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THE "RISK GAP", ITS DETERMINANTS AND ECONOMIC IMPLICATIONS

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Paul Anderson is currently completing his Masters in Economics at the University of Cape Town (UCT). This paper is a revised version of his Honours thesis. Paul also completed his Honours in Economics at UCT as well as his undergraduate degree in Politics, Philosophy and Economics.

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The “Risk Gap”, Its Determinants and Economic Implications

Abstract

Demography and economics are linked and it is not possible to look at either discipline in complete isolation from the other. The gap between the time of first sex and first marriage is of particular importance, as this is the time when a person is most vulnerable to infection with HIV/AIDS as well as unwanted pregnancies. This gap is thus referred to as the risk gap. Both these phenomena are extremely costly. The risk gap in South Africa is growing due to the duel impact of delayed marriages and sexual encounters which take place at an increasingly early age. There is a positive relationship between the provincial HIV/AIDS prevalence rate and the provincial risk gap. This suggests that by manipulating the risk gap, government may have a tool that could be used to affect the HIV/AIDS level in South Africa.

Introduction

Populations and countries’ demographics change and this has an economic as well as a social impact. Thus demography is useful in and essential to fully understanding causes and effects of certain economic phenomena. This is not surprising since any economy is made up of, and run by, people. South Africa has an urgent need to factor population dynamics into all aspects of economic analysis, given that HIV/AIDS is set to have devastating effects on the economy. Therefore it is important to understand the demographic phenomena behind these forces. The gap between first sexual encounter and first marriage is important because, all else being equal, this is the time when a person is most at risk of being infected by the HIV virus. The remainder of this paper will refer to this gap between the age at first sexual encounter and the age at first marriage as the “risk gap”.

As has been well documented, the costs of both of these to an economy are very high, all other things being held equal. The South African Population policy highlights the fact that high premarital (in particular teenage) pregnancy rates as well as the rising incidence of HIV/AIDS, affect the overall development

potential of a country (Welfare Department, 1999: 2). Therefore this paper focuses on issues crucial to South Africa's economy and social patterns. There is much literature that touches on the concept of a risk gap but very little literature is devoted entirely to this subject, especially within a South African context. This paper will briefly review the available and relevant literature before embarking on specific analysis of the South African situation.

The initial aim of this paper is to use demographic tools to analyse the risk gap and its trend, and to approximate its determinants within the South African context. Once this is achieved it should be possible to see the economic and social impacts of a change in the risk gap and its policy implications more clearly. It seems rather obvious that when considering the risk gap it is directly affected by two factors. These are the age at first marriage as well as the age at first sexual encounter. This paper looks at each of these factors individually, their trend, their proximate causes and their implications not only for the risk gap but also the social and economic framework. Finally this paper discusses the economic as well as the social implications that a changing risk gap has for South Africa as a whole. These will include not only costs (or benefits) but also policy implications in the light of South Africa's current population policy.

Data, Methodology and South Africa

Data

This analysis uses data from the South African Demographic and Health survey of 1998 (SADHS 1998), which was carried out and processed between January and October of that year with the support and backing of the South African Health Department. This survey comprised a nationally representative two-stage sample, covering approximately 12 000 women between the ages of 15 and 49 (South African Demographic and Health survey 1998 preliminary report). The SADHS of 1998 collected detailed information on socio-economic characteristics, health conditions, marriage patterns, fertility trends, recent and past sexual behaviour (including use of contraceptives), childhood mortality levels, breast feeding practices and accessibility to health and family planning services. Most of the data used in this paper relates to that on sexual behaviour as well as nuptial trends in South Africa. It has been noted that many people being interviewed may not have been able to give accurate information when asked about their activities a number of years previously due to problems of recall (Foote, Hill and Martin, 1993: 119). However the quality of data on sexual

behaviour and marriage is widely regarded as satisfactory (Blanc and Way, 1998).

Table 1 summarises some characteristics and results of the sample of women that were interviewed. It can be seen from this table that just under half of the sample have never been married. Data on availability of electricity and telephone, source of drinking water, housing materials and type of toilet facility is also presented.

Methodology

Analysis of the age at first sexual encounter and first marriage in this paper is based on the life-table technique; the results are presented in cumulative failure rates. In analysing the risk gap, medians and a logistic probability model are used and results are presented in the form of odds ratios. In line with convention the sample was weighted when looking at the risk gap in order to ensure accurate representation of results. The statistical package STATA was used for all econometric work.

South Africa

In the past South African population policy was directed only towards control of population growth (especially of the African population) but in recent years, the policy has been directed towards the increase of living standards of the population without compromising those of future generations (Department of Welfare, 1999: 1). The Department of Welfare's publication "Population and Development in the New Millennium" highlights high teenage pregnancy rates (and the consequent high school dropout figures) as well as the rising incidence of HIV/AIDS as being the main concerns. Both of these are detrimental to a country's potential social and economic development (Department of Welfare, 1999: 2). Predictions are that between 1999 and 2009 six million South Africans will die due to AIDS (Department of Welfare, 1999: 5). This will have huge economic costs, as it will target the economically active sections of the population and those who die or become ill are either economic consumers or suppliers or both. The Department of Welfare estimates that gains in general population and development indicators over the past few years will be eroded by the effect of HIV/AIDS, specifically by the high infant and maternal mortality rate. It is for these reasons that the impact of the risk gap is so important.

TABLE 1: Summary of characteristics of sample group

CHARACTERISTICS		Freq.	%
Age 5-year groups	15-19	2373	20.22
	20-24	2086	17.78
	25-29	1811	15.43
	30-34	1616	13.77
	35-39	1628	13.87
	40-44	1255	10.69
	45-49	966	8.23
	Total	11735	100
Provinces	Western Cape	919	7.83
	Eastern Cape	2756	23.49
	Northern Cape	1041	8.87
	Free State	936	7.98
	Kwa-Zulu Natal	1826	15.56
	North West	931	7.93
	Gauteng	1057	9.01
	Mpumalanga	1131	9.64
	Northern province	1138	9.7
	Total	11735	100
Residence	Urban	6518	55.54
	Rural	5217	44.46
	Total	11735	100
Childhood residence	City	2016	17.39
	Town	2972	25.63
	Countryside	6607	56.98
	Total	11595	100
Educational attainment	No ed.	810	6.9
	Incomplete prim.ed.	2029	17.29
	Complete prim.ed.	1105	9.42
	Incomplete sec.ed.	5175	44.1
	Complete sec.ed.	1754	14.95
	Higher ed.	862	7.35
	Total	11735	100
Type of toilet facility	Own flush	5005	42.92
	Shared flush	387	3.32
	Bucket latrine	790	6.77
	Pit latrine	3931	33.71
	No facility	1507	12.92
	Other	42	0.36
	Total	11662	100

CHARACTERISTICS		Freq.	%
Has electricity	No	4214	36.1
	Yes	7459	63.9
	Total	11673	100
Has phone	No	8531	73.33
	Yes	3103	26.67
	Total	11634	100
Main wall material	Plastic/cardboard	298	2.6
	Mud	1918	16.71
	Mud and cement	1156	10.07
	Corrugate iron	931	8.11
	Prefab	29	0.25
	Bare Brick	1607	14
	Plaster/finished	5416	47.17
	Other	126	1.1
	Total	11481	100
Source of drinking water	Piped in house	4117	35.31
	Piped in yard/site	3034	26.03
	Public tap	2182	18.72
	Borehole	316	2.71
	Dam/river	1640	14.07
	Rain-water tank	91	0.78
	Water tanker	110	0.94
	Bottled water	10	0.09
	Other	158	1.36
	Total	11658	100
Ethnicity	African	8993	77.03
	Coloured	1533	13.13
	White	755	6.47
	Indian	393	3.37
	Total	11674	100
Current marital status	Never married	5811	49.52
	Married	3956	33.71
	Living together	992	8.45
	Widowed	296	2.52
	Divorced	234	1.99
	Separated	446	3.8
	Total	11735	100
Number of unions	Once	5410	91.93
	More than once	475	8.07
	Total	5885	100

Table 2 provides a description of South Africa and its characteristics.

