

THE UNIVERSITY OF THE WESTERN CAPE

**Towards a More Comprehensive Framework to
Estimating the Indirect Costs of HIV/AIDS in
South Africa**



A Mini-Thesis submitted in partial fulfillment the requirements for the degree of Magister Commerce in the Faculty of Economic and Management Sciences, University of the Western Cape.

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Abstract

This study proposes a modification of the traditional cost-of-illness (COI) approach. It considers additional indirect cost parameters that yield a comprehensive cost structure for human capital at a micro level. Although HIV/AIDS is an epidemiological problem, it has enormous direct and indirect economic costs. Arguably, the most important cost associated with HIV/AIDS results from the high rates of morbidity and mortality among working age adults, the vast majority of those infected. These are essentially losses in an economy's existing stock and potential accumulation of human capital, implying lower levels of labor productivity and eventually loss of labor. These impacts are accounted for in existing macroeconomic and microeconomic impact studies. Indirect costs, such as forgone earnings due to illness, are included whereas forgone earnings of caregivers in the household are unaccounted for.

This study argues that indirect human capital costs due to lost earnings of caregivers fall heavily on poorer households with high dependency ratios, especially in the absence of an altruistic state. Furthermore, a comprehensive measure of indirect human capital costs of HIV/AIDS at micro level should also incorporate resources lost in taking care of HIV orphans, effects on investments and savings. To this end, this research employed a qualitative methodology which emphasizes on exploring how the different coping mechanisms of HIV/AIDS result in indirect costs. Existing South African case studies were reviewed and grouped thematically according to their content and a typographical analysis was carried out. Forgone income of caregivers to the ill and orphans, loss in savings and investment were identified as significant indirect cost parameters of HIV.

Keywords

HIV/AIDS, Cost-of-illness (COI), Human Capital, Willingness-to-pay, Direct Costs, Indirect Costs, Macroeconomic Impact, Labour Productivity, Household Coping Mechanism, Typographical Analysis, Saving and Investment

Declaration

I declare that 'Towards a More Comprehensive Framework to Estimating the Indirect Costs of HIV/AIDS in South Africa' is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Ruth Tekle Andemariam



November 2004

Singed:

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ARV	Antiretroviral
COI	Cost-of-illness
DOH	Department of Health
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GNP	Gross National Product
HCM	Human Capital Methodology
HIV	Human Immunodeficiency Virus
HSRC	Human Science Research Council of South Africa
HST	Health Systems Trust
NGO	Non Governmental Organization
TB	Tuberculosis
UN	United Nations
UNAIDS	Joint United Nations Program on HIV/AIDS
UNDP	United Nations Development Program
WHO	World Health Organization
WTP	Willingness-to-pay

TABLE OF CONTENTS

Chapter One - Introduction.....	1
1.1 Introduction.....	1
1.2 Problem statement.....	1
1.3 Research Question.....	2
1.4 Purpose.....	2
1.5 Research Design.....	3
1.6 Delimitations.....	3
1.7 Limitations.....	3
1.8 Significance.....	4
1.9 Chapter Outline.....	4
Chapter Two – Literature Review and Conceptual Framework.....	5
2.1 Structural impact studies.....	6
2.2 Cost impact studies.....	10
2.2.1 Cost-of-illness approach described.....	10
2.2.2 Studies done using the cost-of-illness approach.....	15
2.3 Conceptual Framework.....	17
Chapter Three - Some Background Information On The Economy Of South Africa.....	18
3.1. Geography.....	18
3.2. Demography.....	19
3.3. Problems of Unemployment and Poverty in South Africa.....	21
3.4. Problems of HIV/AIDS and the HIV Seroprevalence Rates in South Africa.....	22
3.5. Features of Households of South Africa.....	25
Chapter Four - Methodology and Analysis.....	26
4.1 Methodology.....	26
4.1.1. Data Types and Sources.....	26
4.1.2. Data collection methods.....	28
4.1.3 Data analysis method.....	28
4.2 Analysis.....	29
4.2.1 Direct Costs.....	30
4.2.2 Indirect Costs.....	31
Chapter Five - Conclusion and Recommendation.....	37
Bibliography.....	41

LIST OF APPENDICES

Appendix 1 South African case studies findings

Appendix 2 South African HIV/AIDS prevalence rate map by provinces

**Appendix 3 Proportion of households in each province living in formal dwelling, July
2003**



Chapter One - Introduction

1.1 Introduction

Current studies of the cost estimates of HIV/AIDS lead to underestimation of the cost of the pandemic to society. Indirect costs, such as forgone earnings due to illness, are included whereas forgone earnings of caregivers in the household are unaccounted for. In the absence of an altruistic state the indirect human capital costs due to lost earnings of caregivers fall heavily on poorer households with high dependency ratios. Furthermore, a comprehensive measure of indirect human capital costs of HIV/AIDS at micro level should also incorporate resources lost in taking care of HIV orphans, effects on investments and savings.

The different structural studies done on the impact of HIV/AIDS show that the pandemic has wide ranging costs that the traditional cost-of-illness approach was not designed to estimate. If we are to get a more comprehensive costing structure, we should include additional parameters of indirect costs.

1.2 Problem statement

HIV/AIDS is an epidemiological problem with enormous direct and indirect economic costs. Arguably, the most important cost associated with HIV/AIDS results from the high rates of morbidity and mortality among working age adults, the vast majority of those infected. These are essentially losses in an economy's existing stock and potential accumulation of human capital, implying lower levels of labor productivity and eventually loss of labor. These impacts are accounted for in existing macroeconomic and microeconomic impact studies.

However, these studies don't take into consideration the indirect costs that HIV/AIDS places on households which are growing as the epidemic is becoming more widespread and the number of orphans is increasing. Indirect costs, such as forgone earnings due to illness, are included whereas forgone earnings of caregivers in the household are unaccounted for. In the absence of an altruistic state the indirect human capital costs due to lost earnings of caregivers fall heavily on poorer households with high dependency ratios. Furthermore, a comprehensive measure of indirect human capital costs of HIV/AIDS at micro level should also incorporate resources lost in taking care of HIV orphans, effects on investments and savings.

1.3 Research Question

This study will address the following research questions:

1. Who takes the burden of caring for those infected?
2. How are orphans of HIV taken care of?
3. What are the costs involved in taking care of the ill?
4. In what ways are households affected by HIV/AIDS?
5. How is household income affected due to HIV infection?
6. Which variables should be included in the traditional cost-of-illness approach so that we can avoid underestimation to some extent?

1.4 Purpose

This study modifies the traditional cost-of-illness (COI) approach and includes additional indirect human capital costs parameters so that underestimation of the costs could be limited to a certain extent.

1.5 Research Design

The methodology to be employed in this research is a qualitative one because the study emphasizes on exploring how the different coping mechanisms of HIV/AIDS result in indirect costs. The study looked at different household and individual level studies done on the impact of HIV/AIDS in South Africa. The major South African and African journals were browsed for studies on the household and individual level impact from 2000 on wards. 2000 was chosen as a baseline period because there aren't that many such studies done prior to that period. Websites of the major organizations in this field were also browsed to add magnitude to the analysis. The different studies were grouped thematically according to their content and a content analysis was carried out.

1.6 Delimitations

The scope of this study is limited to identifying and incorporating additional indirect cost parameters to estimating the cost of HIV/AIDS. The inclusion of these additional parameters depended on a limited number of case studies in South Africa due to the small number of studies done on the impact of HIV at the microeconomic level.

1.7 Limitations

This study deals with identifying a few indirect costs such as loss of income of caregivers to the ill and orphans, loss of investment and savings. It is based on secondary data collection method. This study doesn't attempt to build a comprehensive costing framework, but the additional indirect costs parameters are hoped to limit underestimation.

1.8 Significance

Estimating the costs of such a complex disease as HIV/AIDS is no simple task. We have to take additional indirect cost parameters if we are to limit underestimation. From the different structural studies done, we can see HIV/AIDS imposes wide ranging indirect costs the most important being loss of income of caregivers to the ill and orphans, loss of investment and savings. By incorporating these additional parameters to the traditional cost-of-illness approach it is hoped we will get a more comprehensive costing framework so that underestimation can be limited to a certain extent.

1.9 Chapter Outline

The study will be divided into four parts. Chapter one provides an introduction, research questions, methodology and limitations of the study. Chapter two provides a literature review of the different studies done on the economic impact of HIV as well as a conceptual framework. Chapter three gives an overview of the South African economy. Chapter four presents the methodology used and a typographical analysis of South African case studies. Finally chapter five presents conclusions and possible recommendations followed by appropriate references and bibliography.

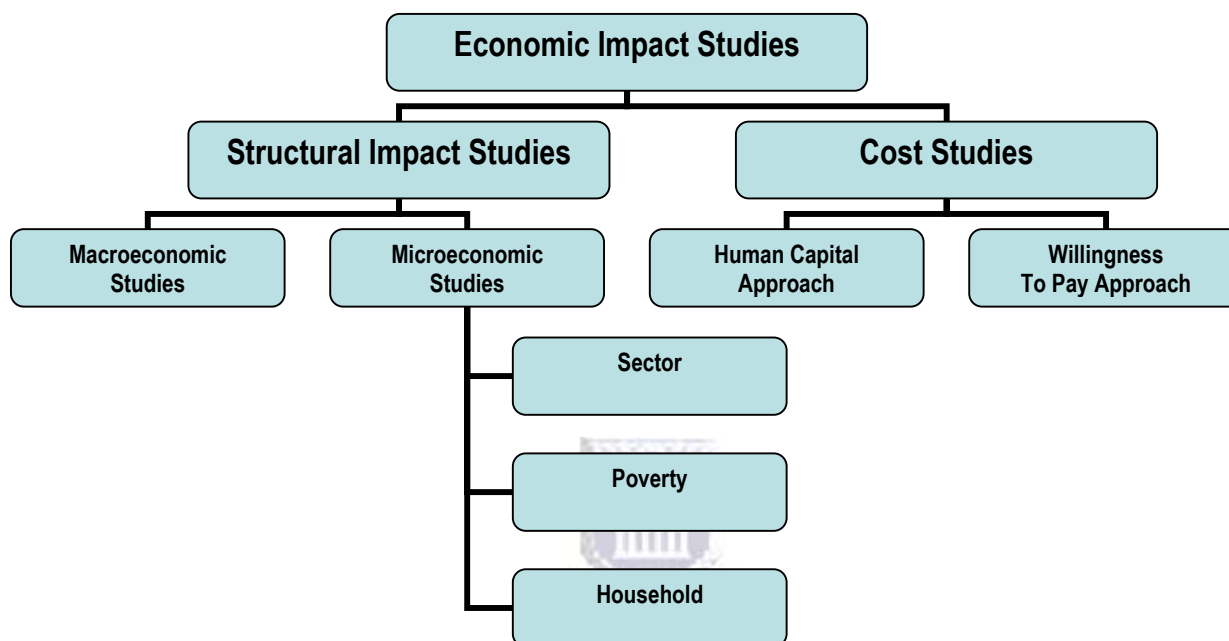
Chapter Two – Literature Review and Conceptual Framework

HIV/AIDS is an epidemiological problem with enormous direct and indirect economic costs. Arguably, the most important cost associated with the HIV/AIDS results from the high rates of morbidity and mortality among working age adults, the vast majority of those infected. These are essentially losses in an economy's existing stock and potential accumulation of human capital, implying lower levels of labor productivity and eventually loss of labor. Studies linking HIV/AIDS and economic performance have incorporated several broad avenues of investigation. Macroeconomic studies examine the relationship between HIV/AIDS and country level growth meaning its impact on labor supply and demand, capital investment and utilization, savings, investment, aggregate demand, GDP and the distribution of income while microeconomic studies explore the dynamics at the household or individual level including the impact of the HIV/AIDS epidemic on poverty, economic sectors, the public sector (Booyesen et al, 2003). Besides these structural impact studies, a number of research on the cost of the pandemic have been undertaken: these studies take into consideration direct costs and sometimes also include forgone income as indirect cost.

