidity, as the infected workforce contracts secondary AIDS-related infections and illness. This is followed by a full blown AIDS, approximately 1 to 2 years before death or ill-health retirement (Rosen, 2001). The excess attrition in the workforce arises as a result of increased morbidity as increasing numbers of workforce are absent due to AIDS-related illness, caring for infected relatives or attending funerals of colleagues or relatives and friends. This results in lower levels of labor productivity, given absenteeism, and decline in skills and experience. Labor turnover and productivity losses are consolidated when workers develop full blown AIDS and die, constituting absolute losses to the labor market. There is a cumulative process of labor losses, given the average incubation period between initial infection and death due to AIDS.

Labor turnover and productivity losses have a direct correlation to the welfare received by a household and the nation as a whole. At micro level, when adults are dying or getting infected, the cost of treatment or funeral might take out the share of children and older member's part of expenditure. At macro level, while governments are in a tight budget constraint, the increasing expenditure on public health related to HIV may cause a decrease in other sectors.

HIV/AIDS has the greatest impact on productive members of society, such as teachers, farmers, traders and agricultural extension workers, thus increasing the number of dependents in a household. This reduces

Table 4. Progression of HIV/AIDS in the labor force.

Time frame	Projected effect on the work force	Effect on company cost
Year 0	Employee becomes infected with HIV	No cost to company
Year 0-7	Morbidity begins (secondary infections, increased absenteeism, sick and compassionate leave)	Morbidity related costs including absenteeism, individual and workforce productivity, management resources, medical care and benefits
Year 7-10	Employees leaves workforce by resigning, retirement or death due to AIDS	Termination including death benefits, retirement benefits, funeral costs, loss of morale, loss of skills and experiences, loss of workplace cohesion
Year 10-on	There will be long term shortage of experienced workforce and the process of human capital accumulation will be impaired, company hires replacement employees	Turnover costs including recruitment, training, loss in profitability and loss in productivity

Source: Adopted from Rosen et al., 2001.

household productivity and caring capacity, and interrupts the transfer of local knowledge and skills from one generation to the next. In Malawi, between 6 and 8% of teachers die yearly. The impact on the public health sector is also devastating, as health workers either die or leave employment to care for family members, leaving clinics with low levels of qualified staff. This in turn undermines preventative health measures and increases the burden on public health structures. HIV/AIDS has critically diminished the agricultural labor force in some of the most badly affected sub-Saharan African countries, thus increasing food insecurity. As a result of HIV/AIDS, more households are now headed by women, children and elderly people. Food insecurity, increase of medical cost and decrease in income leads to low savings, and eventually the loss of welfare at household and national level, which impedes the growth of national economy.

THE IMPACT OF HIV/AIDS

The impact on labor market

Analysis of the impact of HIV on the labor markets is discussed, focusing on both the supply and demand sides of the market. The supply side looks at the quantity and quality of labor force available and its dynamics as a result of HIV/AIDS. The demand side of the market looks at the dynamics in employees needed by firms, changes in wages and condition of work as a result of HIV/AIDS.

The impact on life expectancy

The shift in the age structure of the work force due to the HIV/AIDS related deaths has a direct bearing on the supply of labor. Haacker (2002) reports that under such circumstances, the skill composition of the supply of labor changes. In Southern African countries, AIDS has significantly reduced the life expectancy. In less than ten years time, many countries in Southern Africa will see life expectancies fall to near 30, levels not seen since the end of the 19th Century (Staneck, 2002).

Botswana will lose more years to HIV/AIDS than any Southern African Country. Life expectancy at birth in Botswana has dropped to a level not seen in Botswana since 1950. As indicated in Table 5, the life expectancy is expected to reduce by 64%. Swaziland, Zimbabwe and Namibia will loose more than 50% of their years to AIDS. The proportion of years to be lost to AIDS is relatively lower for Malawi, Zambia, South Africa, Mozambique and Angola. The reduction in life expectancy implies that the labor market of old and experience professionals will be replaced by young and less experienced people, and this has implications for productivity in both the agricultural and non agricultural enterprises.

Impact on population growth

The most obvious impact of HIV/AIDS on labor is on growth of population. In general, HIV affects the supply of labor through a decline in the overall size of the labor force which results from increased mortality rates and reduced birthrates. Consequently, this leads to increased labor turn over. The reduction in the supply of human capital results from the combined effect of the decline in the average level of experience in the work force, and a reduction in the quality of education results in the fall in productivity. Staneck (2002) reports that by 2010, the populations of five countries; Botswana, Mozambique, Lesotho, Swaziland and South Africa will have started to

Table 5. The demographic impact of HIV/AIDS in Southern Africa.

