The impact of HIV/AIDS on the South African labour market from a critical perspective

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This article focuses on the current and future impact of HIV/AIDS on the South African labour market from a critical perspective. The critical perspective originated from the works of Karl Marx and Friedrich Engels and aids our understanding of the extent and nature of the impact of HIV/AIDS on the South African labour market.

HIV/AIDS is expected to impact on various aspects of the labour market, namely labour supply and the composition of labour supply, labour demand, and the interaction between labour supply and demand. The impact of HIV/AIDS on the various components of the labour market was captured in a conceptual model. A dynamic model, based on the conceptual model, was used to model the interplay between HIV/AIDS and labour market trends as accurately as possible, as well as to construct different HIV/AIDS impact scenarios with respect to the labour market. Critical theory was then used to interpret such interrelationships and to discuss the said scenarios, thus arriving at an improved understanding of the impact of HIV/AIDS on the South African labour market.

Introduction

There is divergence of opinion as to how current and future HIV/AIDS trends will impact on the South African labour market. HIV/AIDS will in all probability impact upon various aspects of the labour market. Such aspects include labour supply and the composition of labour supply (e.g., fewer people supplying their labour because of AIDS-related diseases or AIDS-related deaths); labour demand (e.g., entrepreneurs dying because of AIDS-related diseases), and the interaction between labour supply and demand (e.g., employers being less willing to take on permanent workers because of concern that they may be HIV-positive).

Researchers and institutions (e.g., Barker, 1999; StatsSA, 1998a; Dorrington, 1998; ING Barings, 2000) have pointed out that HIV/AIDS has a large number of direct and indirect impacts on the labour market. An example of a direct impact could be the impact of HIV/AIDS on the size of labour supply and labour demand in South Africa, while the impact of HIV/AIDS on the employment decision-making of prospective employers is an example of an indirect impact. Although the said commentators have all indicated that South African HIV/AIDS dynamics are impacting upon the labour market, there appears to be very little consensus about the nature and strength of such impacts.

Upon reading the views of some rather pessimistic commentators (e.g., Dorrington, 1998; Barker, 1996; Barker, 1998; Doyle, 2001; Dorrington et al., 2001), the reader's first impression is that the South African labour market is doomed, and that the best thing to do would be to get out of the country as soon as possible before the labour market and the economy go into stagnation (or even decline).

Research problem

Dorrington (1998) is of the opinion that AIDS will lead to the early mortality of a very large number of economically active people by 2010, with the consequence that the life expectancies of people will drop dramatically. Using available death registration data Dorrington et al. (2001) prepared estimates for the Medical Research Council of the percentage of adult deaths (for the ages 15 to 49) that could be attributed to AIDS-related diseases. They concluded that there was a rapid growth in the percentage of such adult deaths, namely from 9 per cent during the period 1995-1996 to about 40 per cent by 2000-2001.

Barker (1995) indicates in this regard that, although AIDS may look like a "quick-fix" for South Africa's population and unemployment problems, the medical and other costs of AIDS will be so high that it could cripple the South African economy before the demographic effects of AIDS are felt. Finally, Doyle (1991) indicates that 90 per cent of the adults who will die because of AIDS-related diseases will be in their key productive ages of 20 to 50 years of age. This will have disastrous consequences for both productivity and human capital formation in South Africa. Should these authors be correct, AIDS is about to hit the South African labour market extremely hard and could even cripple the economy (see Abt Associates, 2001; Whiteside & Sunter, 2000).
There are, however, some less pessimistic views regarding the future impact of HIV/AIDS on the labour market. For example, Calitz (1996) poses the possibility that a cure for AIDS or success of information campaigns on AIDS could lessen its impact. Even without a cure for AIDS, he believes that the real impact of AIDS will only be felt by 2015 to 2020.

Having shown that there is no consensus about the impact of HIV/AIDS dynamics on the labour market, the question can be raised whether a single research project could correctly identify past impacts of HIV/AIDS on the labour market and what its future impact will be. The author is of the opinion that no single study can provide an accurate picture of extremely complex relationships in which many direct and indirect linkages as well as complex feedback and multiplier effects are at work.

The aim of the research project described in this paper was to construct a conceptual model and, on this basis, a dynamic model for modelling the interplay between HIV/AIDS and labour market trends as accurately as possible in order to arrive at a better understanding of such complex interrelationships. Social theory, specifically the critical theory of Marx, Engels and the members of the Frankfurter Schule (i.e. Marcuse, Horkheimer and Habermas) will then be used for interpreting such interrelationships, thus arriving at an improved understanding of the impact of HIV/AIDS on the labour market. Social theory is used as the backbone of model-building and analysis – hence social theory was applied as part of the model-building process as well as for interpreting the results of the models used in this study.

**Conceptual model**

To develop a dynamic model for application in this study, a conceptual model was formulated on the basis of extensive literature reviews and the author's substantial experience of formulating labour market models based upon the variables suggested by Marx (1982) in his well-known work "Das Kapital". This conceptual model is as follows:

\[
\Delta L = \Delta D \cdot \Delta G \cdot \Delta E \cdot \Delta B \cdot \Delta P
\]

where:

- \(L\) Labour market;
- \(D\) Demographic dynamics (including HIV/AIDS impacts);
- \(G\) Economic growth dynamics;
- \(E\) Education and training dynamics;
- \(B\) Business and business development dynamics; and
- \(P\) PEST dynamics (political, economic, social, technological).

In this model the author postulates that labour market dynamics are interactively driven by five other types of societal dynamics, namely demographic dynamics; economic growth dynamics; education and training dynamics; business and business development dynamics, and political, social, economic and technological dynamics. This postulate is premised upon the base-superstructure epistemology proposed by Marx (as quoted by Cohen, 1982: 216-225).