The objectives of this chapter are twofold: The first is to review some previous studies on the economic impact of HIV/AIDS; and the second is to present the conceptual framework for our assessment. The review of literature will focus on empirical studies dealing with economic impact of HIV/AIDS. It also introduces the theoretical background to the traditional cost-of-illness approach, the focus of this research, and looks at studies done using this costing technique. We can see from the structural studies done that HIV imposes far reaching indirect costs beyond what this costing framework was designed to calculate.

The conceptual framework will present some ‘a-priori’ expectations of the potential indirect costs of HIV/AIDS that should be included in the cost-of-illness framework so as to limit underestimation to some extent.

Figure 2.1 Economic impact studies of HIV



2.1 Structural impact studies

More than 20 years and 20 million deaths since the first AIDS diagnosis in 1981, almost 38 million people are living with HIV (UNAIDS, 2004). An epidemic of this size and scope is bound to have grave economic consequences because the disease is primarily concentrated in the working age group. Different studies have attempted to address the economic impact of the pandemic from different avenues. Initially, the primary focus in HIV/AIDS modeling was demographic, behavioral and epidemiological rather than economic in nature (Booyesen et al, 2003). But during the late 1980's and early 1990's economists started to model its macroeconomic impact on the growth path of many countries. More recently, the focus

has changed once more to micro level studies on poverty, different occupational setting and households¹ as the disease's impact was found to affect individual and households first before it ripples to other economic agents (Booyesen, 2002).

Several economists addressed the macroeconomic implication of HIV/AIDS using different econometric models during the early stages of the epidemic (Broomberg et al, 1991; Cuddington, 1993; Arndt and Lewis, 2000). Broomberg et al (1991) adopted the human capital approach based on the methodology developed by Rice (1966) to project the direct and indirect costs of HIV for the South African society in the 'AIDS' and 'no-AIDS' scenario. Costs are divided into direct and indirect, where direct costs include the costs of health services provided by public and private sectors. Indirect costs include estimates of the morbidity, disability and premature mortality as a result of HIV/AIDS by summing lost future earnings. This study is different from the other macroeconomic studies (Cuddington, 1993; Arndt and Lewis, 2000) in that it tries to project the economic implications in monetary terms. It makes use of what is essentially a cost-benefit framework in that it focuses on those directly affected by the epidemic and excludes from consideration the rest of society. Furthermore it does not recognize that a proportion of lost earnings (indirect costs) would have been saved and applied to investment. This approach is better applied to calculate the costs of a disease than use it for macroeconomic projection.

Cuddington (1993) and Arndt & Lewis (2000) look at the growth path in terms of GDP in the 'AIDS' scenario and 'no-AIDS' scenario. The over-riding message of these studies is that HIV/AIDS will have a substantial impact on the growth path (GDP) of economies through its negative effect on the human capital stock i.e. size, structure and

¹ Households were defined in terms of the standard definition employed by Statistics South Africa, i.e. "a person or a group of persons who live together at least four nights a week at the same address, eat together and share resources".

productivity of labor of the affected. But macroeconomic modeling approach will only become accurate as demographic projections improve and as necessary micro-level research allows more precise assumptions to be made. It is increasingly recognized that these kinds of studies miss the complexity and full significance of the epidemic. When the epidemic was in its early stages projections based on scenarios computed 'with AIDS' and 'without AIDS' were reasonable, but such comparisons are no longer valid. The impact of the disease cannot be treated as an 'exogenous' influence that can be 'tacked on' to models derived on the presumption that the work force is HIV-free. HIV/AIDS has become an 'endogenous' influence on most African countries that has adversely affected their potential for growth and development (Booyesen, 2002).

The focus has shifted from macroeconomic modeling to microeconomic studies recently because of their importance in highlighting economic impact of HIV/AIDS on different sectors (Booyesen, 2002). The economic impact of HIV/AIDS on households is perhaps the most pronounced of all of the sectors as the impact of the disease manifests mainly among households and individuals. In addition to the emotional loss resulting from the death of prime-aged adult, households must cope with increased medical and funeral expenses, as well as the loss of income and services provided by the adult, decreased productive capacity and changing expenditure patterns (Cohen, 2000). In one study done in rural Thailand, households, in response to the epidemic, showed the following behavior: reduction of household consumption, reallocation of labor, dissaving, withdrawing children from school, depending on an extended family system and the community to support and help them cope (Kongsin, 2000). The problem of orphans as a result of deaths of both parents from HIV/AIDS has also become a big problem (Ntozi, 1997).

The fact that HIV/AIDS impoverishes people, their households, communities and enterprises is established but it is not known how they act on different social and economic units and how they interact with each other. From the limited quantitative studies on household impact, we witness a conflict: while the studies indicate effective coping, the anecdote show desperate poverty, social exclusion and marginalization (Whiteside, 2002). Gaffeo (2003) used a modified version of the Dasgupta² model to investigate the interaction between health and under-nourishment on the one hand, and poverty on the other hand. Several cause of poverty traps were detected such as insufficient investments in health, nutrition, human capital and productivity-enhancing technologies, limited access to financial services, the degradation of local environmental resource bases, and social and civic disconnection. The interaction of these factors gives rise to path-dependent poverty dynamics, in which bad outcomes are self-enforcing and the poor remain poor even if small interventions or chance improvements occur.



The education sector, which is the main building block of human capital, has not been spared the effects of the epidemic (Malaney, 2002). A functioning and effective educational sector is seen as central for achieving the goals of sustainable human development. An educated population that embodies the skills and capacities needed for development is essential if production levels are to be increased. One of the benefits of development is an educated society. In sub-Saharan Africa there has been an extensive investment in human capital for many decades. This investment is threatened by the HIV epidemic. Previous as well as current investment in human capital is at risk. It follows that where resources (financial and human) are scarce, and where the HIV epidemic is systematically eroding the capacity for development, urgent actions are needed to ensure that

² Dasgupta model demonstrates the relationships between the environment, socio-economic development and agriculture. Recently, an HIV/AIDS component has been introduced to account for its impact on both agricultural and human development variables.

socio-economic sectors do not collapse. A functioning education system is both fundamental to achieving sustained development and eradicating poverty and to an effective response to the HIV epidemic (Cohen, 1997).

2.2 Cost impact studies

2.2.1 Cost-of-illness approach described

Since it was formalized in the 1960's by Rice and friends, the cost-of-illness (COI) approach has become a standard costing technique used in health economics to evaluate the cost of a particular illness to society. This approach was formulated in the developed world to calculate the costs of a variety of illnesses such as respiratory and circulatory diseases. More recently, it has been used in the instances of such complex diseases like HIV/AIDS, malaria and TB as well. Cost-of-illness categorizes costs into direct and indirect. Direct costs refer to costs where payments are made for whereas indirect costs refer to costs for which resources are lost (Malaney, 2003).

Cost-of-illness calculations have bifurcated along two alternate approaches that are often referred to as the human capital approach and the willingness to pay approach:

i. Human Capital Approach

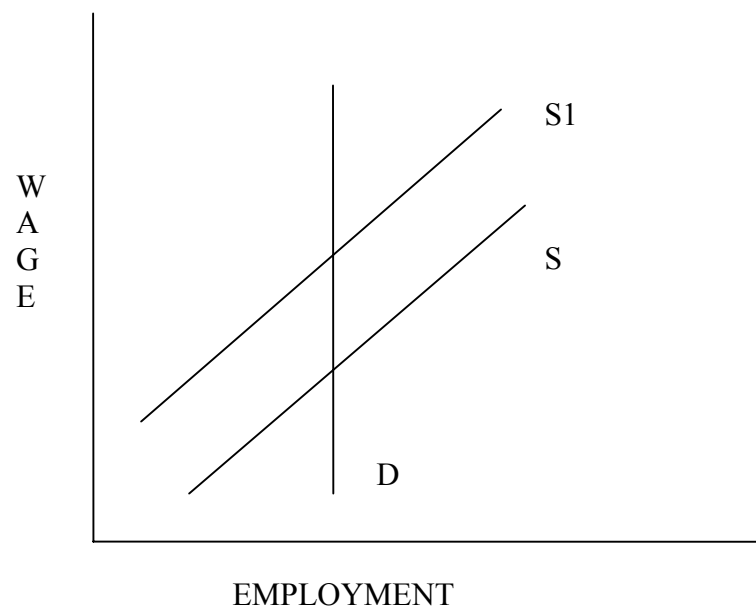
In the human capital approach, a person is seen as producing a stream of output that is valued at market earnings and the value of life is the discounted future earnings stream. Morbidity and mortality destroy labor, a valuable economic resource, by causing persons to lose time and effectiveness from work and other productive activities, forcing them out of the labor force completely, or bringing about premature death (Rice, 2000). The human capital approach attempts

to quantify the costs originating in illness and disease by explicitly determining the costs of each of those elements. The special strength of this approach is that procedures have progressed to where a well recognized framework exists by which methods and data are available to determine at least some direct and indirect costs in a reasonably systematic fashion. Human capital estimates provide an ex post facto measure of resources used or lost, and therefore unavailable for other uses. The value of time lost from work and other productive activities is an undeniable loss to individuals and society. If one wants to know what the economic burden of illness was last year, what resources will be saved by preventive measures that reduce the incidence of disease, or what the economic impact of improved survival rates will be, the human capital method provides an appropriate approach (Malaney, 2003).

But the human capital approach has some shortcomings. It does not take into account the value of leisure or other activities that are not directly priced by the market. While there is some attempt in the formal cost-of-illness literature to incorporate the value of housework, the practical difficulties of implementing this calculation generally lead to its omission (Malaney, 2003). Even deeper problems exist with the human capital methodology in terms of evaluating what the forgone income calculation actually measures in economic terms, especially in the case of mortality. The human capital approach attempts to evaluate the capitalized value of lost wages associated with an inward shift of the labor supply curve as illustrated in Fig. 2.1.

A shift from S1 to S would be the difference in the wage bill associated with the old equilibrium, with a greater number of workers, and a new equilibrium that takes into account mortality associated with the disease. However the formula for the calculation uses the original wage ignoring that an inward shift of the supply curve of labor generally causes an increase in wages. The only case in which this approach would be correct as it stands would be if the demand for labor were perfectly elastic; a case which we know empirically to be extremely unusual (Malaney, 2003).