Country	Population growth rate, 2000		Population growth rate, 2010		Mortality ages 15-49, 2000		Mortality ages 15-49, 2010		AIDS orphans ages 0-15, 2010
	With AIDS	Without AIDS	With AIDS	Without AIDS	Total	With AIDS	Total	With AIDS	% of population
Botswana	0.9	2.6	-1.2	2.0	2.7	2.5	5.0	4.9	7,2
Lesotho	1.7	2.3	0.2	2.0	1.2	0.8	3.0	2.7	3,4
Malawi	1.7	2.7	0.8	2.2	2.0	1.5	2.4	2.0	3,7
Mozambique	1.6	2.5	0.2	2.0	2.0	1.3	3.3	2.8	4,4
Namibia	1.7	2.9	0.2	2.7	2.1	1.8	3.7	3.5	6,6
South Africa	0.6	1.2	-1.2	1.0	1.3	1.0	3.3	3.0	4,4
Swaziland	2.1	3.2	0.5	3.1	2.0	1.5	4.1	3.7	6,8
Zambia	2.0	3.2	1.7	2.9	2.4	1.9	2.4	2.1	4,6
Zimbabwe	0.3	2.2	-0.8	1.9	2.9	2.7	4.1	3.9	5,9

Source: US census bureau (2000).

shrink because of the number of people dying from AIDS. As indicated in Table 4, by the year 2010, Botswana, South Africa and Zimbabwe will be experiencing negative population growth, ranging from -0.8 to -1.2. Without AIDS, the growth rates would have been between 1.0 and 2.9. This negative population growth is due to the high levels of HIV prevalence in these countries and relatively low fertility. Three other countries in the region namely, Lesotho, Mozambique and Namibia, will be experiencing a growth rate of 0.2. Without AIDS, these countries would have been experiencing a growth rate of 2% or greater. This eventually leads to a loss in the labor force. The international labor organization projects that Zambia will lose 19.9% of its labor force by 2020, while Zimbabwe's population in 2020 is expected to be 20% smaller than without AIDS (compared with the labor force size without HIV/AIDS).

Impact on the population structure

The pandemic has a great impact on the structure of the population and therefore affecting the supply of the labor force. Lisk (2002) reports that majority of those who die of AIDS are adults in their productive, sexual and reproductive prime. In 1999, 80% of newly infected people in Rwanda, Tanzania, Uganda and Zambia were between 20 and 49 years. For this reason, the impact of HIV and AIDS on the labor force is even more severe than its impact on the population in general.

As indicated in Figure 2, countries with high HIV prevalence are projected to lose a substantial amount of their labor force to AIDS. Botswana, South Africa, Lesotho and Swaziland are each projected to lose more than 30% of their labor force to HIV/AIDS by 2020. Within the region, other countries that will loose a significant proportion of their labor force to AIDS include Zimbabwe (28.9%), Zambia (19.9%), Malawi (18.9%) and Mozambique (17.7%).

The loss of people of working age, particularly those over the age of thirty five, with proportions of men and women varying according to age group, drastically increases the dependency ratio and has profound implications for the world of work (Lisk, 2002). It is projected that 19 and 18% of the men and women labor force in Southern Africa, respectively, will be lost to HIV/AIDS by 2010. As a result, we expect a reduction in the average age of the work force as young children enter the labor force, with early withdrawals from the labor force due to AIDS.

Increase in number of orphans

The quality of labor force will also be affected not only because many of those infected with HIV/AIDS are experienced workers, but also because the loss of workers has created a generation of orphans. As indicated in Figure 1, it is projected that by 2010, the proportion of orphans in Botswana; the worst affected in the region, would reach up to 7.2% of the population. Other countries expected to have a significant proportion of orphans in their population include Namibia (6.6%), Swaziland (6.8%) and Zimbabwe (5.9%). Orphans may grow without adequate support and guidance and then enter the labor market prematurely, without the necessary skills. The entry of such orphans into the labor market is likely to lower the average level of skills in the work force and hence productivity. The increase in the number of orphans will lead to the increase in the dependency ratio and this has profound implications for the labor market (Vass, 2002).

The impact on loss and formation of human capital

HIV/AIDS will have a large impact on the supply of human capital, both through the destruction of existing