It is further postulated that the interrelationships between HIV/AIDS and labour market trends should not be viewed in isolation from economic, educational, social, political and technological feedbacks and multipliers, but that a comprehensive dynamic model should be formulated that takes all these factors into account. This is exactly what has been done, as can be seen later in the paper. This model was constructed based on the research questions provided below and the literature review from a critical perspective on HIV/AIDS-labour market linkages discussed later in this article.

**Research questions**

To structure the research conducted for the purposes of this study, five research questions were formulated, all dealing with the issue how HIV/AIDS trends impact upon the interrelationship between labour supply and demand in the labour market. The research questions are as follows:

- What HIV/AIDS aspects have an impact on labour market dynamics?
- What is the nature of the impact of HIV/AIDS upon the labour market?
- Are there feedback dynamics present between the labour market and HIV/AIDS, i.e. is the impact indicated above a one-way impact of HIV/AIDS upon the labour market, or is the labour market also continuously impacting on HIV/AIDS trends?
- What are the underlying and proximate reasons for the impact of HIV/AIDS on the labour market?
- What can be done to lessen the impact of HIV/AIDS on the labour market?

**Critical perspective**

The critical paradigm is firmly rooted in the ideas of Karl Marx and Frederick Engels regarding the oppression of the proletariat (labourers) in the labour market by capitalists (employers). Marx (as quoted by Abraham, 1977) stated that the history of humankind is a history of class struggles. In the Manifesto of the Communist Party he pointed out that, under capitalist production conditions, "industrial armies" who are exploited by capitalists have replaced individualised labour. In the name of efficient production (productivity) and profit, capitalists subject labourers to exploitative
obtaining goods to fulfill needs external to the working situation;

- alienation from the production process: Fordist production modes are often foreign to workers and tend to break the labour process up into small meaningless chunks, e.g., one underground mineworker just drills holes into a stopeface day after day;

- alienation from him/herself: The capitalist labour process also alienates people from their own life activities by inculcating an industrial reason with a concurrent loss of strategic and pure reasoning abilities (e.g., as manifested by a lack of high-level critical and creative thinking skills among labourers);

- alienation from their species being: Instead of living active family lives in a developed neighbourhood, many workers work long hours in mines or factories where they stay in single sex hostels in conditions not at all conducive to normal family and social lives;

- objectification: This is a process whereby people become cogs in the production process with a concurrent loss of self-esteem and self-determinism; and

non-critical sexual practices such as not using condoms, having multiple sex partners or using the services of sex workers.

It could be asked how a critical perspective would contribute to our understanding of the impact of HIV/AIDS on the South African labour market. The reason for this is that, in the South African labour market, the HIV sero-prevalence levels among labourers in the formal and the informal sector of the economy are exceptionally high. Examples of this are: 90 per cent HIV sero-prevalence among military policemen in a training camp in Kwa-Zulu Natal; an infection rate of about 60 to 70 per cent in the SANDF, and higher than 40 per cent at several mines and factories in South Africa (Kirk, 2000). The Chamber of Mines of South Africa (Magardie, 2000) indicated that the current rate of tuberculosis infection is 3 000 per 100 000 miners, compared with 500 per 100 000 in 1990. About 70 per cent of tuberculosis sufferers in the mining industry are HIV-positive.

Evidence suggests that the highest levels of HIV sero-prevalence are not found among impoverished dwellers of informal settlements as earlier assumed, but rather among the employed (Mills, 2000 and Whiteside, 1990) who work under similar conditions as those identified by Marx and the neo-Marxists. It appears that such bad working conditions facilitate high levels of HIV/AIDS among
labourers. For example, mineworkers regard their working conditions as so dangerous that they do not expect to live long any way, and therefore see no reason to be concerned about the possibility of contracting HIV/AIDS. This is the main reason why the critical perspective based on the works of Marx and his followers will be used to explain the high levels of HIV/AIDS in the South African labour market.

Another reason for using the critical perspective is that Marx was one of the early users of complex dynamic economic models to investigate the impact of social, socio-economic, political and economic trends on the labour market. The way in which Marx modelled social-political-economic linkages in his later works provided an invaluable source of ideas for the construction of the dynamic model for the purposes of this paper.

As the basis for designing such a model pertaining to South Africa, a literature review of the population, educational, labour market and economic dynamics of the country was conducted. This was necessary since such dynamics were included in the dynamic model constructed for the purposes of this study. The results from the literature review are reported in the sections below.

Population dynamics

The South African population grew rapidly during this century from 5 million in 1902 to more than 43 million in 1999. It is expected that South Africa’s population size will be between 46 to 62 million in 2021, depending upon the impact of AIDS, declining fertility rates and migration from now until that date (Van Aardt & Van Tonder, 1999).

It is thus possible that the South African population could still grow substantially up to the year 2021. Keeping in mind that nearly half the population already lives below the minimum subsistence level, it is hard to imagine how the current number of jobs and educational opportunities could increase sufficiently during the next 20 years to ensure that the level of unemployment does not rise dramatically from its current position (see Van Aardt & Van Tonder, 1999). Also, to ensure that the country is not even worse off by 2020 than now, South Africa will need at least a sustained economic growth rate of 3 to 4 per cent from now until 2021 as well as a more favourable production elasticity of employment - just to cater for the booming population. The 3 to 4 per cent sustained economic growth rate required does not take into account the direly needed eradication of existing backlogs and inequalities. It only takes into account catering for the basic needs of a rapidly growing population in order to keep the standard of living per capita on par with the present position.