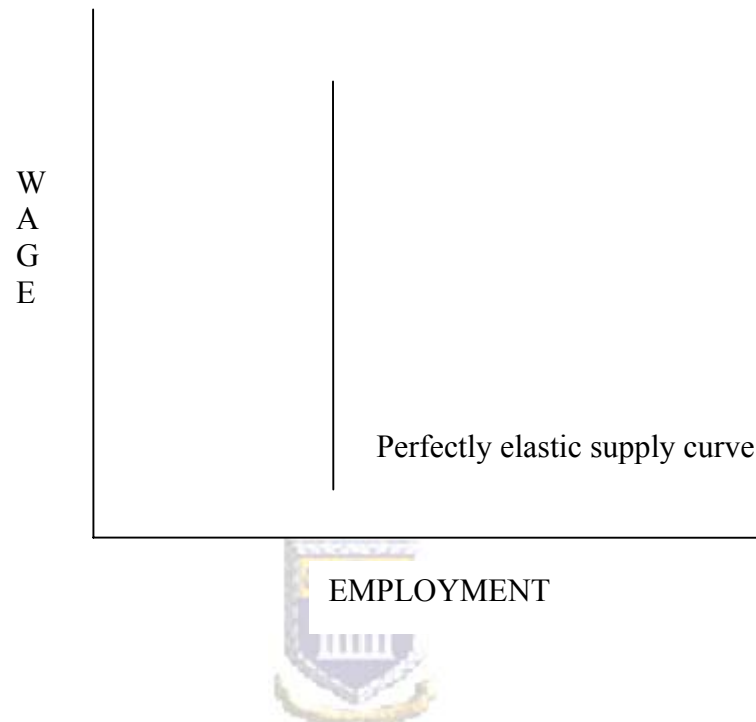
Figure 2.1: Inward shift of the supply curve



A great problem arises in the case of a perfectly elastic supply curve as illustrated in Fig. 2.2, a more plausible assumption in the presence of high unemployment rates. In this extreme case, the reduced labor has no effect whatsoever on productivity, as there is a labor surplus. While there is indeed a significant burden on households who lose breadwinners, from the perspective of the national economy the

productivity losses may be minimal in an economy with high rates of unemployment (Malaney, 2003).

Figure 2.2: Perfectly elastic supply curve



Human capital valuation rests on the assumption that earnings reflect productivity. That is not to say that each employee receives the value of his personal contribution to output, but that each receives the value output added by the marginal or last hired worker. The theory of marginal productivity goes back many years in economics. It rests upon assumptions that sometimes only vaguely reflect reality. Unfortunately, the impact of unfulfilled assumptions, or the robustness of economic models, is frequently unknown. Two key assumptions of the theory of marginal productivity are that labor markets are competitive and firms behave so as to maximize profits (Malaney, 2003).

ii. Willingness-to-Pay Approach

A conceptual alternative to the human capital methodology is the willingness-to-pay approach, also known as “contingent valuation”. Rather than estimating the components of costs originating in disease and illness, WTP proposes that the value of health or the avoidance of illness and disease can be deduced from the amount people would be willing to pay to reduce the probability of an event such as death from a certain disease. This approach is conceptually appealing to its proponents in that it assumes a comprehensive consideration of the potential costs of illness and disease has some grounding in the optimality theory of Vilfredo Pareto³. The idea is that such an expression of the value of health allows policy makers to assess the changes in welfare that would accompany changes in the probability of occurrence of specific events, such as death from a certain disease, and help to determine social preferences for public policy toward control of disease (Hodgson, 1982; Malaney, 2003).

According to this approach, an individual’s valuation of a good is given by the area under a demand curve. The demand curve also reveals how much the individual is willing to pay for an extra unit of that good. Accepting this approach implicitly assumes that the patient evaluates the value of treatment needed to restore to full health (Culyer, 2000).

Theoretically this approach has the advantage that it elicits the full range of costs associated with an illness (treatment costs, lost productivity, value of leisure time given up, cost of pain and suffering...). However, WTP, which was developed originally to assess values for public goods such as the environment, has come under much criticism in the context of “existence” values, which do not

³ Pareto optimality: An allocation that can make at least one individual better off, without making any other individual worse off.

derive from private consumption of a good. It has also been pointed out that the results are sometimes subject to personal interpretations of questions and can be biased by respondents' desire to engage in strategic behavior. Any practical application of WTP must consider ability to pay, which reintroduces valuation on the basis of income and wealth. Furthermore, those who may be at greatest risk may be the least able to pay. In practice, the WTP approach has been difficult to implement and is used in very few cost-of-illness studies (Malaney, 2003).

2.2.2 Studies done using the cost-of-illness approach

Evaluating the cost of HIV/AIDS using the WTP approach is not practical because the majority of those infected come from poor households. Based on the difficulty of conducting effective WTP studies there are only a few examples of this approach that has been used to assess the costs of HIV. A recent study was conducted in Cameroon on the willingness-to-pay for the most affordable triple therapy combination of antiretroviral. Questionnaires were used to evaluate willingness to pay, and patients who could still afford their medication 6 months after the survey were also investigated, to give an indication of actual ability to pay. In addition, oral interviews were carried out for clarification. In all, 84 patients out of a total of 186 were involved in the study. Results indicated that more men (39%) were willing to pay than women (22%), although more women (56%) were afflicted than men. Willingness to pay was directly dependent on cost with 69%, 22% and 9% of respondents indicating willingness to pay \$1, \$2 and \$3 a day respectively. After 6 months of treatment, 22% of patients were still on therapy. A majority of patients stopped taking the drugs after 6 months due to financial constraints (Muko et al, 2004). This study is not comprehensive at all, it looks at the willing to pay for drugs only and not the willingness to pay to avoid getting infected. Binswanger (2003) points out that any attempt to calculate

the costs of HIV using the WTP approach should include loss of income of care-givers; cost of treatment in homes, clinics, and hospitals; funeral costs; death and survivor benefits.

Moving to the human capital approach, when we look at the different cost of HIV studies on firms or occupational settings, we see that only the costs on the operations of the businesses are taken into consideration and don't include any of the social costs that HIV imposes. Aventin (2000) tried to calculate the costs to three manufacturing firms in Cote D'Ivoire. The costs incurred on the firms operations were the only costs calculated. The study shows that the cost of HIV varies from 0.8% to 3.2% of the company's wage bill and these small percentages are attributable to the small number of employees reported as infected by the companies. The numbers of cases are underestimated if the finding of epidemiological surveys of the prevalence of the disease on the adult population in Cote d'Ivoire is taken to be reliable. For this reason, the costs were recalculated assuming a prevalence of 10-15% among the workforce and the results range from 6.8% to 10% of the company's wage bill. These cost studies take into consideration only costs to businesses that come in the form of medical expenses and lowered labor productivity and absenteeism.

A number of studies have also been done to estimate the cost of HIV/AIDS to societies in different countries. A study by McNurchy (1997) in Lesotho tried to estimate the potential direct and indirect costs of HIV/AIDS to Lesotho during 1993-98. AIDS in Lesotho is estimated to have a M151.2 million economic impact during 1993-98. This figure is in constant 1992 prices and includes total direct medical costs of M66.5 million, total direct non-personal costs of M48.5 million, and total indirect costs of M36.2 million. The total economic cost of AIDS in 1993 was M10.9 million, 9.7% of the total health budget and 0.6% of gross domestic product. The average direct

medical cost per HIV/AIDS patient in 1993 was M6210, while the total value of foregone productivity is M25,549.

2.3 Conceptual Framework

The traditional cost-of-illness approach is a standard costing technique in health economics. It is used to estimate the direct and indirect costs that different diseases impose on society. From the different structural studies done on the impact of HIV/AIDS, we can see that the epidemic imposes far reaching indirect costs beyond what the traditional cost-of-illness approach was designed to calculate. The indirect costs that HIV/AIDS places on households are growing as the epidemic is becoming more widespread. The number of orphans is also increasing as both parents die from HIV/AIDS. In the absence of an altruistic state the indirect human capital costs due to lost earnings of caregivers fall heavily on poorer households with high dependency ratios. Furthermore, a comprehensive measure of indirect human capital costs of HIV/AIDS at micro level should also incorporate resources lost in taking care of HIV orphans, effects on investments and savings. Over et al (1989) point out that direct and indirect costs of HIV differ from country to country. This study tries to broaden the traditional cost-of-illness approach, so that additional indirect cost parameters particular to South Africa can be included in the framework to limit underestimation. Policy makers need to know the social and economic burden of HIV/AIDS in monetary terms in order to give HIV/AIDS priority in the face of other challenges that have outstretched government budgets.

Chapter Three - Some Background Information On The Economy Of South Africa

The purpose of this chapter is to present some background information on the economy of South Africa. This information includes the nature of demographics, geography, and different socio-economic indicators. Also discussed are the problems of unemployment and poverty among the population. The above information is provided as necessary backgrounds to the full understanding of the socio-economic conditions accentuating the spread of HIV/AIDS in the country. Also discussed in this chapter is the trend in HIV prevalence rates observed for South Africa for the past decade. Lastly, the features of households are summarized to provide some background information for the assessment.