TABLE 2: General socio-economic and demographic background for South Africa

Characteristics		
Population		
Population size *(in millions)*[1]		44.56m *(mid2001)*
Percent of population living in urban areas[2]		55.2% *(2001)*
Percent of females in population[2]		50.8% *(2001)*
Death rate *(per 1000 lives between 1990-1995)*[3]		9.8
Birth rate *(per 1000 lives between 1990-1995)*[3]		29
Life expectancy[2]		57.0 *(1996)*
Ethnic composition *(2001)*[2]	African – 78%	White-12%
	Coloured – 8%	Indian – 3%
Development and health statistics		
Infant mortality *(per 1000 live births)*[4]		45.4 *(1998)*
Literacy rate *(for population over the age of 20)*[2]		70.8% *(2000)*
Percentage of houses with electricity[2]		70.0% *(2000)*
Fertility and its determinants (1998)		
Total fertility rate (children per women)[4]		2.9
Knowledge of modern contraceptives (% among all women)[4]		96.7%
Characteristics		
Use of modern contraceptives (% among all women)[4]		50.10%
Median age at first marriage for women)[1]		28.7
Characteristics		
Economic Structure (2000)		
GDP per capita[2]		R19999
Core inflation rate[2]		8.3%
Agriculture as percent of GDP[2]		3.2%
Mining as percent of GDP[2]		6.5%
Secondary industry as percent of GDP[2]		3.2%
Manufacturing industry as percent of GDP[2]		18.7%
Tertiary industry as percent of GDP[2]		45.2%

[1] Source: SA Statistics, 2001
[2] Source: SA Survey, 2001/2002
[3] Source: SADHS 1998 Preliminary report
[4] Source: The Europa World Hand Book 2001, vol.2

Age at First Marriage and at First Sexual Encounter

Recent years have seen a large increase in the volume of literature on the age at which marriage takes place, adolescent sexual behaviour, unwanted fertility, and HIV/AIDS. However there is very little written on the gap between the age of first sexual encounter[5] and that of first marriage. This review looks at the timing of marriage, premarital sexual behaviour and literature on the risk gap itself.

The Timing of First Marriage

The timing of marriage (delayed marriage in particular) is a common theme within demographic literature. As early as 1798 Malthus (1798) advocated later marriage in order to curb population growth. For that particular time-period this prescription might have been accurate since sex and marriage were almost exclusively linked (Coale, 1992). Today in general this linkage, although it exists, is not so exclusive. However Bledsoe and Cohen point out that in some countries the age of marriage is still a good indicator of the age of first sex although this is not the universal norm (Bledsoe and Cohen, 1993).

Most developing countries are seeing a trend toward delayed marriages, especially among the better-educated urban sections of the population (Meekers, 1994). There is contrast between the traditional "African and/or Asian" pattern found in most developing countries of early and almost universal marriages and the traditional pattern of "Europe" which is characterised by later and fewer marriages (Coale, 1992). Possible reasons for early marriage in developing countries have been a high level of arranged marriages, high traditional value on chastity, and the subordinate and dependent role of women in these societies (Coale, 1992).

It has been suggested that marriage trends respond to changes in general economic conditions and that poor economic conditions with few employment opportunities result in delayed marriage (National Research Council, 1993: 145). Movement away from a traditional way of life and the rise of the independent woman who is less dependent on marriage for her wellbeing have also been seen to contribute toward a trend in delayed marriages (Smock, 1993).

[5] In this paper the term sexual "experience" or "encounter" refers to actual sexual intercourse.

However it is generally recognised that the most important explanatory variable of delayed marriages is a rise in education levels, especially of women (Bongaarts and Cohen, 1998). Dixon summed up these determinants well and concluded that new constraints in developing countries such as shortage of land and unemployment, not so many arranged marriages as before, and the increased demand and need for education have led to delayed marriages (Dixon, 1971). Singh and Samaras' recent research support this finding (Singh and Samara, 1996).

The trend toward delayed marriages within developing countries is often used to explain fertility transition since most children are produced within sanctioned unions (Dixon, 1971); delaying these unions will therefore decrease the overall fertility. This is true even if marriage and sex are not exclusively linked, as Bongaarts and Cohen show that the timing of the first child is strongly related to the timing of the first marriage (Bongaarts and Cohen, 1998). There are also other effects of this trend toward delayed marriage besides those on fertility transition. For example there are changes in family structure and culture in general, as the traditional way of life becomes less distinctive in developing countries. However this impact is hard to measure due to its nature (Bledsoe and Cohen, 1993).

As one would expect, this nuptial trend also has an effect on the gap between the age at first sexual encounter and first marriage. Delayed marriages may benefit the economy indirectly due to the increased levels of education associated with them. At the same time however, delayed marriages might be associated with increased risk of infections from Sexually Transmitted Diseases (STDs) and unwanted pregnancies (Singh, 1998) both of which factors negatively affect the economy.

A common problem, when looking at this subject, is the broad and ambiguous definition and practice of marriage (Bledsoe and Cohen, 1993; Caldwell, *et al* 1998). The risk gap is obviously an important topic, which has not received much focus until recently, and especially not in a South African context. This research paper hopes to fill the gap to some extent.

The Age at First Sexual Encounter

Research has shown that in developing countries both the age at first marriage and the age at first sexual encounter have been increasing. However, the age at first marriage has risen by a much larger proportion and thus the gap between

the age at first sexual encounter and first marriage has increased (Blanc and Way, 1998). This result is confirmed by Meekers who showed that if the average age of marriage is high then it is very likely that so too is the average age of first sex, and vice-versa (Meekers, 1994). The reason for this relationship could be the existing link between initial sexual intercourse and first marriage already discussed; higher ages of marriage may pull up the average of first sexual encounter.

The Gap between Age at First Sexual Encounter and First Marriage

Literature seems to be in agreement that the risk gap is growing across cohorts in the developing world (Blanc and Way, 1998). The major reason for this is the trend toward delayed marriages. Research has shown that as the number of years that a woman remains unmarried rises, so too do her levels of sexual activity (Singh, 1998). Meekers suggested that women who married later were significantly more likely to have engaged in sexual activity before marriage than those women who married at an earlier age (Meekers, 1994). Frustenburg attributed other causes of increased prenuptial sexual behaviour to Western influence, liberalisation, self-development and separation from traditional practices, values and governance (Frustenburg, 1998). Another generally accepted trend is the decreasing age of menarche, which has probably added to the increase of the level of premarital sex (Zabin and Kiragu, 1998).

The increase in premarital sex as well as the low use of contraceptives makes the gap between first sex and first marriage even more risky and potentially costly. As Foote, Hill and Martin point out this is likely to be correlated with higher incidences of HIV/AIDS as sexual patterns play a major role in the transmission of this virus (Foote, Hill, Martin, 1993). This suggests, fairly logically, that a larger risk gap could lead to a higher incidence of premarital pregnancies, in which the economic and social costs are high (Buvinic, 1998). Some of these costs, which have been suggested by Singh, are an increase in the economic burden, a decrease in educational achievement, social ostracism, and marital problems (Singh, 1998). Additional costs and implications for the health of both the mother and child, such as illegal or unsafe abortions, have also been noted (Acsadi, Johnson-Acsadi and Bulatao, 1990).