To cater for the booming population as well as the eradication of existing backlogs, a sustained annual economic growth rate of about 8 to 9 per cent is required, especially when taking into account the current low labour absorption capacity of the South African labour market (Barker, 1999).

At the moment two opposing forces impact on population growth in South Africa: on the one hand, those forces promoting high population growth and on the other, those impacting negatively on population growth. The forces facilitating high population growth include the large-scale inflow of immigrants (including refugees and illegal immigrants), especially from neighbouring and other African states, and a rapid decline in the mortality rate (especially infant and child mortality rates) now that health facilities are more accessible to all members of the population (especially to the African rural population).

The two forces impacting negatively on the population growth rate are AIDS and declining fertility rates. Although South Africa’s fertility rates remain fairly high and make considerable demands on the economy at a time in respect of the provision of employment and education, there appears to be a downward trend in total fertility rates (TFR) for all population groups. This is clear from the fertility estimates of both Sadie (1998) and Udjo (1998). According to Sadie’s estimates, the TFR dropped from 5.73 in 1970 to 3.49 in 1995. Udjo’s estimates suggest that the TFR dropped from 4.9 in 1970 to 3.2 in 1995. Irrespective of who is correct, they both indicate strong downward trends in South African fertility rates. The implication is that the segment of population growth being driven by births is becoming smaller. It is clear that the TFR of whites is already below the replacement level, in other words there will be a gradual decline of the white population in future. Asians reached replacement rate in 1995 and coloureds in the year 2000. Barker (1992) indicates that the abolition of influx control in 1986 which led to higher levels of urbanisation, also resulted in lower fertility rates since the latter are lower in urban than in rural areas.

As regards mortality, the average life expectancy at birth in South Africa in 1992 was 63 years for Africans and coloureds, 67 years for Asians and 73 years for whites (SAIRR, 1993). However, there are signs that AIDS will reduce the life expectancy of South Africans dramatically during the next two decades. Using the ASSA600 model, Dorrington (1998) shows graphically that, by the year 2008, the mortality rates of people in the working ages will rise dramatically. According to the Financial Mail (1999), about 21 per cent of the workforce will be HIV-positive and about 3 per cent will have full-blown AIDS by 2010.

It is also foreseen that, between 1999 and 2010, the average life expectancy of males will drop to 38 years and that of females to 37 years. During
the same period the number of full-blown AIDS cases is projected to increase from 175,000 per year in 1999 to 560,000 per year in 2010 (Financial Mail, 1999). Such a dramatic increase in AIDS cases will have a massive impact on the labour market, both on supply and demand. In relation to labour demand, AIDS-related morbidity and mortality will force a large percentage of the economically active population (EAP) to withdraw their labour supply. In relation to labour demand, a high AIDS incidence will scare employers into not appointing more labourers, while also forcing entrepreneurs with AIDS to withdraw from the labour market.

According to the United States Census Bureau (1999) database there are already high HIV infection rates in South Africa. For example, 27 per cent of pregnant women tested for HIV/AIDS in Durban in 1997 were found to be HIV-positive, while 18.1 per cent of pregnant women tested in the North West Province in 1997 were HIV-positive. Among prostitutes the HIV infection rates are even higher - 50.3 per cent among 145 prostitutes tested for HIV in KwaZulu/Natal during the period 1996-1997. Given such high infection rates, which are even much higher now, it must be clear that AIDS will hit society, the labour market and the economy very hard.

Education dynamics

The educational profile of South Africa’s population is such that the work force is not sufficiently educated to keep the modern sector of the economy growing without tension. For example, in 1996 there were only about 1,294 million people with matric plus two years of post-matric education or training. This means that only about 6.16 per cent of the total South African population aged twenty years and older could be classified as high-level human resources (HHLR) (StatsSA, 1999b).

Also in 1996, only about 16 per cent of the South African population older than 20 years could be classified as middle level human resources (MLHR). This means that nearly four-fifths of the South African population older than 20 and about three-fifths of the EAP constituted low-level human resources (LLHR). The negative effect of this low educational level is compounded by the fact that, according to the 1996 Census, over 36 per cent of the total South African population older than 20 years has an educational level of standard 4 or lower and can thus be classified as functionally illiterate on the basis of international norms (StatsSA, 1999b).

The high level of illiteracy among the EAP forms an important obstacle towards the realisation of sustainable economic growth, the development of a strong small business sector and South Africa’s ability to become globally competitive. Also, the lack of education and skills in the small business sector has been cited as one of the primary factors leading to the failure of many entrepreneurs entering this sector. Many small entrepreneurs run their businesses on the basis of previous experience and common sense alone, which can be successful only if the scale of their activities remains small enough for effective one-man control (The New Nation, 1992). In turn, this leads to a situation where employers and the self-employed constitute only a very small percentage of the EAP. This is the case especially amongst coloureds and Africans with low levels of education. The low average level of education of entrepreneurs in the informal sector has similarly been cited as an important contributor towards the high level of poverty in this sector.

It is also of concern that the literacy/education levels of people without formal jobs are even less favourable than those of the EAP as a whole. This means that there are a large numbers of people without formal jobs who are virtually unemployable in the formal sector. Especially among the African population, it is evident that the low average skills level of people due to apartheid policies and practices impacts negatively on their ability to participate fully in the small business sector of the formal sector to further the attainment of sustainable economic growth (CSS, 1992).