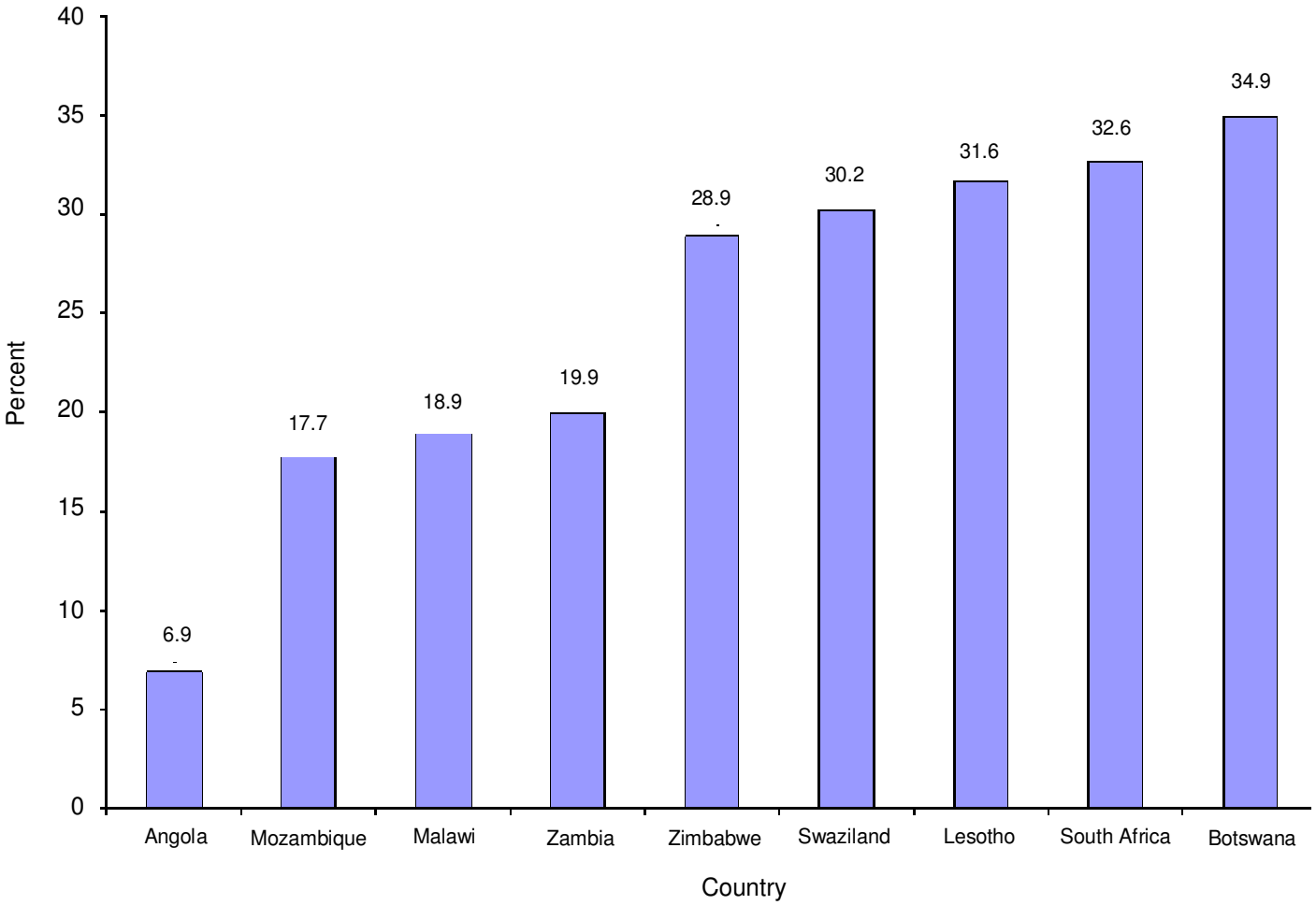

Figure 2. Projections of the proportion of the labor force that would be lost due to HIV/AIDS by 2010. Source: UN (2000, 2001) and ILO (2001).

human capital and through the retardation of the formation of new capital. AIDS selectively destroys human capital, that is, peoples' accumulated life experiences, their human and job skills, and their knowledge and insights built up over a period of years. It is primarily a disease of young adults. As these infected adults become progressively sick and weak, they steadily lose their ability to work. Eventually, the disease kills them in their prime, thereby destroying the human capital built up in them over the years through child-rearing, formal education, and learning on the job (Channing and Wobst, 2003).

It is widely acknowledged that there exists a strong association between education levels and productivity growth in both the agricultural and non agricultural sector. Studies conducted by several scientists including one by Canning and Sevilla (2001) reveal a positive association between schooling and aggregate productivity. Such studies show that school dropouts are positively correlated with the number of orphans.

HIV has negative impact on human capital formation through education in two ways. First, as parents die due to AIDS, particularly for poorer household, the opportunity cost for pupils to attend school rises and thus children become an important source of labor for the household. Second, as the number of qualified teachers decreases due to HIV deaths, the capacity of an education system to deliver is greatly reduced, which results to poor quality of human capital. A study on Zimbabwe (Malaney, 2000) where 19 and 29% of the male and female teachers were infected by HIV, respectively, and absenteeism was increased.