Understanding this risk gap is crucial to economic development in the light of its implication specifically in regard to the spread of HIV/AIDS and the

occurrences of underage premarital pregnancies. This point is even more crucial in a South African context, as the South African Welfare Department has suggested; in that even though their research shows that South Africans are largely aware of AIDS, behaviour patterns to avoid new infections are yet to occur (Department of Welfare, 1999: 6). This finding in itself has huge policy implications. Thus, there is a need to analyse the trend risk gap and its causes more fully. This paper aims to begin the process.

The Timing of First Marriage

Table 3 presents a South African first marriage life-table. This shows the proportion of women, identified by specific characteristics, who are married at particular ages. Note that there are missing proportions for certain characteristics due to insufficient observations in the sub-sample. All subsequent analysis of age at which marriage takes place is based on this life-table in Table 3.

Analysis

It can be seen that most women in South Africa are married by the age of 50. To be more specific 84% of the respondents were married at least once before they were 50 years old. This is relatively low since most literature suggests that for sub-Saharan Africa, marriage is an almost universal state (Coale, 1992).

Even though some age cohorts have not shown a majority of married women, they are nonetheless useful when comparing changes between the age cohorts. Figure 1 shows the proportions of married women in different age groups.

Figure 1 show that older age cohorts have a greater probability of getting married before the age of 20 compared to younger cohorts. There seems to be a distinct break as cohorts above 35 years have a higher probability of getting married earlier compared to younger cohorts. Therefore these results show that there is a pattern over time whereby people have been getting married later. This trend is consistent with literature which suggests that people in developing countries are getting married later (Meekers, 1994; Coale, 1992; Hajnal, 1953).

The marriage life-table results show that there is a general trend where the proportions of women married is higher for rural residents as opposed to urban residents. This is true across all age intervals as figure 2 shows. Thus rural residents are more likely to marry and more likely to marry at an earlier age than urban residents.

TABLE 3: First marriage life-table for women

Interval Cumulative Failure	***14***	***16***	***18***	***20***	***22***	***24***	***26***	***28***	***30***	***32***	***34***	***36***	***38***	***40***
Total population	0.01	0.04	0.12	0.23	0.35	0.45	0.54	0.61	0.66	0.70	0.72	0.75	0.77	0.79
Age groups														
15-19	0.00	0.01	0.05	0.09	-	-	-	-	-	-	-	-	-	-
20-24	0.00	0.03	0.08	0.14	0.22	0.30	0.35	-	-	-	-	-	-	-
25-29	0.02	0.04	0.11	0.20	0.30	0.39	0.47	0.55	0.61	-	-	-	-	-
30-34	0.01	0.05	0.14	0.27	0.37	0.47	0.55	0.61	0.67	0.70	0.72	0.74	-	-
35-39	0.02	0.07	0.17	0.30	0.44	0.54	0.62	0.67	0.72	0.75	0.77	0.80	0.81	0.84
40-44	0.01	0.05	0.16	0.31	0.46	0.56	0.65	0.70	0.73	0.77	0.79	0.81	0.83	0.84
45-49	0.02	0.05	0.15	0.31	0.47	0.59	0.68	0.74	0.78	0.81	0.83	0.83	0.85	0.86
Residence														
Urban	0.01	0.02	0.08	0.18	0.30	0.41	0.51	0.58	0.64	0.69	0.71	0.74	0.76	0.78
Rural	0.02	0.06	0.16	0.29	0.41	0.50	0.58	0.64	0.69	0.71	0.74	0.76	0.78	0.80
Ethnicity														
African	0.01	0.05	0.12	0.23	0.34	0.42	0.50	0.57	0.62	0.66	0.69	0.72	0.74	0.76
Coloured	0.01	0.02	0.07	0.16	0.27	0.40	0.52	0.61	0.67	0.71	0.74	0.76	0.78	0.81
White	-	0.01	0.09	0.27	0.52	0.71	0.83	0.90	0.93	0.95	0.96	0.97	0.98	0.99
Indian	-	0.02	0.20	0.36	0.54	0.66	0.75	0.81	0.84	0.86	0.87	0.90	0.93	0.94
Educational attainment														
no education	0.05	0.14	0.28	0.42	0.53	0.61	0.68	0.74	0.76	0.79	0.81	0.82	0.84	0.86
Incomplete primary education	0.02	0.08	0.21	0.35	0.47	0.55	0.61	0.66	0.71	0.74	0.76	0.78	0.80	0.81
Complete primary education	0.01	0.05	0.16	0.30	0.42	0.50	0.59	0.64	0.69	0.73	0.74	0.78	0.80	0.84
Incomplete senior education	0.01	0.02	0.09	0.20	0.32	0.42	0.51	0.59	0.64	0.68	0.71	0.73	0.76	0.77
Complete senior education	0.00	0.01	0.04	0.12	0.24	0.36	0.45	0.54	0.60	0.65	0.67	0.70	0.72	0.74
Higher education	0.00	0.01	0.02	0.08	0.19	0.35	0.51	0.61	0.68	0.72	0.76	0.80	0.82	0.83
Provinces														
Western cape	0.01	0.02	0.07	0.17	0.29	0.44	0.56	0.64	0.69	0.72	0.74	0.76	0.79	0.82
Eastern Cape	0.01	0.04	0.12	0.23	0.36	0.45	0.53	0.58	0.62	0.65	0.68	0.69	0.72	0.74
Northern Cape	0.00	0.02	0.08	0.17	0.29	0.40	0.52	0.61	0.67	0.71	0.72	0.75	0.76	0.79
Free State	0.01	0.04	0.13	0.27	0.42	0.55	0.66	0.73	0.76	0.80	0.82	0.85	0.86	0.86
Kwa-Zulu Natal	0.01	0.02	0.09	0.18	0.30	0.39	0.48	0.56	0.63	0.68	0.71	0.74	0.76	0.78
North west	0.01	0.04	0.09	0.17	0.28	0.38	0.46	0.55	0.60	0.65	0.70	0.74	0.76	0.77
Gauteng	0.01	0.02	0.08	0.20	0.33	0.44	0.52	0.61	0.67	0.72	0.75	0.79	0.81	0.82
Mpumalanga	0.02	0.07	0.14	0.25	0.36	0.44	0.51	0.59	0.65	0.68	0.70	0.74	0.76	0.76
Limpopo	0.03	0.11	0.25	0.41	0.52	0.58	0.66	0.70	0.74	0.75	0.78	0.78	0.82	0.85
Telephone														
No	0.01	0.05	0.14	0.24	0.36	0.45	0.54	0.61	0.66	0.69	0.72	0.74	0.77	0.79
Yes	0.00	0.01	0.07	0.18	0.31	0.44	0.54	0.61	0.67	0.71	0.75	0.78	0.80	0.81