Labour market dynamics

There has been a rapid growth in the size of South Africa’s EAP, from about 5,3 million in 1960 to 13,8 million in 1996 (Barker, 1995; StatsSA, 1999b). However, the employment creation ability of the South African economy has been deficient since the early seventies. Formal employment opportunities increased by less than 600 000 from 1978 to 1985 in comparison to 2,9 million entrants into the labour market during the same period. Thus more than 2,3 million people entering the labour market could not be accommodated in the formal sector and had to become involved in subsistence agriculture and the informal sector or remain unemployed. The poor employment creation ability of the formal sector can be blamed on low levels of economic growth coupled with capital intensification (see Barker, 1999).

According to StatsSA labour market statistics, about 37,6 per cent of the total 1997 EAP was unemployed (1996a). About a third of the said unemployed were involved in the informal sector of the economy. An estimated 22,9 per cent of the EAP was not involved in either the formal or informal sectors of the economy and was actively looking for formal employment.

The inability of the formal sector to create sufficient job opportunities to cater for the rapidly growing
EAP and large number of labour market entrants per annum is further reflected by changes in the labour absorption capacity (LAC) of the economy. In this regard Lichtheim and Kritzinger-Van Niekerk (1990) indicate that the labour absorption capacity of the formal economy has been declining rapidly from the 1960s onwards. During the period 1965 to 1970, 73.6 per cent of new entrants to the labour market could obtain a job in the formal sector of the economy. The labour absorption capacity decreased to 62.7 per cent for 1970-1975, to 35.4 per cent for 1975-1980, to 21.9 per cent for 1980-1985 and to 12.5 per cent for 1985-1990. Indications are that the labour absorption capacity was only 7 per cent in 1990, 4 per cent in 1991 and -1 per cent in 1992. The labour absorption capacity of the economy apparently took a further nosedive from 1992 to 1999 — it could at present be much lower than zero, which means that more jobs are lost per year than are being created. For example, about 186 000 jobs were lost during 1998 because of retrenchments, while more than half a million jobs were shed from 1994 to 1999 (Mabotja, 1999).

From the 1998 StatsSA report "Unemployment and employment in South Africa", the impact of race and sex upon the labour market becomes clear, i.e. race and sex are very strong determinants of employment status. According to the 1997 October Household Survey (StatsSA, 1998a), the labour supply of African men is double that of African women, while about 70 per cent of white men (in the age group 16-45) were employed in 1997 as against about 35 per cent of African men. Furthermore, when we compare the levels of unemployment among the different racial groups and sexes in society, it becomes very clear that occupational status and organisational seniority are strongly linked to race and sex. An example of this is that about 50 per cent of employed white men and women are working in management, professional and technical jobs as against about 17 per cent of employed African men and 20 per cent of employed African women.

Employment differentials are also evident from the type of economic activities in which people from different sexes and races are involved. In this regard it should be noted that about 9 per cent of African men and about 5 per cent of coloured men are self-employed as against about 20 per cent of white and Asian men. Males are self-employed to a much larger extent than females: about 20 per cent of white and Asian males are self-employed as against 10 per cent of white females and about 2 per cent of Asian females (StatsSA, 1998a).

**Economic dynamics**

During the past decade a lot of time, money and human resources was spent on finding a solution for South Africa's political problems. This was essential to ensure a politically normalised future South Africa. However, finding economic and socio-economic solutions, although as crucial as a political solution, did not get the same attention and societal commitment. Political, economic and socio-economic solutions should go hand in hand, as it is hard to imagine how a political solution will ensure social stability in the medium- to long-term under conditions of a stagnating economy characterised by unemployment and poverty.

After more than two decades of rapid economic growth following the Second World War, the South African economy went into stagnation by the late sixties as manifested in low economic growth rates, declining per capita income and low levels of job creation (McCarthy, 1991). Van der Berg (1989) points out that the highest annual economic growth rate recorded in South Africa since 1945 was 7.7 per cent in 1965. The highest sustained economic growth rate was achieved during the period 1962 to 1970 when an average economic growth rate of 6.1 per cent was recorded. The eighties and early nineties, however, showed the lowest growth rates since 1945. This decline in economic growth over the last two decades already has dire consequences for the South African economy and broader society and the country is still caught in its grip. The low level of economic growth in South Africa further curtails efforts to develop the country economically (McCarthy, 1991).

The low economic growth rates from the sixties (and especially from 1975) onwards together with sanctions, disinvestments and similar measures resulted in increased poverty, rising unemployment and growing resource constraints (Van der Berg, 1991). Furthermore, the low economic growth rate also curbs the fiscal capacity of the State to fulfill the developmental needs of the South African society as a whole (Van der Berg, 1991).

In this regard, Cohen (1993) points out that a low economic growth rate actually has a multitude of negative spin-offs impacting on society as a whole. These include *inter alia*:

- Retrenchments leading to work place tensions;
- increased unemployment leading to an increase in poverty;
- difficult economic circumstances leading to higher levels of violence and crime, and
- economic uncertainty leading to higher levels of social instability.

The South African economy experienced very little real growth during the nineties. According to ABSA (1999), the average actual GDP growth rate for the period 1991 to 1995 was only 0.8 percent. During the same period the availability of net new capital as a percentage of GDP was only 3.1 percent as
against 10.7 per cent for the period 1981 to 1985. Furthermore, during most of the same period (1991-1995) there was a negative growth in capital stock and a strong negative growth in formal sector employment opportunities. This is especially worrisome in light of the fact that the South African EAP grew by another 2.2 million people while there was a negative growth in employment opportunities (see Barker, 1995; Barker, 1999).