Teachers with sick families also took time off to attend funerals or to care for the sick. The early loss of qualified employees in the public sector is resulting into a decline in the quality of public services and countries are eventually finding it hard to replace highly qualified public servants such as doctors and teachers who fall victim to HIV/AIDS. Even in the unlikely event that there is a sufficient supply of teachers to replace losses, there is usually a negative impact on students. Women that are HIV positive have fewer babies, partly because they may die before the end of their child bearing age, and up to one third of children are themselves affected and may not

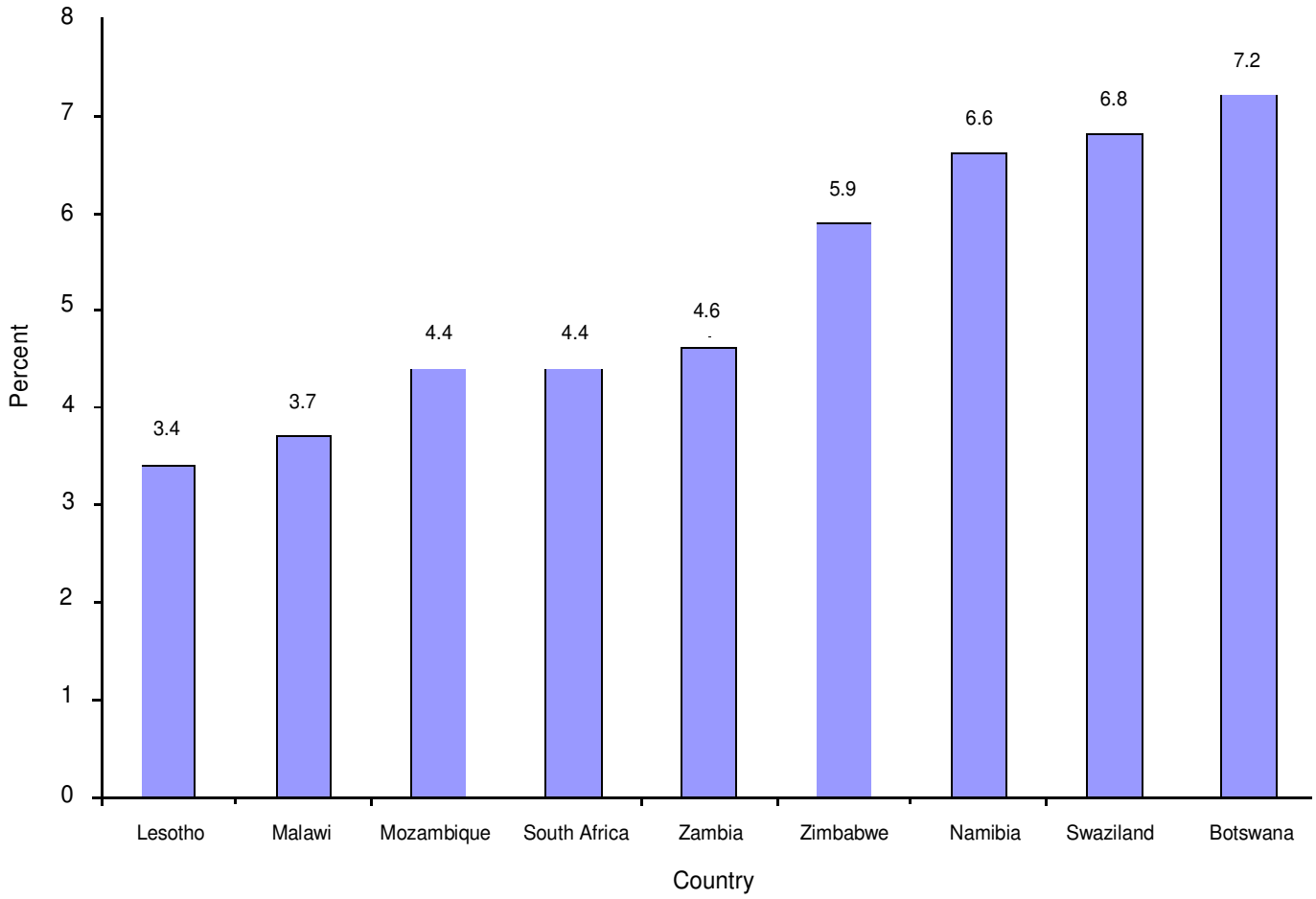

Figure 3. Projections of the proportion of the population that will be orphans by 2010. Source: UN (2000, 2001) and ILO (2001).

survive to school age: so that the number of children in school is falling (Lisk, 2002).

In general, AIDS weakens the mechanisms that generate human capital formation. In family homes, the quality of child-rearing depends heavily on the parents' human capital. If one or both parents die while their children are still young, the transmission of knowledge and potential productive capacity across the two generations will be weakened. At the same time, the loss of income due to disability and early death reduces the lifetime resources available to the family, which may well result in the children spending much less time (if any at all) at school (Vass, 2002).