Source: SA DHS98

FIGURE 1: Timing of first marriage: comparison among different age cohorts

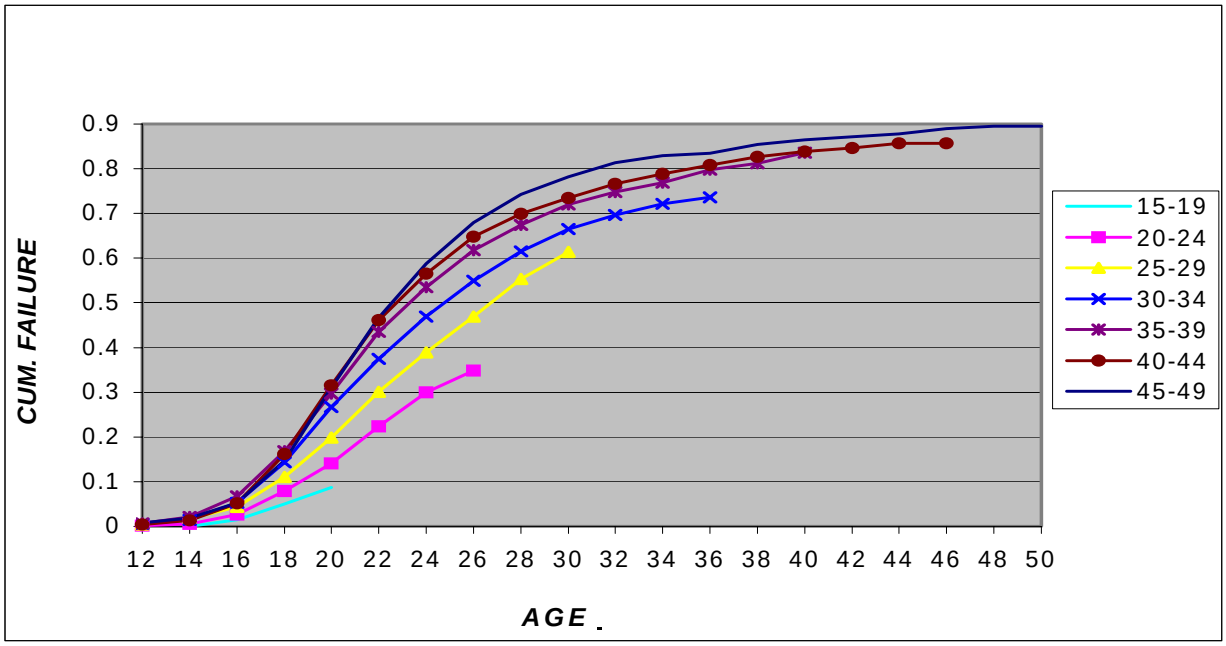
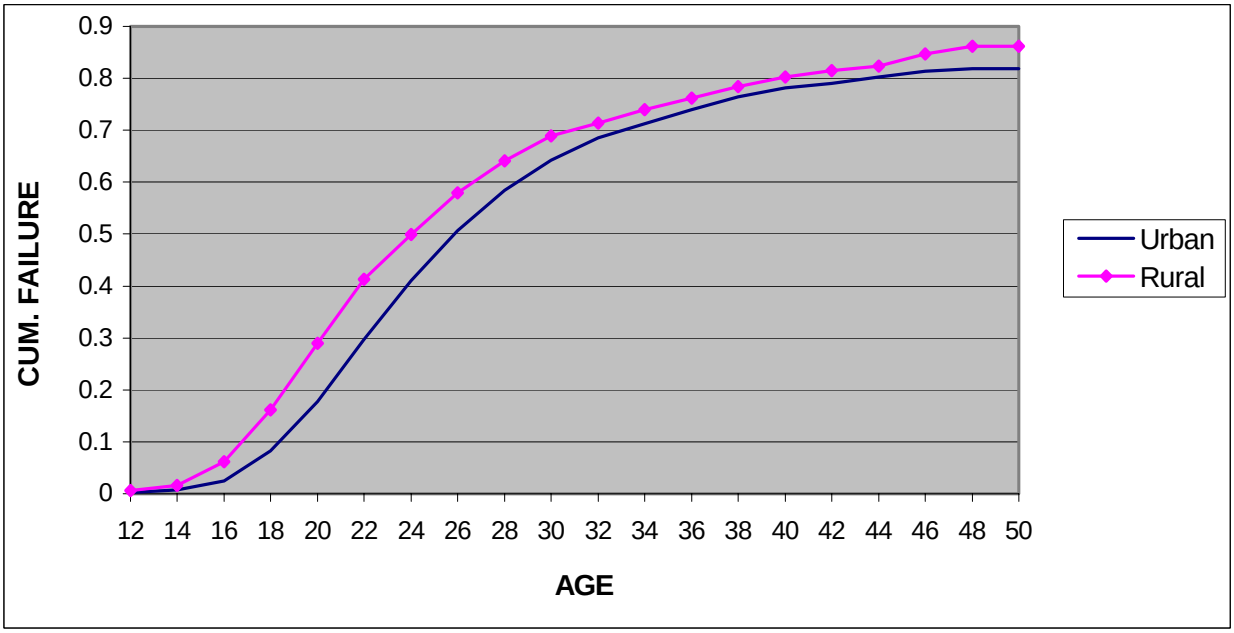


FIGURE 2: Timing of marriage: comparison among different places of residence



From the marriage life-table (table 3) it can be seen that Indians are more likely to get married at an earlier age. This is due to strong cultural ties that promote early marriages. From approximately the age of 22 Whites have the highest percentage of married women relative to the other ethnic groupings. Almost everyone in this group appears to be married by the age of 40 and marriage also seems to take place at a relatively younger age compared to Coloureds and Africans. Coloureds tend to get married later but have a higher proportion of those married by age 50 relative to Africans.

As expected, those with less education are more likely to get married at a younger age compared to those with a higher level of education. The percentage of those married by the age of 50 is fairly similar across different educational levels. This suggests that higher education levels are not necessarily related to a lower probability of getting married over a life-time but rather to delayed marriages to some extent. These results can be seen in figure 3.