The modelling approach and modelling process

There are many ways in which researchers endeavour to determine the nature and strength of relationships between variables. Some prefer a qualitative approach, determining the nature and strength of relationships between variables by using qualitative techniques such as focus groups or interviews. Other researchers prefer a quantitative approach, e.g., analysing data or modelling simulations (Dorrington, Bourne, Bradshaw, Laubscher and Timaeus, 2001). It will be very difficult to determine the strength and nature of the relationship between HIV/AIDS and labour market variables through a qualitative approach because of the huge effort that will be required conducting focus groups all over the country. Even if this was possible, focus group participants will not necessarily have the detailed insight into the relationship between HIV/AIDS and labour market variables required to ensure a good study.

For that reason, this study opted for a more quantitative modelling approach similar to that used by Marx to model the relationships between capital, society and commodities in Das Kapital (1982). Modelling was selected as the preferred quantitative approach, since the large number of demographic, economic, labour, political, educational and other variables impacting upon one another continuously can be dynamically linked into a model, ensuring that direct, indirect, feedback and multiplier interrelationships between variables are included. The model that was developed is based on the following conceptual model as discussed earlier, namely: \( \Delta L = \Delta D \times \Delta G \times \Delta E \times \Delta B \times \Delta P \), where \( L \) = Labour market, \( D \) = Demographic dynamics, \( G \) = Economic growth dynamics, \( E \) = Education and training dynamics, \( B \) = Business and development business development dynamics, and PEST dynamics (political, economic, social, technological). The dynamic model formulated for the purposes of this study is discussed below.

The dynamic model

The dynamic model is based on the theoretical overview provided in this study. This dynamic model uses data from 1996 as the base year and generates projections up to 2020. The model consists of 8 sub-models, namely:

- a population sub-model;
- a labour market sub-model;
- an agricultural income sub-model;
- a manufacturing income sub-model;
- a mining income sub-model;
- a services income sub-model;
- an education and training sub-model; and
- an income and expenditures sub-model.

The different sub-models are shown below. The results obtained are shown and discussed later in this article.

Population sub-model

\[
\begin{align*}
\text{PI} &= 42700000 \\
\text{PG} &= \text{BI} \cdot \text{DE} \text{ (dynamically this would be } \Delta \text{PG} = \Delta \text{BI} \cdot \Delta \text{DE}) \\
P_t &= P_{t-1} + (\text{PG} \cdot dt) \\
\Delta \text{D} &= (P \cdot \beta_3) \\
\text{BI} &= (P \cdot \beta_4) - (G \cdot \beta_5) - (SE \cdot \beta_6) - (AD \cdot \beta_7) \\
\text{DE} &= \text{AD} + M \text{ (dynamically this would be } \Delta \text{DE} = \Delta \text{AD} + \Delta M) \\
M &= P \cdot \beta_8
\end{align*}
\]

Labour market sub-model

\[
\begin{align*}
\text{EA} &= P \cdot \Pi \text{ (dynamically this would be } \Delta \text{EA} = \Delta P \cdot \Delta \Pi) \\
E &= (DP \cdot \beta_{20}) + (EA \cdot \beta_{21}) + LE \\
J &= (EA \cdot \beta_{22}) + (GE \cdot \beta_{23}) + (DP \cdot \beta_{24}) - \beta_{23} \\
N &= \text{EA} - J \text{ (dynamically this would be } \Delta N = \Delta \text{EA} - \Delta J)
\end{align*}
\]

Agricultural income sub-model

\[
\begin{align*}
A_t &= A_{t-1} + (F \cdot dt) \\
A_I &= 22550 \\
F &= (E \cdot \beta_1) + (J \cdot \beta_2) + \beta_{14}
\end{align*}
\]

Manufacturing income sub-model

\[
\begin{align*}
M_t &= M_{t-1} + (\text{MFA} \cdot dt) \\
M_F &= 148191 \\
\text{MFA} &= (E \cdot \beta_{11}) + (J \cdot \beta_{12}) + \beta_{13}
\end{align*}
\]

Mining income sub-model

\[
\begin{align*}
M_n &= M_{n-1} + (\text{MA} \cdot dt) \\
M_I &= 39122 \\
\text{MA} &= (E \cdot \beta_5) + (J \cdot \beta_{10}) + \beta_{15}
\end{align*}
\]

Services income sub-model

\[
\begin{align*}
S_t &= S_{t-1} + (\text{SA} \cdot dt) \\
S_I &= 273111 \\
\text{SA} &= (E \cdot \beta_8) + (J \cdot \beta_7) + (N \cdot \beta_{12}) + \beta_{19}
\end{align*}
\]
Education and training sub-model

\[ LE = (TE + TEC + U) \] (dynamically this would be \[ \Delta LE = \Delta TE + \Delta TEC + \Delta U \])

\[ PE = P \times \beta_{26} \]

\[ SE = PE + SED \] (dynamically this would be \[ \Delta SE = \Delta PE + \Delta SED \])

\[ SED = P \times \beta_{27} \]

\[ TE = P \times \beta_{26} \]

\[ TED = P \times \beta_{28} \]

\[ TSP = PE + SED \times TE + TED + U \] (this would also be a dynamic process)

\[ U = P \times \beta_{30} \]

Income and expenditures sub-model

\[ GE = DP \times A \] (dynamically this would be \[ \Delta GE = \Delta DP \times \Delta A \])

\[ DP = A + MN + MF + S \] (dynamically this would be \[ \Delta DP = \Delta A + \Delta MN + \Delta MF + \Delta S \])

\[ G = GE / P \] (dynamically this would be \[ \Delta G = \Delta GE / \Delta P \])

where:

- A: GDP generated through agriculture
- F: Farming activities
- AI: Agricultural income for 1996
- E: Entrepreneurship
- \( \beta_{1,n} \): Beta scores
- J: Formal jobs
- P: Population
- PI: Population for 1996
- PG: Population growth
- BI: Births
- DE: Deaths
- AD: AIDS related deaths
- G: GDP per capita
- SE: School education
- M: Non-AIDS related mortality
- MN: GDP generated through mining
- MA: Mining activities
- MI: Mining income for 1996
- MF: GDP generated through manufacturing
- MFA: Manufacturing activities
- MFI: Manufacturing income for 1996
- S: GDP generated through services
- SA: Service activities
- SI: Income from services during 1996
- N: Number of people without a formal job opportunity
- EA: Economically active population
- T: Vector of labour force participation rates
- DP: Gross domestic product
- LE: Labour education
- GE: Government expenditure
- TE: Teacher education
- TEC: Technical education
- U: University education
- PE: Primary education
- SED: Secondary education
- TSP: Total number of students and pupils

\[ \Lambda \] vector of elasticity rates regarding government's use of available capital

Findings

By means of the dynamic model above, a large number of simulations were generated based on different HIV/AIDS scenarios. This was done to determine the possible impact of different possible future HIV/AIDS trends on the labour market. Firstly, a baseline simulation was done where the impact of AIDS was based on no HIV/AIDS. Although it is based on an invalid premise - namely that there is no HIV/AIDS in South Africa - this scenario presents a baseline to determine to what extent different levels of HIV/AIDS are likely to impact on the labour market. The results from this simulation are shown in Table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>EAP</th>
<th>Formal jobs</th>
<th>No formal jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>42 700 000</td>
<td>16 226 000</td>
<td>7 117 866</td>
<td>9 108 500</td>
</tr>
<tr>
<td>2001</td>
<td>48 613 541</td>
<td>16 473 145</td>
<td>8 199 529</td>
<td>10 273 616</td>
</tr>
<tr>
<td>2006</td>
<td>55 221 111</td>
<td>20 944 022</td>
<td>9 475 325</td>
<td>11 508 696</td>
</tr>
<tr>
<td>2011</td>
<td>62 619 661</td>
<td>25 795 471</td>
<td>10 977 867</td>
<td>12 818 103</td>
</tr>
<tr>
<td>2016</td>
<td>70 919 688</td>
<td>26 949 491</td>
<td>12 743 078</td>
<td>14 260 403</td>
</tr>
</tbody>
</table>

Under the assumption "no HIV/AIDS", the South African population could potentially grow to about 70.9 million by 2016. Of this total, about 26.9 million people will be economically active with only about 12.7 million employed in formal jobs. The implication of this is that, in the absence of HIV/AIDS, only 47 per cent of the EAP will have formal job opportunities by 2016. Also, by 2020 60 per cent of all formal job opportunities will not be permanent positions, but will be casual, contract or franchise employment opportunities. Roberts (1999) and Van Wyk and Van Aardt (2002) indicate that employers are taking on fewer permanent employees (as against casual, contract or franchise employees) because they are cautious about hiring new permanent employees due to HIV/AIDS ravages among employees, labour legislation, low labour productivity, trade unions and the like.

It is foreseen that most of the new formal job opportunities created over the next two decades will be in the service and the labour-intensive manufacturing sectors, while there will be a net loss of employees in the primary sectors (agriculture, mining, forestry and quarrying). Under the "no HIV/AIDS" scenario a whole range of societal factors will impact on job creation. Labour market policies and labour legislation, business income and investments, franchising and business confidence are expected to be the main drivers of job creation under this scenario. However, the moment HIV/AIDS begins to feature in the labour market, the impact of other societal
variables on labour market variables become weaker compared to the HIV/AIDS impacts. This can be seen from Table 2, a simulation of the impact of AIDS based on low HIV sero-prevalence (4 per cent in 1996 to 6 per cent in 2008) levels during the projection period.

Table 2  Low HIV/AIDS scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>EAP</th>
<th>Formal jobs</th>
<th>Not formal jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>42,700,000</td>
<td>16,226,000</td>
<td>8,069,964</td>
<td>9,236,403</td>
</tr>
<tr>
<td>2001</td>
<td>46,155,647</td>
<td>18,239,146</td>
<td>7,867,688</td>
<td>10,411,447</td>
</tr>
<tr>
<td>2006</td>
<td>53,933,028</td>
<td>20,494,550</td>
<td>8,919,965</td>
<td>11,575,184</td>
</tr>
<tr>
<td>2011</td>
<td>60,074,408</td>
<td>22,828,275</td>
<td>10,104,470</td>
<td>12,723,804</td>
</tr>
</tbody>
</table>

It is clear that, with a low level of HIV/AIDS, the South African population could potentially grow to about 66.6 million by 2016. About 25.3 million of these people will be economically active, but only about 11.5 million will have formal job opportunities. The implication of this is that only about 45.3 per cent of the EAP will have formal job opportunities by 2016 and 54.7 per cent will not.

It is also important to note that, under the low HIV/AIDS scenario, 10 per cent fewer jobs will be created than under the no AIDS scenario. The reason why so many formal job opportunities are not created is that employers are wary of employing more workers for fear that they are HIV-positive, especially in the light of legislation which protects the job status of employees with HIV/AIDS. Another reason is that many entrepreneurs and prospective entrepreneurs, who could have created jobs, are expected to close shop due to suffering from AIDS themselves (see Van Wyk & Van Aard, 2002). It appears that as a higher level of HIV/AIDS is introduced into the simulation, the impact of HIV/AIDS on job creation becomes even more severe. This can be seen from Table 3, which represents results from a simulation where the impact of AIDS was based upon a medium level of HIV sero-prevalence rates (6 per cent in 1996 to 10 per cent in 2008) during the projection period.