The public sector is experiencing a much higher cost of absenteeism than the private sector because of the greater employment security that exists in the public sector. In countries like Malawi for example, employees can take one or more years of sick leave with pay. Lisk (2002) reports that some Southern Africa countries will loose between one-quarter and one-third of their skilled and educated population in one way or another, having a bearing on human capital formation.

The impact on productivity

Impact on enterprises

The enterprise presents a typical full cycle relationship between the HIV/AIDS, labor markets and welfare. Such linkages or interrelationships among three concepts are shown in a framework adopted from Vass (2000) in Figure 4 that indicates, as a result of illness or death caused by AIDS, there is an increase in absenteeism, labor turn over and cost of recruitment. Productivity for the sick members of staff is reduced. In the event of death, the employer may make a replacement, but as mentioned earlier, the replaced labor may be less experienced and thus lowering productivity of the enterprise. On the other hand, the cost of caring for the sick is usually taken by the employer. This results into the rise in cost of caring for the employees and will affect profitability of the enterprise.

A study on several Southern African countries has estimated that the combined impact of AIDS-related absenteeism, productivity declines, health-care

expenditures, and recruitment and training expenses could cut profits by at least 6 to 8%. Nam Water, Namibia's largest water purification company has reported that HIV/AIDS was hindering its operation as absenteeism rose and productivity dropped. A study of a sugar mill in South Africa put the cost per worker per year at R 9,500 (about £800). Of this, the cost of replacement workers, lost productivity, and absenteeism account for about a quarter each (Haaker, 2002). Figure 4 also illustrates how these costs combine and reinforce each other to reduce revenues and profits of enterprises, and therefore their potential to survive. Available evidence suggests that productivity levels in South Africa and other countries in that sub-region could decline by up to 50% in the next five to ten years, with devastating consequences for profits.

In a study on Zambian enterprises, employers and employees in eight Zambian firms were interviewed to assess the direct and indirect costs of illness and reports some insight of firm's cost of employee's sickness. The main causes of ill health were tuberculosis (TB) (46.8%), diarrhea (12.9%), and sexually transmitted infections (STIs) (5.8%). Annual treatment costs incurred by employers ranged from US$4 to 100 per person treated. Other employer's costs included productivity losses, paid sick leave, cost of employee replacement and funerals. Employees incurred costs of US$13 on average per episode of illness (Lisa, 2003). The study notes that the common causes of ill health were those most frequently associated with AIDS. More broadly, the study illustrates that the impact of HIV/AIDS on firms is high, and that employers must adopt strategies to address it.

The Impact on agricultural productivity

The HIV/AIDS pandemic can affect agricultural productivity in several ways. As a result of the loss in the agricultural labor force due to death, the productivity at household level is reduced. Lisk (2002) reports that loss of agricultural labor can lead to farmers switching from cash crops to subsistence farming, a reduction in soil improvement, irrigation and other capital investments, and within subsistence farming changes to less labor-intensive crops. Families are also forced to sell food grain, livestock, equipment and land to cover AIDS-related expenses and loss of knowledge and skills as a negative effect on productivity (Howard et al., 2002). The loss in knowledge and management skills through the deaths of agricultural experts can also result in a reduction in agricultural productivity. The Southern Africa region is already facing tremendous losses in agricultural productivity as a result of AIDS.

In Malawi for example, FAO (2000) reported that about 16% of the deaths of agricultural experts in the Ministry of Agriculture are caused by AIDS. A study (Meera et al., 2002) on the impact of HIV/AIDS on agricultural productivity in Malawi revealed that the probability of decreased crop yields was higher among households that faced chronic sicknesses. The study also found out that the impact on productivity was higher among poorer households as the proportion of households with decreased crop yields was the highest among the very poor categories of households who were affected by chronic sickness (82 to 93% of the households). Kwaramba (1997) reports that in Zimbabwe, the production of maize, cotton, vegetables and groundnuts were estimated to drop by 61, 47, 49 and 37%, respectively as a result of HIV/AIDS related illnesses and deaths.

The impact on welfare

The HIV/AIDS pandemic has a far more extensive impact on welfare than apparently thought. We have seen that HIV/AIDS lowers labor productivity thus income and therefore welfare. In this section, we look into how HIV has magnified welfare problem in Southern Africa.

Impact on household poverty

The households face an immediate impact from HIV/AIDS if a member of the household is infected or dies of it. In most cases, the presence of AIDS means that the household will dissolve as parents die and children are sent to relatives for care and upbringing. A study on Zambia reported that 65% of the households in which a mother had died dissolved. However, in most cases before the dissolution takes place, the family looses most of its assets, including the income earner, further impoverishing the household (Meera et al., 2002). AIDS does not only reverse efforts to reduce poverty but it also increases the percentage of people living in extreme poverty. A study on Botswana revealed that household income for the poorest quarter of households is expected to fall by 13% (Haacker, 2002). Income earners in these households are also expected to take on an average of four more dependants because of HIV/AIDS. In Malawi where the number of orphans is skyrocketing, family sizes are also beginning to rise (Meera et al., 2002).