FIGURE 3: Timing of marriage: comparison among different education levels

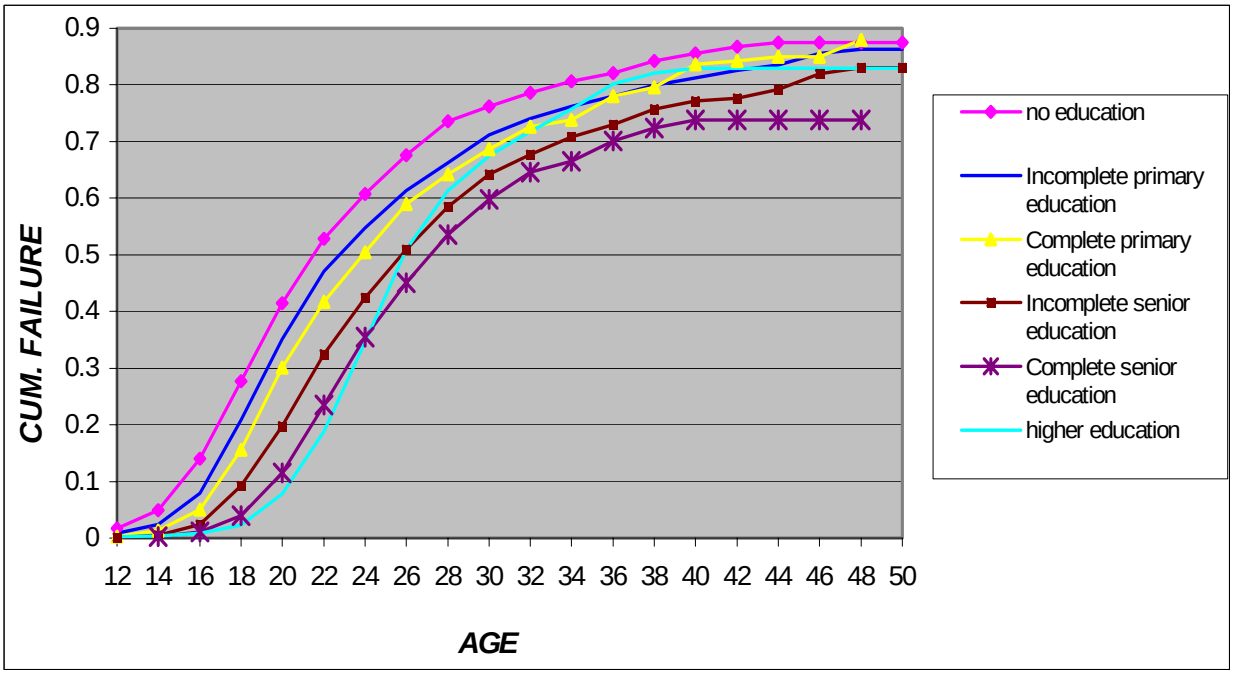
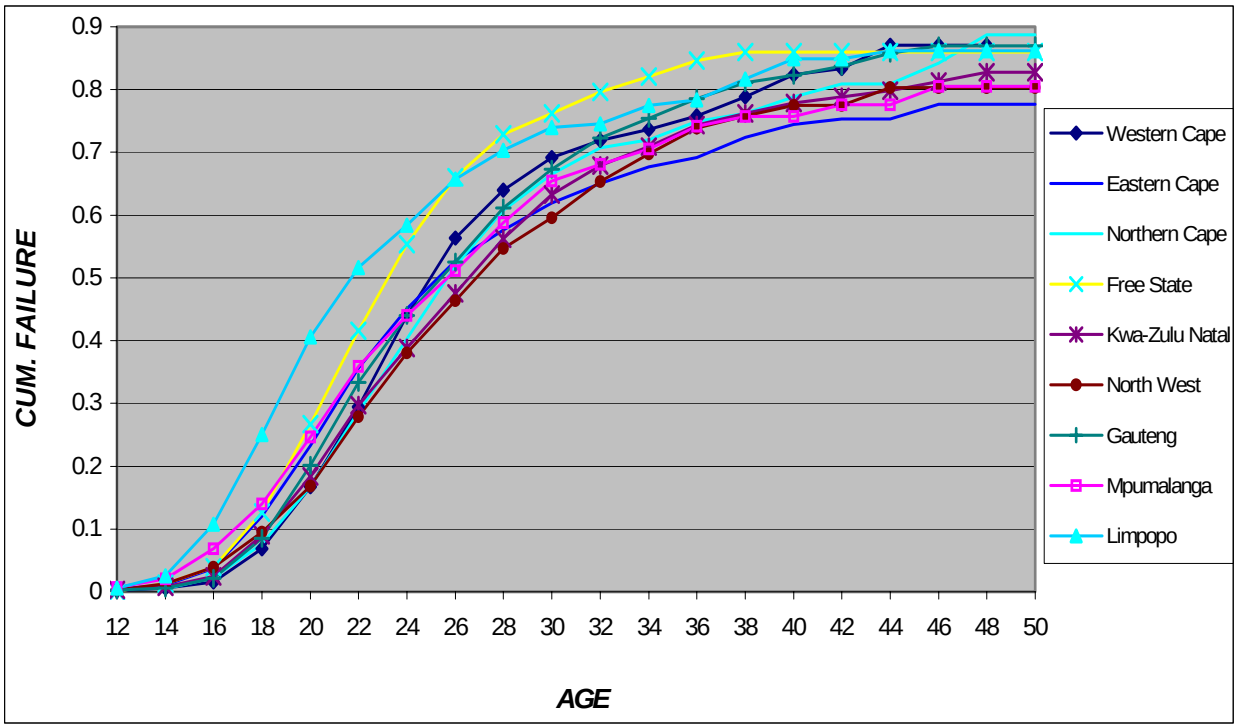


Table 3 shows that the Limpopo province has by far the highest proportion of women married by the age of 20. A possible reason for this is the traditional practice of early marriages in this province. The Free State also has a relatively high percentage of those married at an early age. The other seven provinces all

have relatively similar proportions of those getting married early. No one province has an unusually high proportion of women married by the age of 50 compared to the other provinces. The Eastern Cape, and to a lesser degree Mpumalanga, have relatively low percentages of married women at the age of 50 compared to the other provinces. These relationships can be seen clearly in figure 4.

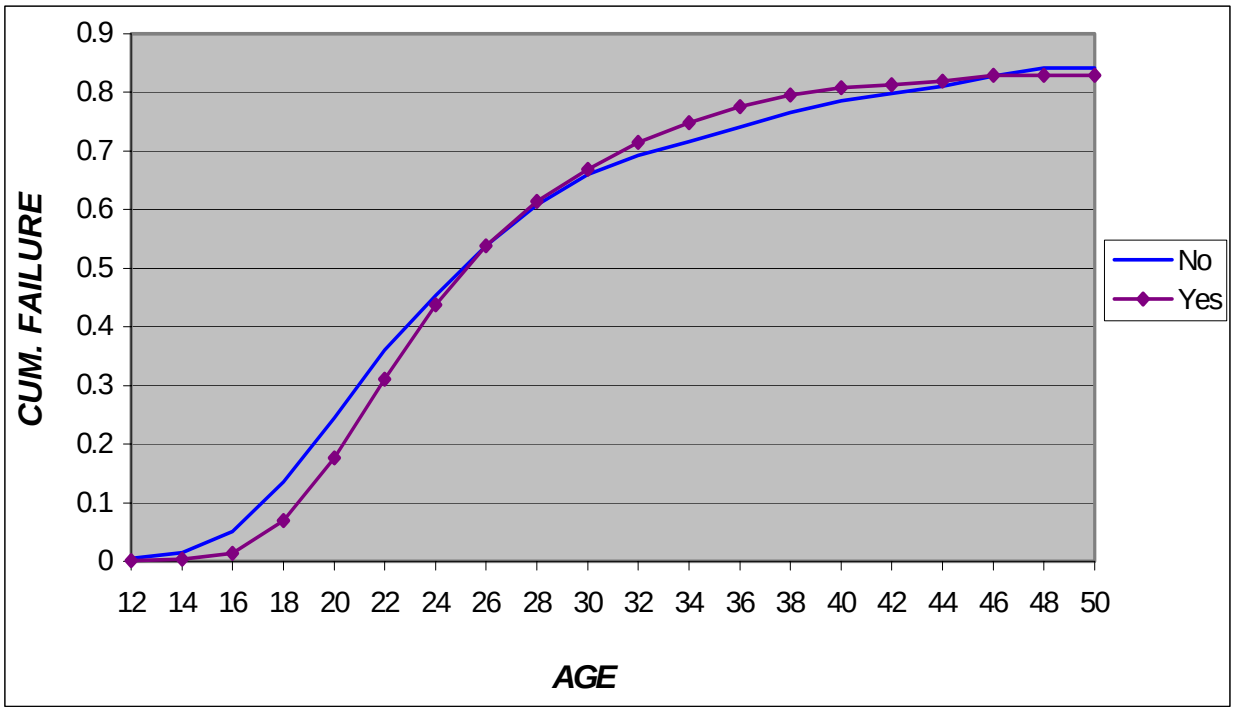
FIGURE 4: Timing of marriage: comparison among different provinces



In this paper, the factor of telephone ownership is used as a very crude and simple indicator for those with a relatively high or low-income level. These results can be seen graphically in figure 5.

In all the age intervals up to approximately the mid-20s a greater proportion of those with no telephone get married than do those with a telephone. From this approximate age onward, however, the trend is reversed, though the difference is very small. In all the age intervals from the mid-20s onwards, except for the last, a larger percentage of those with a telephone are married than those without a telephone. In other words those without a telephone seem to get married earlier than those with a telephone. From this one could infer that those with lower levels of income tend to marry earlier than those with higher levels of income.

FIGURE 5: Timing of marriage: comparison by ownership of a telephone



Discussion

As South Africa has developed and urbanised and as the status of women has improved over the years, the fundamental and primarily cultural determinants of early marriage have unravelled to some extent. Therefore it is not surprising that earlier marriages are more common in rural areas in South Africa, given that these areas hold much more strongly to traditional African culture, in which early marriage is generally promoted.