3.1. Geography



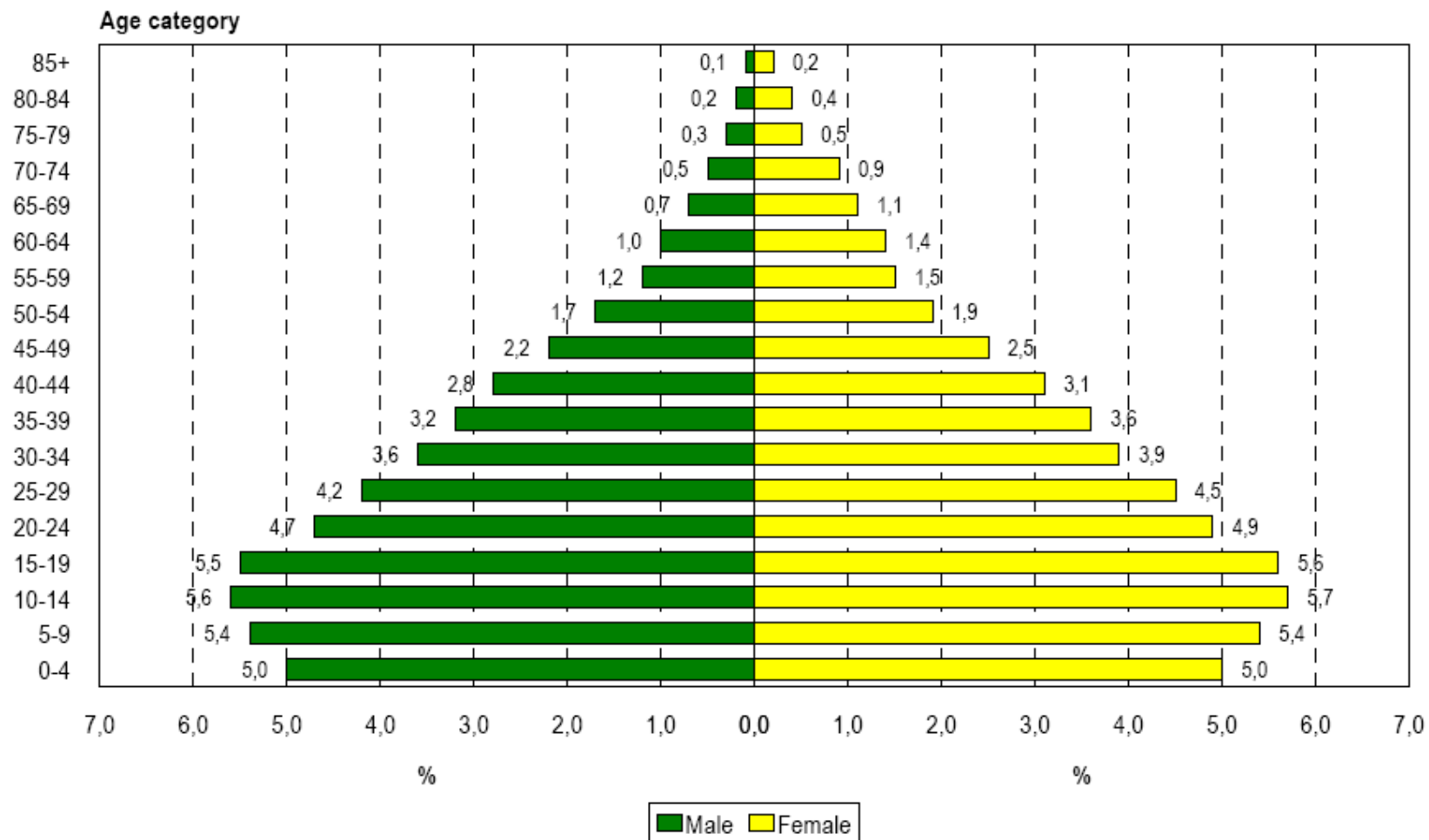
South Africa occupies the southern tip of Africa, its long coastline stretching more than 2 500km from the desert border with Namibia on the Atlantic coast southwards around the tip of Africa and then north to the border with subtropical Mozambique on the Indian Ocean. Although the country is classified as semi-arid, it has considerable variation in climate as well as topography. The total land area of South Africa is slightly more than 1.2 million square kilometers, and it measures some 1 600km from north to south and approximately the same from east to west. The country is divided into provinces: the Western Cape, Northern Cape, Eastern Cape, Free State, Limpopo, North West, Kwa-Zulu Natal, Gauteng and Mpumalanga (Geography IQ, 2004).

3.2. Demography

Since the HIV/AIDS pandemic affects human population, it is important to provide some background information on the pertinent characteristics of the human population of South Africa. South Africa is a country with an estimated population of about 44.8 million people according to census 2001. Majority of the population consists of young people aged 29 or younger (Statistics South Africa, 2004) with 46.1% of the population living in rural areas. South Africa has an estimated total fertility rate (TFR) of 3.1%; and infant mortality rate estimated at 15.4% (Department of Health (a), 2003). A significant feature of this population is that it consists mainly of young people. The 2001 census indicates that 61.5 percent of the population were less than 29 years of age. These young people tend to be particularly vulnerable to the HIV/AIDS pandemic, since many of them are sexually active and carefree about their sexual behavior.



Figure 3.1. Presents some details of the South African population from census 2001



Source: Statistics South Africa (a), 2004

3.3. Problems of Unemployment and Poverty in South Africa

South Africa is a middle-income, emerging market with an abundant supply of natural resources; well-developed financial, legal, communications, energy, and transport sectors; and a modern infrastructure supporting an efficient distribution of goods to major urban centers throughout the region. However, growth has not been strong enough to lower South Africa's fundamental socio-economic problems: high unemployment rate and widespread poverty. Table 3.1 presents the unemployment rates of the country by provinces.

Table 3.1. Unemployment rate by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	ZA
1996	48.5	30.0	28.2	39.1	46.0	32.9	28.5	37.9	17.9	[1] 33.9
1998	36.9	21.3	23.1	27.2	35.7	25.0	17.9	26.5	13.5	[2] 25.2
1999	29.8	23.3	20.6	25.9	34.0	24.4	18.1	23.5	13.7	[3] 23.3
2001	54.6	43.0	36.4	48.7	48.8	41.1	33.4	43.8	26.1	[4] 41.6
2002	28.1	33.5	27.0	34.3	36.7	29.8	30.0	30.7	18.6	[5] 29.4
2003	31.8	28.6	28.2	31.3	30.6	25.0	27.5	29.4	20.6	[6] 28.2
2004	32.5	26.1	28.2	32.2	30.8	25.7	22.3	30.4	16.9	[7] 27.8

EC: Eastern Cape **FS:** Free State **GP:** Gauteng **KZN:** KwaZulu-Natal **LP:** Limpopo
MP: Mpumalanga **NC:** Northern Cape **NW:** North West **WC:** Western Cape **ZA:** South Africa

Source: Health Systems Trust, 2003

A close observation of Table 3.1 reveals that the unemployment rate varies greatly between the provinces: Western Cape has the least rate of unemployment while Kwa-Zulu Natal has the highest for the years 1996 to 2004. When we look at the national rate, the unemployment rate seems to be getting better: 27.8 percent for the year 2004, lower than the previous three years. The main cause of high unemployment remains the structure of the economy, which favors large, capital

enterprises. The unemployment problem also exacerbates the second fundamental socio-economic problem of the country, poverty.

The second problem facing the population is poverty. Table 3.2 compares the poverty rate in the different provinces. The Eastern Cape and Limpopo province seem to be faced with the highest poverty rates at 66.5% and 62.6% respectively. The poverty rate in the Western Cape is very low compared to the other provinces at 7.5%.

Table 3.2. Poverty rate by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	ZA
1998	66.5	28.4	13.1	46.8	62.6	44.1	19.9	38.2	7.5	40.0

EC: **Eastern Cape** FS: **Free State** GP: **Gauteng** KZN: **KwaZulu-Natal** LP: **Limpopo**
 MP: **Mpumalanga** NC: **Northern Cape** NW: **North West** WC: **Western Cape** ZA: **South Africa**

Source: Health Systems Trust, 2003

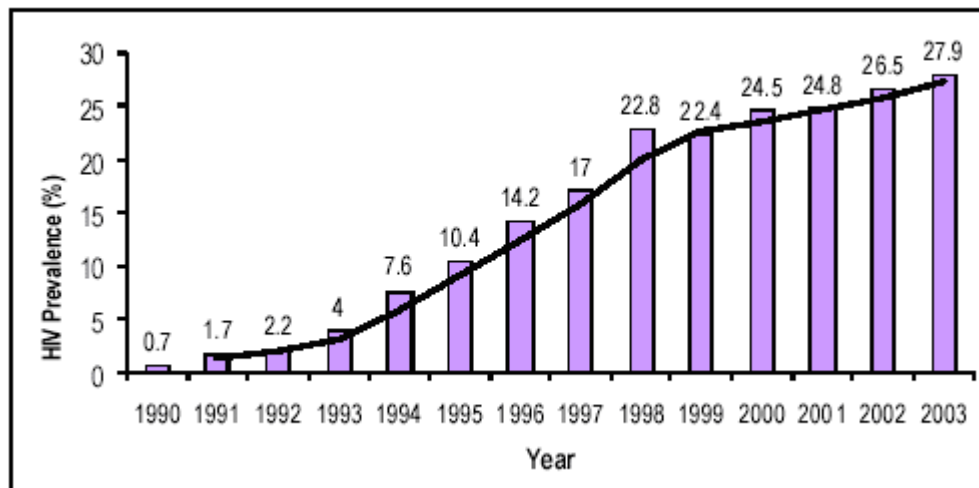
The above two problems of poverty and unemployment create serious social problems for the population. The HIV/AIDS rate is more pronounced in the provinces with high rates of unemployment or poverty so it follows that these social problems accentuate the spread of HIV/AIDS pandemic in the country.

3.4. Problems of HIV/AIDS and the HIV Seroprevalence Rates in South Africa.

Over the past decade, the devastating effects of the HIV/AIDS pandemic on the human population of South Africa has led both the provincial and national governments to conduct HIV seroprevalence surveys to determine the HIV prevalence rates in the various provinces of South Africa. These seroprevalence surveys are based on data obtained from antenatal clinics hence they are biased towards women. These data are however the most reliable source of information on the

HIV/AIDS prevalence rates in the country. Figure 3.2. presents the trend in the prevalence rates of HIV at national level for 2003.

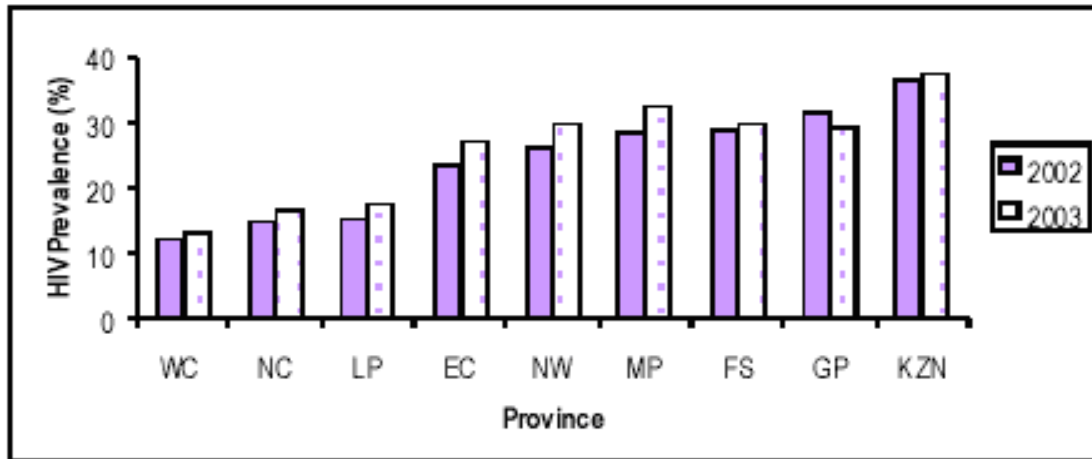
Figure 3.2. Prevalence of HIV among antenatal attendees in South Africa, 1990-2003



Source: Department of Health (b), 2003

A close observation of Figure 3.2 reveals a rapidly increasing trend in the HIV prevalence rate for South Africa. The prevalence rate for the entire country rose from less than 1 percent in 1990 to about 27.9 percent by the year 2003. Figure 3.3 further illustrates this rapidly increasing trend in the HIV prevalence rates by provinces.

Figure 3.3. HIV prevalence by province among antenatal clinic attendees, South Africa: 2002-2003



Source: Department of Health (b), 2003

It is important to note that there are regional differences in the HIV seroprevalence rates even within South Africa. It can be observed from figure 3.3 that Kwa-Zulu Natal has the highest rate of about, whereas Western Cape had the least HIV prevalence rates for the years 2002 and 2003. It is therefore apparent from these statistics of the HIV seroprevalence that the HIV/AIDS pandemic constitutes a major threat to the human population to the entire nation of South Africa. The cost of the rising trend of HIV/AIDS therefore needs to be assessed. This is the rationale for undertaking this study which focuses on the cost estimation of HIV/AIDS in South Africa. A brief discussion of the features of households of South Africa is presented next.