The impact of HIV on poorer households is relatively higher than the wealthier households. In the story of a household in Malawi, the poor categories of households show much vulnerability in cases of chronic illness caused by AIDS. If the sickness is prolonged, and if it occurs during the critical agricultural season, the impact is bigger, moving the household down the economic ladder. Rich households are usually able to survive the shock with fewer economic problems; therefore, not many of them see a change in their relative wealth category. The poorest households, with hardly any

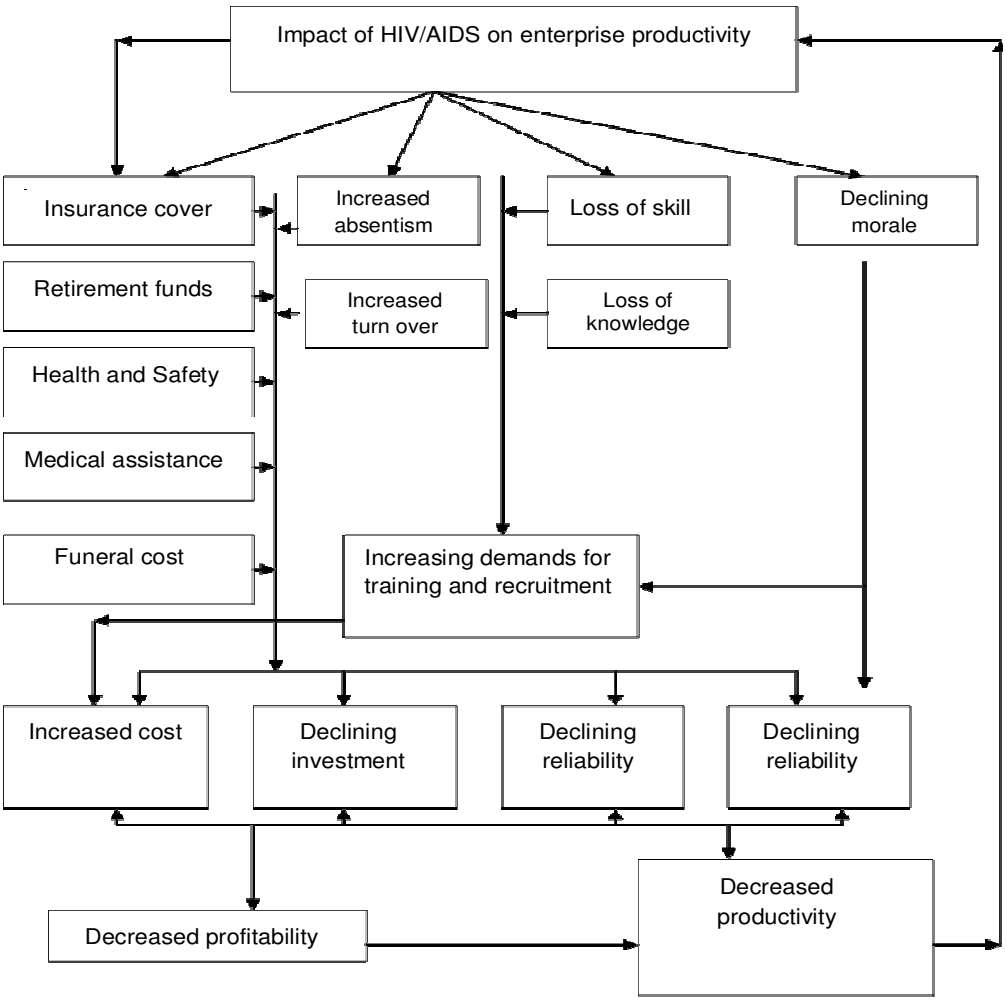

Figure 4. Impact of HIV/AIDS on enterprise productivity. Source: Adapted from Vass (2002).

resources in the first place, are already so poor that there is no worse category for them to move down to (Meera et al., 2002).

Impact on vulnerable groups

Impact on women and children: Women perform the majority of household and agricultural work in Southern Africa. In short, they bear and care for the work force, present and future as well as taking care of themselves. It follows that when women are affected, the workforce is affected. Women are exposed to several forms of violence, some of which put them in circumstances of dependency and sexual harassment. This undermines women's efforts to achieving economic security and independence, and thus broadening the existing inequalities between men and women.