Table 3  Medium HIV/AIDS scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>EAP</th>
<th>Formal jobs</th>
<th>Not formal jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>42,700,000</td>
<td>16,226,000</td>
<td>8,851,496</td>
<td>9,364,503</td>
</tr>
<tr>
<td>2001</td>
<td>47,233,921</td>
<td>17,948,880</td>
<td>7,543,105</td>
<td>10,405,784</td>
</tr>
<tr>
<td>2006</td>
<td>51,622,081</td>
<td>19,616,619</td>
<td>8,286,845</td>
<td>11,327,772</td>
</tr>
<tr>
<td>2011</td>
<td>55,849,997</td>
<td>21,222,998</td>
<td>9,106,179</td>
<td>12,117,819</td>
</tr>
<tr>
<td>2016</td>
<td>59,897,759</td>
<td>22,761,148</td>
<td>9,999,197</td>
<td>12,761,951</td>
</tr>
</tbody>
</table>

The South African population could potentially grow to about 59.9 million by 2016 with a medium level of HIV/AIDS, compared to 66.6 million with a low level of HIV/AIDS. Compared with the low HIV/AIDS scenario, the result was 6.7 million fewer people by 2016 and 1.46 million fewer jobs. Compared to the no AIDS scenario projection shown in Table 1 above, 21.5 per cent less formal sector jobs will be created during the period 1996 to 2016. The reasons for this dramatic drop in job creation include the following:

- Potential investors growing increasingly wary of investing in a country where higher levels of HIV/AIDS are found;
- a smaller population buying goods, i.e. a smaller consumer base, leading to fewer business opportunities for entrepreneurs;
- sustained high levels of capital intensification by prospective employers because they are scared of employing large numbers of HIV-positive employees, as discussed above;
- higher levels of early mortality among employers because of AIDS, and
- a shrinking economy because of the effects of AIDS on the community (see Barker, 1995).

A further projection done for this study was based upon a high sero-prevalence rate (6 per cent in 1996 to 14 per cent in 2008) during the projection period. The results are shown in Table 4:

Table 4  High HIV/AIDS scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>EAP</th>
<th>Formal jobs</th>
<th>Not formal jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>42,700,000</td>
<td>16,226,000</td>
<td>6,776,095</td>
<td>9,449,903</td>
</tr>
<tr>
<td>2001</td>
<td>46,540,951</td>
<td>17,685,561</td>
<td>7,381,725</td>
<td>10,303,836</td>
</tr>
<tr>
<td>2006</td>
<td>50,100,519</td>
<td>19,038,197</td>
<td>8,031,574</td>
<td>11,066,622</td>
</tr>
<tr>
<td>2011</td>
<td>53,351,708</td>
<td>20,273,849</td>
<td>8,725,860</td>
<td>11,544,769</td>
</tr>
<tr>
<td>2016</td>
<td>56,264,938</td>
<td>21,380,676</td>
<td>9,476,980</td>
<td>11,903,696</td>
</tr>
</tbody>
</table>

Table 4 illustrates the havoc that a high level of HIV/AIDS could wreak on the South African labour market. In this simulation, only about 44.3 per cent of the EAP will have formal job opportunities by 2016, thus leaving 55.7 per cent of the EAP without formal job opportunities. Furthermore, compared with the no HIV/AIDS scenario, 25.6 per cent fewer formal job opportunities will be created by 2016. This shows clearly that HIV/AIDS will in all probability impact strongly upon job creation in the labour market. However, such impacts do not occur in isolation, but are mediated by a large number of economic, social, political, technological, educational and attitudinal variables.

Although such variables are expected to play a big role in mediating the impact of changes in HIV/AIDS dynamics, the impact of HIV/AIDS could be even more profound than shown in this study because of variables such as fear of working with HIV-positive employees; the impact of the vertical transmission of HIV on infant and child mortality rates; the dramatic decrease in the production
elasticity of employment in the labour market during the past 7 years; the impact of AIDS on the health system and the fiscus; the impact of AIDS-related diseases on labour productivity, and economic stagnation during the past two decades. All of these variables cannot be fully integrated into the dynamic model, yet they will exacerbate the impact of HIV/AIDS on the labour market and the economy.

The impact of AIDS on the economy and labour market can potentially be as profound as indicated by Barker (1995). He is of the opinion that the medical and other costs associated with AIDS could be so high that the economy will be crippled long before the full demographic effect of AIDS is felt. He mentions the following potential consequences of HIV/AIDS for the economy and labour market:

- The impact of AIDS on health services will be massive and can even be devastating. The proportion of the national health budget spent on HIV/AIDS treatment could be as high as 75 per cent by 2005.
- Indirect costs because of lost production. According to Doyle (1991), more than 90 per cent of all adults affected by AIDS will be in their key productive ages (20 to 50).
- Higher-skilled workers and employed people will be affected by HIV/AIDS to a greater extent than less skilled workers or the unemployed. The reason for this is that higher-skilled workers and the employed earn higher salaries, enabling them to purchase more “beer and sex” in addition to making them more mobile (see Whiteside, 1990).

It is conceivable that HIV/AIDS sero-prevalence rates in South Africa could become even higher than projected in the high HIV/AIDS scenario. This would result in an even smaller population outcome for 2016. To investigate this possibility, a final projection was done based upon HIV sero-prevalence rates of 6 per cent in 1996 and 16 per cent in 2008. The results are shown in Table 5 below.