3.5. Features of Households of South Africa

HIV/aids has a profound impact on households and individuals first before it ripples to other agents of the economy so it is important to summarize some of the observed features of households of South Africa. Approximately 67% of households were living in a formal dwelling such as a house on a separate stand, a flat in a block of flats, a townhouse or a retirement village in October 1999. Household size for the entire nation averaged at 3.8 by the end of 2001 (Health Systems Trust, 2003). Household savings as a percentage of GDP have averaged only 3 per cent in the last couple of quarters, taking into consideration that there was an improvement in real disposable income. Savings as a percentage of disposable household income averaged a mere 0, 5 per cent in the second quarter against 54, 8 percent household debt to disposable income. The worsening savings picture for households can be explained by a number of factors, principal of which are growing dependency ratios. This trend could be attested through higher employment creation and speeding up of the broad based empowerment program (Policy and Law Online News, 2004).

Chapter Four - Methodology and Analysis

4.1 Methodology

This study rests on qualitative research methods. Qualitative research enables us to create concepts and identify patterns of economic behavior that may feed back into the theoretical literature. Research on economics usually relies on quantitative methods and considers qualitative methods as a second best 'soft option' but it has proved to be a viable alternative for researching particular kinds of questions that lie outside the traditional concerns of economics (Hill et al, 1999). Qualitative method is adopted in this instance to help us gain insight into the theoretical and empirical evidence of the impact of HIV on the South African society. The research questions are also best answered using this approach.

HIV/AIDS has a profound impact on households and individuals and this study tries to explore the different pathways that HIV/AIDS imposes indirect costs to the South African society by looking at how households and individuals cope with the disease. To this end, it tries to answer research questions by exploring different South African studies on how the different coping mechanisms of HIV/AIDS result in indirect costs.

4.1.1. Data Types and Sources

This study employs secondary data, the scope of this research and resource constraint don't allow for primary data collection. Peer reviewed research articles were supplemented with articles from grey area literature to provide added magnitude to the analysis. The aim of this research was to motivate the inclusion of additional indirect cost parameters such as resources lost in taking care of the ill and orphans, effects on saving and investment when estimating the total

costs of the disease. Thus, this study heavily relies on the limited household case studies done in South Africa to back up the inclusion of these additional indirect cost variables.

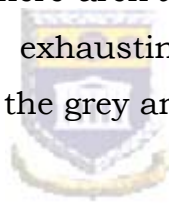
Case studies are not particularly popular with many researchers because they are clouded by ambiguities but they can prove to be very useful in many instances. A case study is defined as 'an intensive study of a single unit for the purpose of understanding a larger class of similar units' (Gerring, 2004). By seeking to understand as much as possible about a single subject or small group of subjects, case studies specialize in "deep data," or "thick description"--information based on particular contexts that can give research results a more human face. Because its project designs seem to emphasize exploration rather than prescription or prediction, researchers are comparatively freer to discover and address issues as they arise in their experiments (Gerring, 2004).

However, case study results may not be generalizable. They are difficult to test for validity, and rarely offer a problem-solving prescription. Simply put, relying on one or a few subjects as a basis for cognitive extrapolations runs the risk of inferring too much from what might be circumstance. The personal integrity, sensitivity, and possible prejudices and/or biases of the investigators need to be taken into consideration as well. For the purpose of this study, different case studies were included to avoid these weaknesses.

Data was collected from journals, official websites of organizations working in the field of HIV, working papers and research presented at conferences. It might be difficult to generalize from the limited data—most of the household level studies done so far are based on East African countries. All the above were readily available in the library or on the Internet.

4.1.2. Data collection methods

During the first stages of the epidemic, economists were concentrating on projecting the macroeconomic implications of the disease. But recently, more and more microeconomic studies are being undertaken. From these microeconomic studies, the ones done on households are the most profound ones as households and individuals feel the immediate effects of the disease. These studies can show how the HIV/AIDS epidemic imposes indirect costs on households and society as a whole. For the purpose of this study, we have chosen micro level studies (studies done on impact of households, orphans, investment and saving) in the South African context. The major South African and African journals were browsed for studies on the household and individual level impact from 2000 on wards. 2000 was chosen as a benchmark period because there aren't that many such studies done prior to that period. After exhausting these resources, we then consulted some articles from the grey area literature to add magnitude to the analysis.



4.1.3 Data analysis method

The data analysis will be a typological analysis. It will look at different household and individual level studies done on the impact of HIV/AIDS in South Africa. The different studies will be grouped thematically according to their content and a content analysis will be carried out. Because the sample size is small, there will be no need for coding. Instead, variables which impose indirect costs will be identified and information to back the inclusion of these variables will be picked up from the different studies. The validity of these studies will be maintained through triangulation.

4.2 Analysis

The human capital approach was developed to comprehensively assess the economic burden imposed by an illness. The pandemic nature of HIV/AIDS, however, entails costs that are considerably broader and more far-reaching than this method was designed to incorporate. The basic human capital formula strains under the weight of a disease that affects entire societies on an effectively permanent basis. In order to do a more comprehensive accounting of the costs of HIV/AIDS, it therefore appears necessary to broaden our implementation of the human capital approach.

Consider the following human capital approach modified by Malaney:

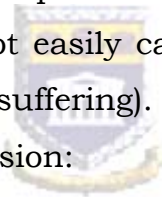
Cost-of-illness = Private Medical Costs + Non-Private Medical Costs + Labour Loss + Risk Related Behaviour Modification + Investment Loss + Non- Economic Personal Burden (Malaney, 2003)

Malaney tried to broaden the basic cost-of-illness approach in her paper on the 'microeconomic approaches to calculating the burden of malaria' (2003). The first two terms, private medical costs and non-private medical costs (or direct costs), are captured effectively by the basic approach. The ubiquity of the disease in certain regions leads to a modification of social and economic behavior with serious consequences for economic growth. Although, both malaria and HIV are an epidemic, there are certain differences in the way they affect the society and the economy as a whole. This paper tries to modify Malaney's formula further, so that it can be better suited to estimating the indirect cost of HIV/AIDS.

Consider the following further modified human capital approach:

Cost-of-illness = Direct Costs (Private Medical Costs + Non Private Medical Costs) + Indirect Costs (forgone income + opportunity cost of caregivers + opportunity cost of caring for AIDS orphans + Investment loss + Savings loss)

The pandemic nature of HIV/AIDS clearly entails indirect costs that are much broader than simply lost wages and investment loss. The above formula attempts to capture broader categories of indirect costs that are specific to HIV/AIDS and allows us to think more comprehensively about the indirect costs of the disease. We add three new indirect cost parameters that are fitting for the HIV pandemic (opportunity cost of caregivers, opportunity cost of caring for orphans, savings loss), retain one such parameter (investment loss) and omit two parameters which are not easily calculable in this instance (risk related behavior & pain and suffering). Below is a description of each parameter in the modified version:



4.2.1 Direct Costs

i. Private Medical Cost

Private medical costs include all expenditure by the individual they include such as expenditures on condoms, blood test fees, doctors fees, the cost of anti-retroviral, the cost of transportation to medical facilities, counseling fees.

There is substantial evidence of links between HIV/AIDS and a number of other illnesses too. To the extent that malaria is a contributing factor for other illness it is necessary to attribute to it a share of the entire range of direct costs associated with those illnesses.

ii. Non-Private Medical Cost

Non-private medical costs include expenditures by the government on such factors as health facilities, education and research.

4.2.2 Indirect Costs

i. Forgone Income

This parameter is captured by the basic human capital approach. The devastating financial impact of AIDS sickness begins with loss of income of the person directly affected by the disease.

ii. Cost of Caring for HIV Orphans

In South Africa, it is estimated that, by 2010, there will be 1.5 million children orphaned as a result of AIDS. As the number of adults dying of AIDS rises over the next decade, an increasing number of orphans will grow up without parental care and love and will be deprived of their basic rights to shelter, food, health and education. The deep-rooted kinship systems that exist in South Africa, extended - family networks of aunts and uncles, cousins and grandparents, are an age-old social safety net for such children (Frederickson et al, 2004). The burden of taking care of orphans falls mainly on these extended - family networks and within communities. Caring for these orphans increases the vulnerability of the families and communities that take them in, reduces household income and food security, stretches social services, and undermines community cohesion (Levine, 2001). It is difficult to quantify the resources lost in taking care of orphans in such informal settings but it is obvious that orphans put an extra burden on households.

Fostering and institutional care seem to be another alternative of caring for HIV orphans. The different South African studies on orphan care (Steinberg et al, 2002; Desmond et al, 2002; Michael et al, 2002; Desmond and Quinlan, 2002) argue that institutional care should not be adopted as a first option. Institutional care has a bad name in some places where “orphan farming” has developed as an income generating activity (Barnett and Blaikie, 1992). Desmond and Quinlan (2002), in their study relating to the cost of care and support of HIV orphans in South Africa identified six different formal approaches: statutory residential care, statutory adoption and foster care, unregistered residential care, home-based care and support and community-based support structures. They found that in Nazareth House, a statutory residential care in the Western Cape, it took ZAR 3,873.00 to take care of a single HIV orphan per month. Similarly, they found that it cost ZAR 609.00 per child at the Durban Children’s Society (a statutory adoption and foster care) in Kwa-Zulu-Natal, ZAR 996.00 per child at the Jardim House (unregistered residential care) in Mpumalanga and ZAR 506.00 at the Sinizo (home-based care and support) in Kwa-Zulu Natal.

Whichever route we go, formal or informal, the society is bound to lose resources as a result of caring for HIV orphans. The more common informal settings of caring for orphans has the advantage of providing the child with a homely atmosphere but in a context of intense social and economic pressures, orphans are increasingly reported to being mistreated and abused by caregivers Governments should intervene in such instances by setting up agencies which watch over the rights of these children (Whiteside et al, 2002). Where informal settings are not feasible, it becomes important to choose the most cost-effective form of formal care institutions. These costs must be reflected as indirect costs in the traditional cost-of-illness approach because with the increasing number of orphans as the epidemic becomes more

widespread, they are bound to constitute a huge bulk of the costs of HIV to society.

iii. Forgone Income of Caregivers

Caregivers to people with AIDS provide invaluable care in terms of time spent helping out in the day-to-day chores of the patient as well as emotional support. The unpredictability of HIV/AIDS, uncontrollability of symptoms, the debilitating or disfiguring effects of the disease requires the presence of a caregiver almost on a full time basis. And due to the long time between falling ill and eventually dying, it could be a long and hard unpaid job. Caregivers provide practical support such as shopping, housekeeping, and transportation to clinics, as well as more basic assistance such as help with bathing, going to the bathroom, and feeding. As symptoms worsen, caregivers are also likely to take on more clinical roles such as keeping track of medications, giving injections, inserting catheters, and cleaning wounds.