In South Africa the desirability and feasibility of marriage may also have an effect on the age at which people marry and marriage trends (Dixon, 1971). Marriage as an institution might have lost its previous authority and its exclusive link to sexual activity and childbearing. The high divorce rate, high levels of premarital sexual activity and premarital pregnancy highlight this. However rural households are often large with a lone adult head, and in which there is no room for mature unmarried women, this partly explains the different ages at which people marry for the first time, according to their place of residence.

The more liberal and independent role of women in South Africa in the last two decades could also have led to marriage becoming less feasible at a young age,

since a large number of women are no longer dependent on early marriage for survival (Smock, 1993). This could also explain the difference in the ages at which urban and rural women marry, as women are generally more independent in urban areas and are thus not dependent on early marriage.

The increased poverty within South Africa, as well as the larger number of unemployed, also could have contributed to delayed marriages (National Research Council, 1993: 140). There is a possibility that there is a high correlation between income and education levels; marriage may therefore be delayed in order to complete education. People in higher income groups could be more likely to marry later in life when their education is complete due to the fact that they are better able to support a family. On the other hand these results could be interpreted as contrary to the findings in some literature that predict that poor economic conditions with few employment opportunities result in delayed marriages (National Research Council, 1993: 145).

Probably the most powerful determinant of delayed marriages within the South African context over the past few decades is the increased availability and level of education, specifically for African women (Bongaarts and Cohen, 1998; Dixon, 1971; Singh and Samara, 1996). Those with higher levels of education tend to get married later in life, because marriage plans are often postponed or not considered until education is completed (Bongaarts and Cohen, 1998). Within the South African context, a woman may wish to delay marriage in order to attain a higher level of education and thus becoming more desirable as a marriage partner and, in turn, able to demand a higher bridal price. Again this kind of explanation would lend support to Dixon's theory that the timing of marriage depends partly on its desirability and feasibility (Dixon, 1971). Urban areas are generally associated with a higher level and better availability of education, as opposed to the rural areas; thus the differential between urban and rural residency is not surprising.

The Age at which First Sexual Encounter Occurs

Table 4 presents results from a life-table analysis of the age at first sexual encounter. This table shows the proportion of women, by specific characteristics, which had their first sexual encounter by certain ages. Again, missing numbers are due to the fact that there were not enough observations in the sub-sample. Subsequent analysis of the age at first sexual encounter is based on Table 4.

TABLE 4: Life-Table of women's first sexual encounters

Age Interval Cumulative Failure	*14*	*16*	*18*	*20*	*22*	*24*	*26*	*28*	*30*	*32*	*34*	*36*	*38*
Total population	0.03	0.19	0.50	0.76	0.89	0.94	0.97	0.98	0.98	0.99	0.99	0.99	0.99
Age groups													
15-19	0.02	0.23	0.57	0.72	1.00	-	-	-	-	-	-	-	-
20-24	0.02	0.20	0.54	0.80	0.89	0.92	0.94	-	-	-	-	-	-
25-29	0.03	0.18	0.51	0.77	0.89	0.94	0.96	0.97	0.98	-	-	-	-
30-34	0.03	0.20	0.50	0.77	0.90	0.94	0.97	0.98	0.99	0.99	0.99	0.99	-
35-39	0.03	0.18	0.45	0.77	0.91	0.96	0.98	0.98	0.99	0.99	-	0.99	0.99
40-44	0.03	0.16	0.42	0.71	0.89	0.94	0.97	0.98	0.99	0.99	0.99	0.99	1.00
45-49	0.02	0.16	0.43	0.69	0.86	0.92	0.96	0.98	0.98	0.99	0.99	0.99	0.99
Residence													
Urban	0.02	0.15	0.43	0.71	0.86	0.92	0.95	0.97	0.98	0.98	0.98	0.99	0.99
Rural	0.03	0.24	0.59	0.83	0.94	0.97	0.99	0.99	0.99	0.99	0.99	-	0.99
Ethnicity													
African	0.03	0.22	0.56	0.82	0.94	0.97	0.99	0.99	0.99	1.00	1.00	1.00	1.00
Coloured	0.02	0.12	0.36	0.64	0.79	0.87	0.91	0.94	0.96	0.97	0.97	0.97	0.98
White	0.00	0.04	0.19	0.46	0.70	0.84	0.92	0.95	0.96	0.98	0.98	0.99	-
Indian	0.01	0.04	0.22	0.44	0.65	0.77	0.85	0.90	0.91	0.91	0.92	0.95	0.97
Educational Attainment													
No education	0.06	0.28	0.59	0.82	0.92	0.96	0.98	0.98	0.99	0.99	0.99	-	0.99
Incomplete primary education	0.04	0.29	0.63	0.85	0.96	0.98	0.99	0.99	0.99	0.99	0.99	1.00	-
Complete primary education	0.05	0.26	0.58	0.84	0.94	0.96	0.98	0.98	0.99	0.99	0.99	1.00	-
Incomplete senior education	0.02	0.18	0.51	0.79	0.92	0.95	0.97	0.98	0.99	0.99	0.99	0.99	0.99
Complete senior education	0.01	0.09	0.34	0.65	0.82	0.90	0.94	0.96	0.97	0.98	0.98	0.99	-
Higher education	0.01	0.07	0.29	0.54	0.73	0.86	0.93	0.96	0.97	0.98	0.99	0.99	1.00
Province													
Western Cape	0.01	0.12	0.36	0.64	0.80	0.89	0.93	0.95	0.97	0.98	0.99	0.99	1.00
Eastern Cape	0.03	0.24	0.58	0.81	0.92	0.96	0.98	0.98	0.99	0.99	0.99	0.99	0.99
Northern Cape	0.02	0.11	0.37	0.66	0.82	0.89	0.94	0.96	0.97	0.98	-	0.98	0.98
Free State	0.03	0.21	0.47	0.76	0.89	0.93	0.98	0.99	1.00	-	-	1.00	-
Kwa-Zulu Natal	0.01	0.12	0.41	0.70	0.86	0.92	0.95	0.97	0.97	0.98	0.98	0.99	0.99
North west	0.02	0.15	0.44	0.76	0.93	0.96	0.98	0.98	0.99	-	0.99	-	-
Gauteng	0.03	0.15	0.47	0.76	0.90	0.95	0.98	0.99	0.99	0.99	0.99	0.99	1.00
Mpumalanga	0.05	0.34	0.70	0.89	0.95	0.98	1.00	1.00	-	1.00	-	-	-
Limpopo	0.02	0.22	0.58	0.82	0.93	0.96	0.97	0.98	0.99	-	0.99	-	1.00
Telephone													
No	0.03	0.22	0.57	0.82	0.93	0.97	0.98	0.99	0.99	0.99	1.00	1.00	1.00
Yes	0.01	0.10	0.32	0.60	0.79	0.87	0.92	0.95	0.96	0.97	0.97	0.98	0.98