Table 5 Very high HIV/AIDS scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>EAP</th>
<th>Formal jobs</th>
<th>Not formal jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>42 700 000</td>
<td>16 229 000</td>
<td>6 776 096</td>
<td>9 449 003</td>
</tr>
<tr>
<td>2001</td>
<td>45 404 782</td>
<td>17 253 817</td>
<td>7 296 744</td>
<td>9 957 073</td>
</tr>
<tr>
<td>2006</td>
<td>47 653 604</td>
<td>18 108 369</td>
<td>7 837 632</td>
<td>10 270 737</td>
</tr>
<tr>
<td>2011</td>
<td>49 414 872</td>
<td>18 777 951</td>
<td>8 396 627</td>
<td>10 379 023</td>
</tr>
<tr>
<td>2016</td>
<td>50 654 903</td>
<td>19 248 325</td>
<td>8 979 401</td>
<td>10 269 424</td>
</tr>
</tbody>
</table>

Should the very high HIV/AIDS scenario realise, HIV/AIDS could plunge the labour market, the economy and society in an acute crisis. Only about 46.6 per cent of the EAP will have formal job opportunities, resulting in levels of unemployment and possibly even job losses hitherto unknown in South Africa. The important question is: What are the chances of such a doomsday scenario becoming reality in South Africa? To answer this question, the findings of the following recent studies should be considered:

- Matebeni (2000) shows that the HIV prevalence rates used in this study could be a dramatic underestimate of the existing and future HIV sero-prevalence rates in South Africa. The South African National NGO Coalition (2001) indicates that as many as 16 per cent of South Africans could be HIV-positive by 2010. This supports the chances that the very high HIV/AIDS scenario postulated in this study might realise.

- UNAIDS (2000) estimates the HIV prevalence rate for adults at about 17 per cent in 2000 and that about 50 per cent of 15-year old boys are at a high lifetime risk of becoming HIV-positive and of dying due to AIDS. If this is true, the very high HIV/AIDS scenario as presented in this study could be an underestimation of the true HIV sero-prevalence rates in South Africa.

Overview

An important question that still needs to be addressed in this study is why there are such high levels of HIV/AIDS among the labour force. UNAIDS (2000) and Whiteside and Suner (2000: 58-69) provide five possible explanations for such high HIV sero-prevalence rates which strongly link to the views expressed by Marx, Engels and Marcuse about the plight of labourers in capitalist societies. They are as follows:

- Denial that HIV/AIDS exist and that individuals are HIV-positive: Workers working in factories and mines cannot afford to disclose their HIV status for fear of being victimised or fired. Labourers in hostels also cannot acknowledge their HIV status for fear of being ostracised and/or socially isolated in hostels. The result is that workers suffer from social alienation in the sense that, although they may know that they should disclose their HIV status for the benefit of the social unit with which they interact, fear of existential pain withholds them from doing so. Such non-disclosure could be detrimental to the workers themselves (e.g. not receiving anti-retroviral drugs or high-quality food) as well as to the social units which are unaware of their HIV status (e.g., having unprotected sex with HIV-positive people).

- Being uninformed about HIV and AIDS: Labourers seldom received high-quality sex education at school, at home or in the workplace. The sexual practices that they did
learn and the industrialised sexual culture in which they function often facilitate high levels of HIV sero-conversion. Marx (1981) referred to persons behaving dangerously to themselves under workplace influences as people alienated from their species being. Results of such alienation of the species being with regard to sexual behaviour include forced sex, dry sex, sex with multiple sex partners where the chances of contracting STDs are high and not caring about the sexual well-being of sex partners. Such practices have been shown to be widespread in industry where it largely explains the high HIV sero-prevalence rates found among labourers.

- Lack of education: The fairly low schooling levels among the South African EAP result in labourers being unable to make well-informed health and sexual practice decisions. In this way labourers in industry are alienated from themselves, because they have not learnt how to plan their lives, how to take care of themselves and how to improve their situation in life. Such workers are often caught in a poverty trap where they are forced to do menial jobs because of their low levels of education. This places them in working and living conditions that facilitate contracting HIV/AIDS.

- Men and women who are marginalised: Marx (1981) referred to marginalised people as those who have gone through a process of "entässerung", i.e. a process of becoming estranged from society. Such estranged people living on the margins of society have much higher HIV prevalence rates than people living more conventional lives (UNAIDS, 2000). Labourers working in mines, agriculture and factories are typical examples of people living on the margins of society - they are often migrant labourers who have left their families behind in the rural areas for a period of time and are now staying in conditions proximate to their co-workers where alcohol and prostitutes are desired and freely available. As high HIV sero-prevalence is common among prostitutes, high levels of HIV sero-prevalence could be expected among these labourers.

- Huge inequalities in society: Marx (1981) premised his work upon the huge inequalities found between capitalists and labourers in the period following the industrial revolution. He referred to this type of alienation as a process of externalisation, where labour simply becomes a means for survival to workers while the capitalists (managers and formal sector entrepreneurs) enjoy interesting jobs, bigger incomes and better lifestyles.

Labourers cannot afford those products and services (i.e. houses, good education, health facilities and high-quality entertainment) that would take them out of a low quality lifestyle where they are highly susceptible to HIV/AIDS.

To limit the very high level of HIV sero-conversion among labourers in South Africa, it is imperative that the developmental, alienation, educational, housing (hostel or informal settlement) and income issues mentioned in this paper be addressed urgently. It is, however, not expected that employers will address these issues in such a way as to alleviate the plight of labourers. It is rather foreseen that many employers will transform their businesses to become more capital intensive and will use more contract and outsourced labour for fear of appointing a labour force that is largely HIV-positive (Van Wyk & Van Aardt, 2002). The resultant higher levels of unemployment may force many labourers to return home where they spread HIV/AIDS to their home towns and settlement areas. This is expected to be the next wave of HIV transmission in South Africa from retrenched and unemployed HIV-positive labourers returning home.

References