One of the major coping strategies adopted by households when a member falls ill is to withdraw from income generating activities and care for the ill (Oni et al. (b), 2002;Booyesen, 2002; Desmond et al, 2000; Whiteside at al, 2002; Steinberg et al, 2002). In one household survey of households in rural Limpopo Province, Oni et al. (b) (2002) found that affected household members suffered an income loss when members had to leave their jobs to cater for the sick members of the household. Thus, forgone household income includes loss of annual income of the infected members; as well as the forgone income or earnings of the care-givers when these care givers are also members of households. The per capita monthly income for affected household was estimated at R226, while that of unaffected household was 32 per cent higher at approximately R330.

In what is one of the most comprehensive household surveys in South Africa, Booysen et al (2004) assessed the socio-economic impact of HIV in two local communities in the Free State province, one urban (Welkom) and one rural (Qwaqwa). The household impact of HIV/AIDS was determined by comparing over time the observed trends in socioeconomic variables in HIV/AIDS-affected households and a control group using statistical methods. For this purpose, a six-monthly survey on the quality of life and the economics of 387 affected and non-affected households was conducted. Costs to caregivers as a result of morbidity and mortality of the infected were determined. Loss of income to those persons caring for the ill, including both direct care and time spent accompanying the ill person on visits to health care facilities were considered. These losses in income were estimated based on the number of days of work lost by those caring for the ill, employing the specific household's average monthly employment earnings divided by thirty as a proxy of the daily loss of income. When it comes to mortality, the income losses to the persons caring for the deceased individual were taken as the income loss in the month prior to their death. The burden of these losses was found to be much higher in the affected households.

Forgone earnings of people who are infected with HIV are accounted for in the traditional cost-of-illness framework whereas forgone earnings of caregivers in the household are unaccounted for. These costs should be accounted for because Members who would otherwise be able to earn or perform household and family maintenance may be spending their time caring for the person with HIV.

iv. Loss of Savings and Investment

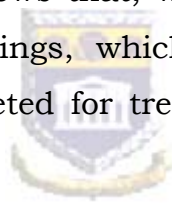
The heavy cost burden imposed by HIV/AIDS on households has potentially significant macroeconomic consequences as it interferes with a family's ability to save and invest in both human and physical

capital. Macroeconomic models take into consideration the negative impact of HIV/AIDS on savings and investment. Freire (2002), in her study on the impact of HIV on the saving behavior in South Africa, used a framework concentrating on the capital market to predict the savings behavior from 2000 to 2015. In the absence of any HIV/AIDS policy, she found a significant drop in the saving behavior of the consumers in South Africa for the period 2000-2015: a 5-percentage points fall. Many microeconomic studies also show that the epidemic eats into the savings of households affected by the disease.

According to evidence from a number of household impact studies done in South Africa, households affected by HIV/AIDS-related morbidity and mortality appear to first deplete their savings to alleviate the financial pressure (Desmond et al, 2000; Oni et al. (b), 2002; Booysen, 2002; Booysen et al, 2004). The direct costs of prevention and treatment of the disease eat into the disposable incomes of families then move to savings and other financial channels. In a case study done by Booysen (2002) on the financial responses to the epidemic, the most frequent response seems to be the utilization of savings. Affected households save approximately 40 per cent less than non-affected households on a monthly basis. This is understandable since affected households generally face higher unemployment burdens, have lower per capita income, and face greater burden associated with illness and death and therefore relatively greater expenditure on health care and/or funerals. The magnitude of dissaving is considerable, particularly when looking at the amount of savings used relative to the average current level of monthly saving. The most frequently purposes cited by affected households for dissavings are funeral expenses, medical expenses, food, transportation and clothing expenses.

In a household survey done in the rural Limpopo province, Oni et al. (a) (2002) found a significant difference between the mean household

savings of affected and unaffected households. Unaffected households had a mean household savings of R575.21 compared to household savings of R367.20 for affected household. Affected households therefore saved approximately 36 per cent less than did unaffected households. This difference in household savings can be attributed to the fact that these households had encountered reduced household income or loss of earnings as a consequence of medical incapacitation or morbidity, or as a result of the death of a household member. The attendant increases in household expenditures on health care, funerals and transportation can also account for the lower savings amongst HIV/AIDS affected households. Besides utilizing savings to cope with financial burden that the epidemic brings with it, households also exhibit other behaviors such as borrowing, sale of assets including land (Oni et al. (a), 2002; Booyesen, 2002; Booyesen et al, 2004; FAO, 2002). It follows that, where there is no saving there will be no investment. Savings, which could have been used for investments, are being depleted for treatment and prevention of the epidemic.



That the cost-of-illness can be expected to understate the true extent of the economic burden imposed by HIV/AIDS is not difficult to see. We have tried to illustrate that the human capital approach can and should have a more inclusive notion of indirect costs in place of the narrowly defined forgone term familiar from traditional HCM calculations. These additional indirect cost parameters should be included in the costing framework because these cost account for huge resource losses and are bound to increase as the epidemic becomes more widespread.

Chapter Five - Conclusion and Recommendation

When choices are made about the allocation of limited resources, decisions are made on behalf of societies. Policy makers need to know the social and economic burden of a disease in monetary terms, the universal language of policy makers, in order to give it a priority in the face of other challenges that have outstretched government budgets. Only when they have accurate and current estimates of the costs of a specific disease can they allocate limited economic and other resources for prevention and treatment.

The general approach to evaluating the economic burden of a disease, the cost-of-illness methodology, was designed to calculate the cost a disease places on societies. Cost-of-illness calculations have bifurcated along two alternate approaches that are often referred to as the human capital approach and the willingness to pay approach. The more widely used approach in calculating the cost of a disease is the human capital method. The basic approach should have a more inclusive notion of indirect costs in place of the narrowly defined forgone income term familiar in the instance of such complex diseases like malaria, tuberculosis and HIV/AIDS.

The pandemic nature of HIV/AIDS creates broad costs that this approach is simply not designed to recognize, and these costs have potentially large-scale impacts on economic growth over the long run. The terms should be structured to include such effects as the loss of income of caregivers, loss of investment and savings and resources lost in taking care of HIV-orphans. By adopting a more inclusive approach when considering the indirect costs imposed by HIV/AIDS it will be possible to limit underestimation to a certain extent.

We have seen from the different case studies that one of the major coping strategies adopted by households when a member becomes infected with HIV is to withdraw from income generating activities and

care for the ill. This means that households not only suffer income loss due to the withdrawal of the affected individual but they also suffer an income loss when members leave their jobs to cater for the sick. Members who would otherwise be able to earn or perform household and family maintenance are, therefore, forced to spend their time caring for the person with AIDS. This is one of the indirect costs characteristic to HIV and should be included in the cost-of-illness framework.

Another indirect cost category characteristic to the HIV pandemic is the loss of resources as a result of taking care of orphans. In South Africa, it is estimated that, by 2010, there will be 1.5 million children orphaned as a result of AIDS. As the number of adults dying of AIDS rises over the next decade the number of orphans will also increase. The deep-rooted kinship systems that exist in South Africa, extended-family networks of aunts and uncles, cousins and grandparents, are an age-old social safety net for such children (Frederickson et al, 2004). Fostering and institutional care seem to be another alternative of caring for HIV orphans. Whichever route we go, formal or informal, the society is bound to lose resources as a result of caring for HIV orphans.

Saving and investment are also affected as a result of the pandemic. The direct costs of prevention and treatment of the disease eat into savings and other financial channels of affected households. The different studies show that affected households save less than unaffected households on a monthly basis. The magnitude of dissaving is considerable, particularly when looking at the amount of savings used relative to the average current level of monthly saving. It follows that where there is no saving, there will be no investment. Foreign direct investment also might be affected, as foreign firms would be reluctant to invest in a country where a high percentage of the labor force is

infected with HIV. Further research is needed to look into this aspect of investment.

These are not the only indirect costs that HIV/AIDS imposes but they are the more pronounced ones. That the cost-of-illness methodology can be expected to understate the true extent of the economic burden imposed by the disease is not difficult to see. At the early stages of the epidemic, the costs imposed by the epidemic were negligible but as it is gaining momentum—the costs to society are becoming larger. It has now a stage reached where it affects social capital on top of human and physical capital. HIV now stands as one of the biggest problems to the South African economy next to unemployment, poverty and crime. It is imperative that policy makers see the full cost that the disease is imposing on the South African economy and society so that much needed resources will be allocated towards its prevention.

Microeconomic level studies, especially the ones done on the impact of HIV on households are important as they give us insight as to the different pathways the epidemic imposes costs. This is because HIV affects individuals and households before the effects ripple out to other agents of the economy. To date, the number of such studies done is very limited. In order to identify the costs that HIV imposes on society, it is important to undertake micro level studies on a large scale. The pandemic is bound to have increased social costs as it becomes more widespread. Accurate and timely data should also be collected in order to make the cost calculations valid.

In the modern world, 20 years seems a long time to be at war, but it is hardly surprising when the enemy is as elusive, and pervasive, as HIV. It is two decades since scientists first identified the cause of what was a baffling new syndrome ravaging immune systems and destroying lives. Since then, AIDS has gone from being a health problem to arguably the biggest threat to prosperity in the developing world. The

newly announced Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria may finally deliver some succor, but even that fund remains grossly under financed at this point. Nevertheless, we should be optimistic that the new visibility for infectious disease symbolized by such programs represents but the first step towards putting appropriate resources at the service of those fighting the global burden of this disease. As the old adage goes 'prevention is better than cure' but in this instance prevention is also cheaper. The disease is spreading like wildfire through out the world but it is not too late to curb new infections. Among others, awareness programs should be intensified.



Bibliography

- Arndt, C. and Lewis, J.D. (2000), *The Macro Implications of HIV/AIDS in South Africa: A Preliminary Assessment*. **The South African Journal of Economics**, 68 (5), 856-887.
- Arndt, C. and Lewis, J.D. (2001), *The HIV/AIDS Pandemic in South Africa: Sectoral Impacts and Unemployment*. **Journal of International Development**, 13, 427-449.
- Aventin, L. and Huard, P. (2000), *The Costs of AIDS to Three Manufacturing Firms in Cote D'Ivoire*. **Journal Of African Economies**, 9 (2), 161-188.
- Barnett, T. and Blaikie, P. (1992), **AIDS in Africa: It's Present and Future Impact**. Portland: Guilford Press.
- Baylies, C. (2000), *Overview: HIV/AIDS in Africa: Global & Local Inequalities & Responsibilities*. **Review of African Political Economy**. 86: 487-500
- Beck, E.J. et al. (2001), *The Cost of HIV Treatment and Care: A Global Review*. **Pharmaco Economics**, 19 (1), 13-39.
- Binswanger, H.P. (2003), *Willingness to pay for AIDS treatment: myths and realities*. **Lancet**, 362 (9390) 1152-3
- Bollinger, L. and Stover, J. (1999), *The Economic Impact of AIDS*. Glastonbury, CT: The Futures Group International. [Online] Available at www.policyproject.com visited on 26 February 2004
- Bonnel, R. (2000), *HIV/AIDS and Economic Growth: A Global Perspective*. **The South African Journal of Economics**, 68 (5), 820-853.
- Botswana Institute for Development Policy Analysis. (2000), *Impacts of HIV/AIDS on Poverty and Income Inequality in Botswana*. Policy Report. [Online] Available at <http://www.synergyaids.com/documents/BotswanaHIVInequality.pdf> visited on April 2002
- Booyesen, F. le R. et al. (2004), *The Socio-Economic Impact of HIV/AIDS on Households in South Africa: Pilot Study in Welkom and Qwaqwa, Free State Province*. University of the Free State, Centre for Health Systems Research & Development. Joint Economics Aids and Poverty Proogramme. [Online] Available at <http://jeapp.org.za/attachment.php?attachmentid=2> visited on 2 October 2004
- Booyesen, F. le R. et al. (2003), *The Impact of HIV/AIDS on the South African Economy: A Review of Current Evidence*. Paper Presented at the TIPS/DPRU Conference, Johannesburg, 8-10 September.
- Booyesen, F. le R. (2002), *Financial Responses of Households in the Free State Province to*

HIV/AIDS-related morbidity and mortality. The South African Journal of Economics, 70 (7), 1193-1215.