Source: SA DHS 98

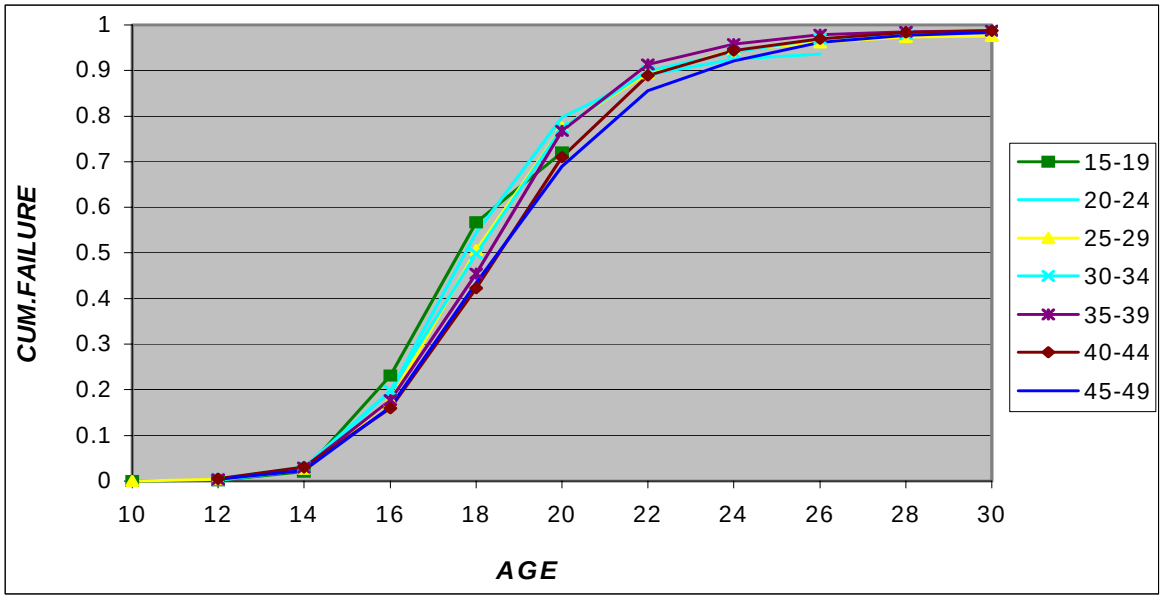
Analysis

Table 4 shows that about 50% of women had had sex by the age of 20 and almost all women had had sex by the age of 26. When this result is compared

with the results from the life-table on the timing of marriage it highlights the fact that marriage and first sex are not exclusively linked. Few women have sex for the first time when they get married.

Results from the life-table showing age of first sexual encounter indicates that a greater proportion of the younger cohorts have their first sexual encounters by the age of 18, relative to older cohorts. This seems to hold generally over the teenage years and thus it would seem that in older generations, the first sexual encounter occurred later in life compared to younger generations, or so at least they report. The likelihood of the first sexual encounter tends to level out among the different age cohorts by the age of 26. This suggests not that more women are having sex in modern times as opposed to 20 years ago but that they are entering into sexual relations at a younger age. These results suggest that there is a trend over time towards having the first sexual encounter at a younger age. This can be seen in figure 6 below.

FIGURE 6: Age at first sexual encounter: comparison among different age cohorts

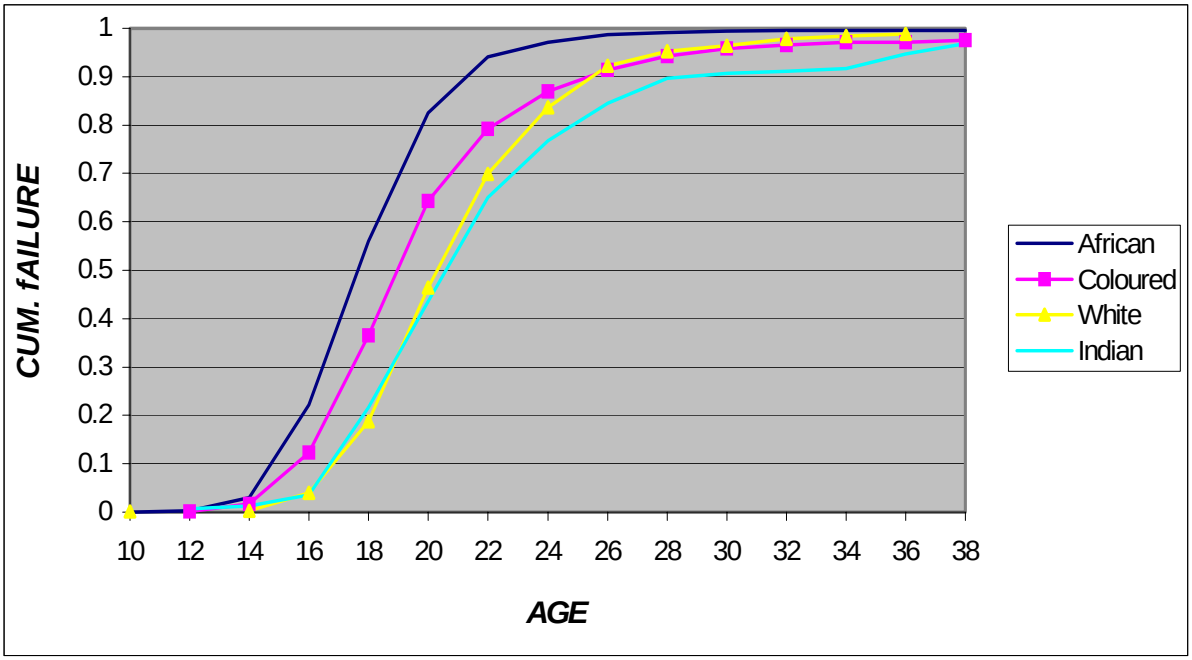


The life-table in table 4 shows that a greater percentage of rural residents have their first sexual encounter at an early age as opposed to urban residents. This relationship is particularly applicable for the teenage years and only fully equalises at around the age of 30.

The life-table results show that Africans are clearly more likely to have early sexual encounters compared to the other ethnic groupings. At the other extreme,

Indians tend to have relatively late first sex experiences. The percentage of Coloured women in this regard tends to lag behind that of Africans but lead that of Whites by age of 24. However, by the age of 30, Whites are more likely to have had sex than Coloureds. These results can be seen graphically in figure 7.

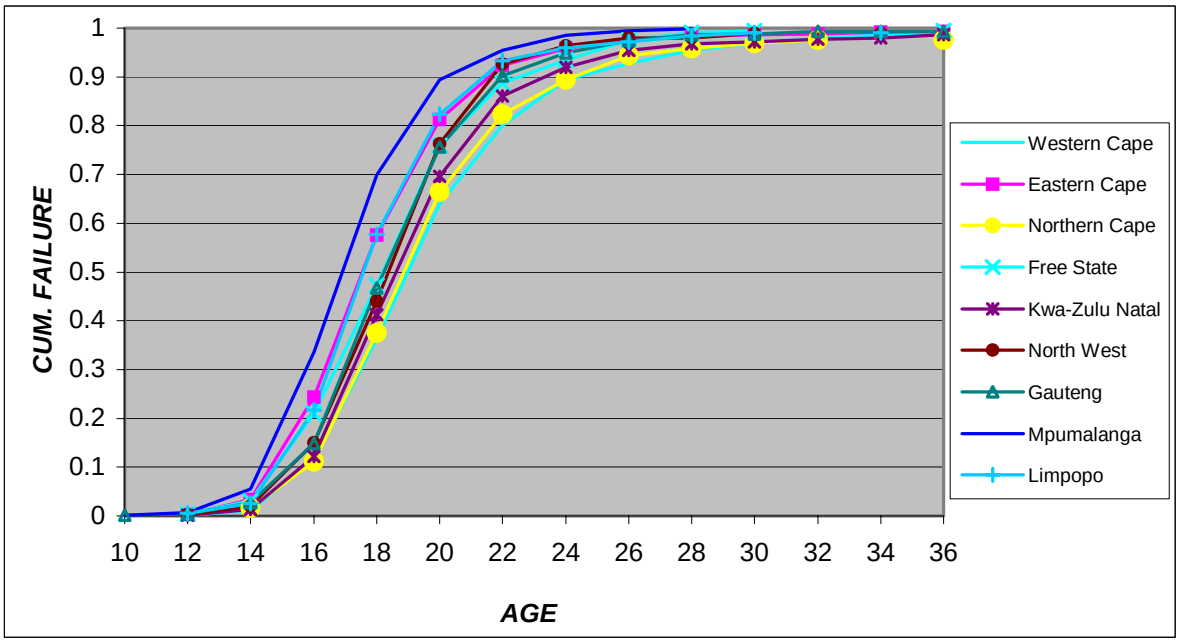
FIGURE 7: Age at first sexual encounter: comparison among different ethnic groups



Up to their mid-20s, the proportion of those with little or no education is greater than that of those with a higher level of education. From the about the age of 25 the proportions of those who have had their first sexual encounter is similar between women with various levels of educational attainment. Thus those with less education tend to have earlier initial sexual relations compared to those with higher levels of education.