HIV/AIDS increasingly and disproportionately affects women and adolescent girls in Southern Africa. Traditional power relations between men and women means that women and adolescent girls are less able to negotiate concerns about their sexuality and are therefore less able to protect themselves from the risk of HIV infection. Girls are at high risk of coercive sex and violence. HIV prevalence among adolescent girls is outpacing that of all other age groups and of males. The situation is compounded by the stigma and discrimination faced by women with HIV/AIDS, who often face eviction from their homes if they disclose their status. Women in Southern Africa are also the main source of agricultural subsistence labor. In HIV-affected households, food production can be reduced by up to 60% when a major part of women's time and energy turns to caring for HIV/AIDS-infected family members. This burden is also increasingly affecting elderly women who take on the care of orphans left behind by the deaths of their sons and daughters (Oxfam, 2002).

HIV/AIDS has enormous implications for children, since 60% of the region's population is under the age of 18. Figure 3 shows the potential increase of orphan children in the region (UN 2000, 2001; and ILO, 2001). Children

become particularly vulnerable to the impacts of HIV. When times are difficult, children have to help out by searching for wild foods or by working to boost household earnings in order to buy more food if it is available. Households affected by HIV/AIDS also have greater health care costs and therefore less money for food or education. As a result, children's education suffers because of missed schooling; they may even be withdrawn from school altogether. In Zimbabwe, 18% of households have removed one or more children from school as a coping mechanism in response to the lack of food. The long-term consequences of malnutrition are profound. Poor nutrition of pregnant women will affect the brain, body growth and development of the baby. Under-nourished children fall repeatedly ill as their immune systems never get the full complement of micronutrients they need. If chronic malnutrition continues throughout the lifecycle, stunting can result. In the central region of Malawi, 56% of children under five are stunted and majority will never reach their full physical or mental potential.

HIV/AIDS is exacerbating children's problems in the current crisis. The number of orphans is increasing dramatically: There are already 3.2 million AIDS orphans in the region, and the number of street children in urban areas is increasing visibly. In 2010, in all affected countries except Angola, between one-fifth and one-quarter of all children less than15 years will have lost their mother or both parents to AIDS.

Health care workers: While the demand for health services is expanding, more health care professionals are being affected by HIV/AIDS. In Malawi for example, the illnesses and death rate due to HIV/AIDS among health care professionals increased by 5 to 6 times (Lisa, 2003). The health workers are also facing increased workloads and therefore, increased stress due to the increase in the number of patients. In extreme cases, the increased stress among health care workers if not accompanied by equivalent increments in the remuneration, could lead to migration to other countries and thus creating a vacuum in the labor force.

Sex workers and other jobs requiring mobility: The most obvious category of workers at special risk is that of commercial sex workers, a very high proportion of who (up to 80% in some areas) is seropositive. Workers with jobs that involve mobility from home and separation from family, for instance, in transport services (long-distancetruck drivers, train crews, sailors, etc.) mining, construction, seasonal workers in agriculture and tourism, and migrant workers of all kinds without their families, are particularly vulnerable to HIV infection (Lisk, 2002).

They frequently resort to commercial sex, running the risk of becoming infected and later spreading that infection to their spouses and home communities. Other categories facing occupational risks include health workers (exposed to infection by poor medical practices) and the security forces.

Security forces and males with higher education: The police and army are at risk not only because of their mobility and living arrangements (in large concentrations of single men), but also because of the power derived from their military status: Civilian populations who interact with the military, especially displaced persons and refugees, also have higher than average infection rate (Howard, 1997).

Males with higher levels of education, such as teachers and middle/senior civil servants have a similar power to the one exercised by the security forces, mainly due to higher disposable incomes. This put them at a higher than average risk of contracting HIV due to their increased ability to pay for casual sex. This will result in more deaths among the mentioned categories of workers and eventually affecting the quality of productivity of the labor force.

Macro economic impacts of HIV and how they relate labor markets, productivity and welfare

The macro economic impacts of HIV/AIDS manifest on both the supply and demand side. The customer base is narrowed and demand growth for some commodities is increased. The pandemic has profound impacts on the government fiscal balance as it creates distortions in government revenue, savings and investments, GDP growth and increases the cost of social protection.

Impact on government revenue

HIV/AIDS is affecting government revenue, primarily through its adverse impact on the tax base. The reduction on the rate of population growth and hence the labor force implies a reduction on the components of the tax base such as personal income, company profits, imports or consumption. At the same time, a certain category of expenditure such as, health and social expenditure increases. The decline in productivity of the enterprises leads to low profitability and therefore reduced government revenue.

Impact on gross domestic product (GDP) growth

GDP projections for most Southern African countries show substantial GDP losses due to the HIV pandemic. The losses are primarily due to the decline in labor supply, human capital and savings, as well as due to the decline in total factor productivity. The epidemic creates a vicious cycle by reducing economic growth which leads to increased absolute poverty. In addition, the epidemic is likely to increase income inequality by increasing the supply price of scarce skilled labor, leading to higher

wages for skilled workers Vis-a-vis unskilled and unemployed labor (Lisk, 2002).