- Broomberg, J. et al. (1991), *The Economic Impact of the AIDS Epidemic in South Africa*. Centre for Health Policy, Aids in South Africa, University of Witwatersrand, Johannesburg.
- Burger, R. (2002), *The Macroeconomic Impact of HIV/AIDS in South Africa: A Supply Side Analysis*. Seminar delivered at the School of Economics, University of Cape Town, 26 October. Unpublished paper.
- Byford, S. et al. (2000), *Cost of Illness Studies*. Centre for Health Economics, University of York. [Online] Available at <http://bmj.bmjournals.com/cgi/content/full/320/7245/1335> visited on 24 February 2004
- Caldwell, G. (2001), *The Economic Impact of HIV/AIDS on Commercial Agriculture in Kwazulu-Natal*. Unpublished Honors Paper. Cape Town: School of Economics, University of Cape Town.
- Choi, B. and Pak, A. (2002), *A method for comparing and combining cost-of-illness studies: an example from cardiovascular disease*. Surveillance and Risk Assessment Division, Centre for Chronic Disease Prevention and Control, Population and Public Health Branch, Health Canada. 23, 2.
- Cohen, D. (1997), *Socio-economic causes and consequences of the HIV epidemic in Southern Africa: a case study of Namibia*. HIV and Development Programme Issues Paper No. 31, UNDP.
- Cohen, D. (2000), *Poverty and HIV/AIDS in Sub-Saharan Africa*. UNDP Conference Paper. [Online] Available at http://www.undp.org/seped/publications/poverty_HIV_SSA.pdf visited on 2 September 2004
- Cuddington, J. (1993), *Modeling the macroeconomic effects of AIDS, with an application to Tanzania*. **World Bank Economic Review**, 7 (2), 173-89.
- Culyer, A.J. and Newhouse J.P. (2000), *Handbook of health Economics: Handbooks in Economics 17*, Volume 1A and 1B. **Elsevier Science**, Amsterdam
- Desmond, C. et al. (2000), *The Hidden Battle: HIV/AIDS in the Family and Community*. **South African Journal of International Affairs**, 7 (2), 39-58.
- Desmond, C. and Gow, J. (2002), *AIDS, Public Policy and Child Well-Being, Cornia, G.A. The Current and Future Impact of the HIV/AIDS Epidemic on South Africa's Children*. **UNICEF-IRC**, Florence: chapter 6.
- Desmond, C. and Quinlan, T. (2002), *Costs of Care and Support*. HEARD, University of KwaZulu Natal.

- DOH (a) (Department of Health). (2003), *Annual Report*. [Online] Available at www.doh.gov.za visited on 3 November 2004
- DOH (b) (Department of Health). (2003), National HIV and Syphilis Antenatal Sero-Prevalence Survey in South Africa. [Online] Available at www.doh.gov.za visited on 3 November 2004
- Dixon, S. et al. (2001), *AIDS and Economic Growth in Africa: A Panel Data Analysis*. **Journal of International Development**, 13, 411-426.
- FAO (Food and Agriculture Organization of the United Nations). (2002), *The Impact of HIV/AIDS on Rural Households and Land Issues in Southern and Eastern Africa*. [Online] Available at http://www.fao.org/documents/show_cdr.asp?url_file=/wairdocs/ad696e/ad696e02.htm visited on 2 September 2004
- Fredriksson, J. and Kanabus, A. (2004), *Aids Orphans in Africa*. [Online] Available at <http://www.avert.org/aidsorphans.htm> visited on 2 September 2004
- Freire, S. (2003), *Economics of AIDS and Access to HIV/AIDS Care in Developing Countries, Issues and Challenges*. HIV/AIDS Affected Households: Status and Temporal Impacts. ANRS, chapter 6.
- Freire, S. (2004), *Impact of HIV/AIDS on Saving Behavior in South Africa*. Paper presented at the DPRU-TIPS-Cornell University Forum on "African Development and Poverty Reduction: The Macro-Micro Linkage," October 13-15, 2004, Cape Town, South Africa.
- Gaffeo, E. (2003), *The Economics of HIV/AIDS: A Survey*. **Development Policy Review**, 21, 1-17.
- Geography IQ. (2004), *South Africa- Geography and Economy*. [Online] Available at www.geographyiq.com visited 15 November 2004
- Gerring, J. (2004), *Oxford Handbook of Comparative Politics*, Boix, C. and Stokes S. *The Art and Science of the Case Study*. Boston University, Massachusetts: chapter 4.
- Haddad, L. and S. Gillespie (2001), *Effective Food and Nutrition Policy Responses to HIV/AIDS: What we Know and What We Need to Know*. **Journal of International Development**, 13 (May), 487-511.
- Hill, E. and Meagher G. (1999), *Doing 'Qualitative Research' in Economics: Two Examples and Some Reflections*. Open Discussion Papers in Economics, Number 16. The Open University
- HST (Health Systems Trust). (2003), *Health Statistics*. [Online] Available at www.hst.org.za visited on 7 October 2004

- Hodgson, T. and Meiners, M. (1982), *Cost of Illness Methodology: A Guide to Current Practices and Procedures*. **Milbank Memorial Fund Quarterly**, 60, 429-462.
- Im-em, W. and G. Suwannarat. (2002), *Response to AIDS at Individual, Household and Community Levels in Thailand*, **UNRISD**, Geneva.
- Hendrick, J. (2004), *The impact of HIV on caregivers*. Queen Elizabeth II Health Sciences Centre, Halifax, Nova Scotia. [Online] Available at <http://www.cpa.ca/phase/caregivers.pdf> visited on 7 October 2004
- HIV & AIDS Statistics. [Online] Available at <http://www.avert.org/statindx.htm> visited on 7 October 2004
- Kongsin, S. and Watts, C. (2000), *Conducting a household survey on economic impact of chronic HIV/AIDS morbidity in rural Thailand: Methodological issues*. International AIDS Economics Network (IAEN) Conference, Durban.
- Levine, A. (2001), *Orphans and other Vulnerable Children: What role for social protection*. World bank.
- Malaney, P. (2003), *Micro-economic Approaches to Evaluating the Burden of Malaria*. CID Working Paper No. 99. Centre for International Development, Harvard University. [Online] Available at <http://www.cid.harvard.edu/cidwp/099.htm> visited on 3 February 2004
- Malaney, P. and Sachs, J. (2002), *The Economic and Social Burden of Malaria*. Centre for International Development, Harvard University. Insight review articles pp 680-685. [Online] Available at <http://www.nature.com> visited on 23 February 2004
- Malaney, P. (2000), *The Impact of HIV/AIDS on the Education Sector in Southern Africa*. CAER II Discussion Paper No. 81.
- McNurchy. (1997), *The economic impact of HIV / AIDS in Lesotho*. **AIDS Anal Afr**, 7 (4), 11-2.[Abstract]
- Morris, C. et al. (2000), *Economic Impact of HIV Infection in a Cohort of Male Sugar Mill Workers in South Africa*. **South African Journal of Economics**, 68 (5), 933-46.
- Muko, K.N. et al. (2004), *Willingness to pay for treatment with highly active antiretroviral (HAART) drugs: a rural case study in Cameroon*. **Journal of Social Aspects of HIV/AIDS Research Alliance**, 1 (2), 107-113.
- National Institute on Drug Abuse. (1992), *The Economic Costs of Alcohol and Drug Abuse in the United States*. [Online] Available at <http://www.nida.nih.gov/EconomicCosts/Index.html> visited on 26 August 2004
- Nattrass, N. (2002), *AIDS, Growth and Distribution in South Africa*. CSSR Working Paper No. 7. Cape Town: AIDS and Society Research Unit, Center for Social Science Research, University of Cape Town.

- Ntozi, J.P.M. (1997), *Effect of AIDS on Children: The Problem of Orphans in Uganda*. **Health Transition Review**, 7 (Suppl.), 23-40.
- Oni, S.A. (a) et al. (2002), *The Economic Impact of HIV/AIDS on Rural Households in Limpopo Province*. **The South African Journal of Economics**, 70 (7), 1173-1192.
- Oni, S.A. (b) et al. (2002), *Economic Impact of HIV/AIDS on Rural Households, Small Holder Agricultural Production and Orphans in the Limpopo Province of South Africa*. University of Venda, Center for rural development. Joint Economics Aids and Poverty Program. [Online] Available at http://www.commerce.uct.ac.za/dpru/Prof_Larry_Obi.pdf visited on 7 September 2004
- Over, M., Bertozzi, S. and Chin, J. (1989), *Guidelines for Rapid Estimation of the Direct and Indirect Costs of HIV Infection in a Developing Country*. **Health Policy**, 11 (2), 169-186
- Policy and Law Online. (2004), *T Manuel: South African Savings Institute/Metropolitan Excellence Research Awards*. Speech made at the South African Reserve Bank Conference Centre on 18 October 2004. [Online] Available at <http://www.polity.org.za/pol/speech/2004/?show=58420> visited on 20 November 2004
- Rice, D. and Cooper, B. (1976), *The Economic Cost of Illness Revisited*. **Social Security Bulletin**, US Department of Health, Education and Welfare.
- Rice, D. (2000), *Cost of illness studies: what is good about them?* **Injury Prevention**, 6, 177-179. [Online] Available at <http://ip.bmjournals.com/cgi/content/extract/6/3/177> visited on 3 February 2004
- Rice, D. (1966), *Estimating the Cost of Illness*. **Health Economic Series**, US Department of Health, Education and Welfare.
- Rugalema, G. (2000), *Coping or Struggling? A journey into the Impact of HIV/AIDS in Southern Africa*. **Review of African Political Economy**. 86: 537-545
- Salkeld, G. et al. (1996), **Economic Cost Of Health Effects Of Occupational: Exposure To Hazardous Substances**. Department Of Public Health, University Of Sydney
- Songer, T. and Ettaro, L. (1998), *Studies on the cost of Diabetes*. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Diabetes Translation
- Statistics South Africa. (a) (2004), *Census 2001*. [Online] Available at <http://www.statssa.gov.za/census01/html/default.asp> visited on 15 November 2004
- Statistics South Africa. (b) (2004), *General Household Survey 2003*. [Online] Available at <http://www.statssa.gov.za/publications/P0318/P03182003.pdf> visited on 15

November 2004

Steinberg, M. et al. (2002), *Hitting Home: How Households Cope with HIV/AIDS*. Discussion Document. Health Systems Trust.

UNAIDS, (2004), *2004 Report on the Global AIDS epidemic, 4th Global Report*. [Online] Available at <http://www.unaids.org> visited on 25 November 2004

Whiteside, A.L. (2002), *Poverty and HIV/AIDS in Africa*. **Third World Quarterly**, 23 (2), 313–332.

Whiteside, A.L. and Sunter, C. (2000), **AIDS: The Challenge for South Africa**. Cape Town: Human & Rousseau.

Whiteside, A.L. and Barnett, T. (2002), *Aids, Public Policy And Child Well-Being, Cornia, G.A. Poverty and HIV/AIDS: Impact, Coping and Mitigation Policy*. **UNICEF-IRC**, Florence: chapter 11.

Walker, N. et al. (2004), *Estimating the global burden of HIV/AIDS: What do we really know about the HIV Pandemic?* **The Lancet**, 363 (9427), 2180-5.



Appendix 1 Findings of South African Case Studies

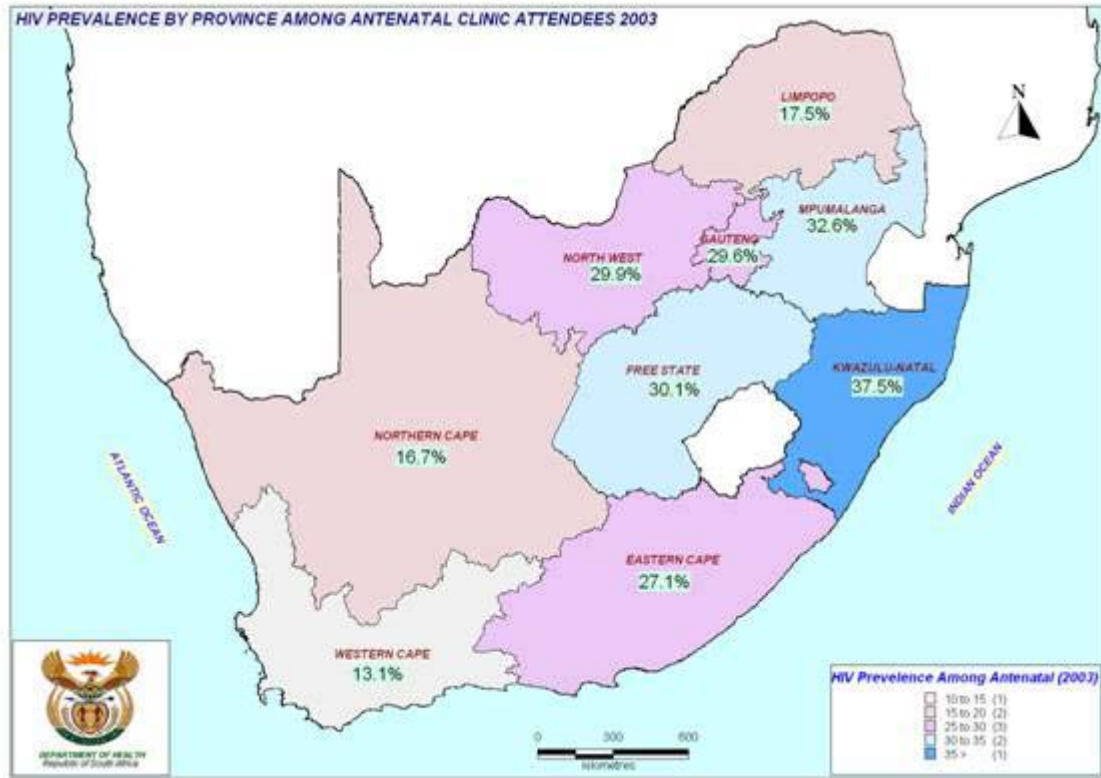
Outline of South Africa Cases

S.N.	Author/Date/Title	Type of study	Findings
1	Booyesen F. LE R/ 2002 / Financial responses of households in the free state province to hiv/aids-related morbidity and mortality	Households Survey	Affected households borrow more, save less, sale more assets than unaffected households as a result of HIV/AIDS
2	Booyesen F. LE R/ 2004 / The Socio-Economic Impact of HIV/AIDS on Households in South Africa: Pilot Study in Welkom and Qwaqwa, Free State Province.	Households Survey	The percentage of households that sheltered an orphaned child steadily increased over time as did the rates of orphan hood, A relatively larger percentage of affected households utilized savings, borrowed more or sold assets, The evidence highlights the relatively important role of social grants in mitigating the socio-economic impact of the HIV/AIDS epidemic
3	Oni , S.A et al/ 2002/ The Economic Impact of HIV/AIDS on Rural Households, Small Holder Agricultural Production and Orphans in the Limpopo Province of South Africa.	Households Survey	Significant decline in household income, changes in household expenditure patterns with increased expenditures on health and medical care, reduction in household saving, a significant increase in households loans, withdrawal of children from schools, to reduce payment of school fees, and the sale of household assets to meet up with increase household expenses engendered, reduction in household labour available for farm production; reduction in agricultural output, reduction in farm area cropped and a decline in agricultural income, home-based care system for orphans is by far more cost effective than the institutional orphanage
4	Oni , S.A et al/ 2002/ The Economic Impact of HIV/AIDS on Rural Households in Limpopo Province	Household Survey	Loss of income of both affected and caregivers, more borrowing, less saving as a result of HIV/AIDS

5	Steinberg, M et al/ 2002/ Hitting Home: How households cope with the impact of the HIV/AIDS Epidemic	Household Survey	Deepening poverty among the already poor as a results of loss of income of both affected and caregivers, disruption and termination of schooling children, increasing childhood malnutrition, increasing strain on extended family network
6	Sandra Freire/ 2003/ HIV/AIDS Affected Households: Status and Temporal Impacts	Typological	The traditional definition of 'affected households' is not valid anymore. Part of the status impacts and all the temporal impacts are experienced by households traditionally considered as non-affected. As a consequence, the restrictive definition of an affected household could lead to the underestimation of the cost of HIV/AIDS and to inappropriate policies.
7	Chris Desmond & Jeff Gow /2002/ The Current and Future Impact of the HIV/AIDS Epidemic on South Africa's Children	A chapter in a book 	-infant and child mortality rates will double over 15 years; life expectancy will dramatically decline as more children acquire HIV; millions of orphans will be created as adults die and these children will kept in poverty and be less likely to attend school and receive the normal socialisation of childhood. -the national AIDS plan has a focus on prevention of HIV transmission, information and education about HIV have been effective in raising awareness of the disease; government has pushed orphan care onto the community
8	Karen Michael, Chris Desmond, Jeff Gow /2002/ The Hidden Battle: HIV/AIDS in the Family and Community	Review of different literature	Impacts at the household level are decreased income, increased costs, decreased productive capacity and changing expenditure patterns. Three coping strategies are observed: altering household composition; withdrawing savings or selling assets; receiving assistance from other households. Following death, the impacts break out of the family into the community, primarily through orphaning. The distribution of the impacts of the AIDS epidemic falls unevenly

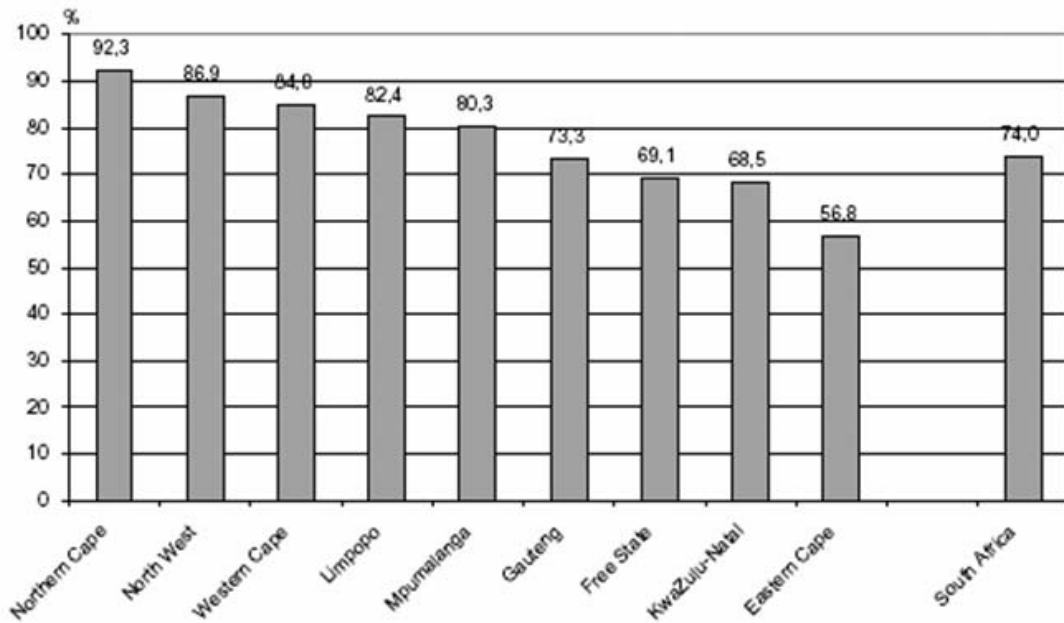
			among the genders. Women have higher infection rate and bear a disproportionate burden of the care of HIV-positive people. Orphaned girls are more vulnerable to exploitation.
9	Tim Quinlan and Chris Desmond /2002/ Costs of Care and Support	Review of different literature	Home/community/state-based programmes could not cope on their own. There is a need to combine the three agencies.
10	Sandra Freire / 2002/ Impact of HIV/AIDS on saving behaviour in South Africa	Analysis of one differed indirect cost—Gali and Moresi model	the saving rate in 2015, under under the hypothesis of a virus evolution, should be at least 5 percentage points inferior to the estimated saving rate that would prevail in the absence of the epidemic
11	FAO/2002/ The Impact of HIV/AIDS on Rural Households and Land Issues in Southern and Eastern Africa.	Review of different literature	rural households cope with the epidemic by selling assets including land
12	Tony Barnett and Alan Whiteside /2002/ Poverty and HIV/AIDS: Impact, Coping and Mitigation Policy.	A chapter in a book	Mitigation of the impact of AIDS is so far rather poorly documented
13	Haddad et al/ 2001/ Effective Food and Nutrition Policy Responses to HIV/AIDS: What we know and what we don't know.	Review of different literature	Nutritional support has the potential to significantly postpone HIV/AIDS-related illness and prolong life. Appropriate community-based interventions aimed at improving the food, health, or care preconditions of nutritional well-being need to be designed through a participatory process of assessment, analysis, and action

Appendix 2 South African HIV/AIDS prevalence rate map by province



Source Department of Health (b), 2003

Appendix 3 Proportion of households in each province living in formal dwelling, July 2003



Source: Statistics South Africa (a), 2004