According to a macro-economic sensitivity analysis of the impact of HIV/AIDS on the South African economy, through 2015 conducted by the bureau for economic research, (BER) and the level of real (GDP) growth is projected to be 1.5% lower by 2010 and 5.7% lower by 2015 with HIV/AIDS than without the disease Neal Cohen (2002).

Haacker (2002) modeled the impact of HIV/AIDS on the Zambian economy under several scenarios. He estimates that in the medium term under an "open-economy" model, Zambia will experience a 5.8% reduction in GDP per capita because of HIV/AIDS of this percentage, 1.0% due to total factor productivity, 1.7% to the capital/labor ratio, and 3.1% to "experience" (aggregate knowledge and skills of the workforce, lost due to AIDS mortality and to new entrants in labor force lacking such experience). In the long term, he projects a 1.8% decrease in GDP per capita because of HIV/AIDS. The lower figure for the long-term reflects partly that the decline in experience will be partly reversed as the weight of younger cohorts in the working-age population declines, reflecting lower birth rates.

Social protection

Most countries are already facing significant impacts on the cost of pensions and social security. As more employees die before their retirement age, the contributions to a social security fund decline. On the contrary, social spending is likely to increase as a result of the proportion of orphans in the population. It is important to remember that all this is happening as the tax base continues to narrow and therefore reducing national revenue.

Conclusion

We started by providing a global and regional prevalence of the HIV pandemic. A framework was presented to describe the relationship of the core concepts; namely, HIV/AIDS, labor markets, productivity and welfare. The results show that the impact of HIV/AIDS on all the three core concepts is enormous. It has been observed that the infection by HIV on an individual sets on a long chain reaction. We tried to show that the reaction starts with decreasing the productivity of an individual who is a source or potential source of labor, eventually leading to a permanent loss of that labor source.

The discussion also proved that there was indeed a strong relationship between productivity and welfare and that they all are linked to the macro economy. We showed how increased heath care and social security cost, together with falling profitability of enterprises and the loss of income by workers results into a reduction in government revenue. If the macro economic impact leads to a decline in private savings and investments, then employment creation in the formal sector would also decline.

However, although the short term has impacts of HIV/AIDS on labor markets, productivity and welfare in a closed economy are simple to demonstrate such interrelationships as complex in an open economy. Thus, the projections made regarding the quantitative impacts of the pandemic would become mere speculation when you apply them to an open economy. As economies get more integrated into the global economies, it means that the impact of HIV on national economies can no longer be assessed in isolation of the potential labor market dynamics in the global economy.

Most literature cited suggests that there could be some kind of linear relationship between HIV/AIDS and growth. However, some recent research suggests that these studies might be too optimistic. What they fail to consider is that undermining human capacity, HIV/AIDS reduces productivity, disrupts organizations and unravels institutions. The implication is that the pandemic's effects are more likely to be non-linear (Barks, 2001). The findings in this review are therefore not conclusive, but they form a good basis for further research.

Following the discussion presented earlier on, some recommendations are being proposed. They are categorized into two, namely, program and research recommendations. Program recommendations are proposed actions to be taken to reduce the spread and impact of the pandemic based on the available research findings. Research recommendations are recommend-dations that point to gaps in the current research findings and therefore propose for a further generation of information that can provide a more precise insight on the impact of HIV/AIDS.

RECOMMENDATION

The following recommendations are considered:

1. Investing a greater part of National savings in the HIV prevention efforts and treatment could contribute to the alleviation of the impact of HIV/AIDS. Both the private and public sector need to expand prevention programs dramatically to protect those that are not yet infected by the HIV. This can be done by following the guidelines provided in the respective National Frameworks for HIV/AIDS prevention.
2. The countries which are relatively stronger in terms of their economy can adopt some policies for attracting labor forces, especially skilled labor forces from outside of the country or region.
3. As most of the countries of the region are agriculture dependent and the agriculture is labor intensive thus the

special attention should be given by the policy makers on household and firm agriculture.

4. To mitigate impact of HIV, governments should adopt multi-sectoral approach. People-oriented, community based approaches are necessary for creating and sustaining the conditions in which HIV/AID can be prevented and its impact addressed more effectively.

5. Social cohesion is also very important to minimize negative impact of HIV. Therefore, governments should implement policies that encourage communal harmony and discourage discrimination against weaker sections of the society.

Most research conducted on the impact of HIV/AIDS tends to focus on short-term impacts and it also assumes a linear relationship between HIV prevalence and the outcomes on labor markets, productivity, welfare and economic growth. We hypothesize that the relationship may be non-linear and thus a more detailed analysis needs to be conducted to understand the relationships before projections can be made on the impact to the economy.

Although this paper discussed the current and potential impact of HIV/AIDS on the labor markets, we did not explicitly analyze the dynamics in the wage as a result of the changes in the supply of skilled labor. Thus we recommend future studies to explore the potential impact of the pandemic on the wage rate within the labor markets.

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