Mpumalanga province has the highest likelihood of early sexual encounters followed by Limpopo province and the Eastern Cape respectively, which also have a relatively high level of likelihood. The Western Cape has the lowest percentage of those having had their first sexual encounters by the age of 18. All the other provinces not mentioned show relatively similar trends. The proportions of those having had first sexual encounters across the provinces equalise around the age of 25. Thus a generalisation could be made that Mpumalanga, as well as the Limpopo province and the Eastern Cape, exhibit earlier ages of first sexual encounters relative to the other provinces. This can be seen in figure 8.

FIGURE 8: Age at first sexual encounter: comparison among different provinces



Again, ownership of a telephone is used as a simple proxy for income. Those people with no telephone are more likely to have an earlier initial sexual experience than those who do own a telephone. This relationship is particularly strong up to the approximate age of 22. Thus, one could again infer from this that those people with lower incomes generally have an earlier initial sexual experience compared to those with higher income levels.

Discussion

These results might contradict a portion of literature that suggests that the age at the first sexual encounter in developing countries is fairly constant or is increasing slightly (Blanc and Way, 1998; Meekers, 1994), but support a reported trend toward higher levels of prenuptial sexual activity (Singh, 1998). Some explanations, put forward for this are as follows: by Frustenburg (1998), are the influence of Western society, self-development and liberalisation and the separation from traditional practices, values, and governance. These explanations seem very relevant to the South African situation. It has also been suggested that the age of menarche is decreasing in developing countries (Zabin and Kiragu, 1998). This could also contribute to earlier ages of first sexual encounters, as there is an increase in the proportion of sexually mature, but unmarried women (Senderowitz and Paxman, 1985).

The result of early first sexual encounters in rural areas is in line with other empirical evidence found in developing countries (Singh, 1998). This finding could very well be linked to the fact that early marriages are also a characteristic of the rural lifestyle.

There are a number of reasons why Africans have earlier sexual experiences. Africans' early first sexual encounters are correlated with their early traditional marriages. It is also the case that Africans live predominately in rural areas and generally have lower levels of education. The fact that fertility is highly valued in the African culture could also explain the incidence of early sexual encounters. It should also be noted that educational attainment might be highly correlated to place of residence and ethnicity. A somewhat common trend is that it is more likely for those with incomplete primary education to have early sex than those with no education at all. This is because men would rather marry someone with a little education than one with none.

Provincial differentials in the age at first sexual encounter probably lie in the cultural differences between the provinces. In the more traditional provinces, such as Limpopo, the incidence of earlier sexual experience may also be correlated to the presence of the more traditional early marriages. There is also likely to be a high correlation between ethnicity, education, income and residence in the individual provinces as well as nationally.

The Risk Gap

Although the following models cannot accurately depict the trend of the risk gap over time it seems logical it would have changed. The reason for this is that results so far have shown that there are trends toward an earlier age at first sexual encounter and a later age at first marriage in South Africa. Therefore it stands to reason that the gap between the two is growing.

From here on this paper will only examine results for African women, because of the low number of White, Indian, and to a lesser degree, Coloured women in the sample. This can be seen clearly in the following table where the majority of observations are from African women. Moreover, the Indian and Coloured populations are heavily concentrated in Natal and Western Cape respectively, and to a lesser extent in Gauteng, and thus may distort provincial results. Thirdly, in its later stages this paper will compare provincial HIV/AIDS prevalence rates to provincial risk-gap medians. Since the Health Department obtains these provincial prevalence rates from antenatal health clinics they come

primarily from African women. Limiting our sample to African women ensures more accurate and robust results. Table 5 shows the distribution of the length of the risk gap in years of all women compared with African women only.

TABLE 5: Distribution across all women versus African women only, by size of the risk gap

Gap in years	***All women***			***African Women***		
	Freq.	*Percent*	*Cum.*	*Freq.*	*Percent*	*Cum.*
Min/-5	62	1.07	1.07	56	1.35	1.35
-4/-5	567	9.75	10.82	429	10.35	11.70
0	1264	21.74	32.55	687	16.58	28.28
1/2	1105	19.00	51.56	765	18.46	46.74
3/4	828	14.24	65.80	630	15.20	61.94
5/6	620	10.66	76.46	487	11.75	73.70
7/8	427	7.34	83.80	326	7.87	81.56
9/10	352	6.05	89.85	279	6.73	88.30
11/12	217	3.73	93.59	185	4.46	92.76
13/15	181	3.11	96.70	153	3.69	96.45
16/max	192	3.30	100.00	147	3.55	100.00
Total	5815	100.00		4144	100.00	

The risk gap presented above is calculated simply as the age at first marriage minus the age at first sexual encounter. Admittedly this calculation does not capture all those exposed to the high levels of risk of premarital sex as it only accounts for those who have already married at least once. In order to obtain a proxy for the length of time sexual behaviour outside of marriage has taken place an expanded risk gap is used in this paper. This is calculated as the age at marriage minus the age at first sexual encounter for those who are married and the current age minus age at first sexual encounter for those not yet married. Although the expanded risk gap is not the focus of this paper it is useful and interesting for comparative purposes.

Table 6 shows the median length in years of both the risk gap, as well as the extended risk gap, for various socio-economic characteristics. The overall population median of 3 and 4 years respectively confirms the fact that most people engage in sexual behaviour before entering into marriage, and more specifically are in this high-risk category for approximately 3 years. As expected, the gap medians for the different age cohorts are not very useful. Comparisons between age groups can only really start to be made from those currently aged 30 and upwards, as it is only from this age that the majority of women have married and been exposed to sexual relations. For women older than 30 years the median risk gap does seem to be increasing over time. Those

in urban areas appear to have higher gap medians than those in rural areas. This is most likely due to the delay in marriage in urban areas as has been seen before and it is not surprising that those with higher education also have higher medians. There seems to be a differential in the median risk gap between provinces, with Limpopo recording the lowest, due to the average early age at marriage, and Gauteng the highest, probably in line with its high levels of urbanisation and education. In line with these results, those women who do not own a telephone seem to have lower gap medians than those with telephones.

TABLE 6: Median gap distribution by characteristic

Characteristics		***Risk gap[6] Median***	***Expanded[7] gap Median***
Total population		3	4
Age groups	*15-19*	1	2
	20-24	1	4
	25-29	3	7
	30-34	4	7
	35-39	3	6
	40-44	3	4
	45-49	3	4
Residence	*Urban*	4	5
	Rural	2	3
Educational attainment	*No education*	2	3
	Incomplete primary education	2	4
	Complete primary education	2.5	3
	Incomplete senior education	3	4
	Complete senior education	5	6
	Higher education	5	6
Provinces	*Western Cape*	2	4
	Eastern Cape	3	4
	Northern Cape	4	6
	Free State	2.5	4
	Kwa-Zulu Natal	4.5	6
	North West	4	5
	Gauteng	5	5
	Mpumalanga	3	5
	Limpopo	1	2
Telephone	*No*	3	4
	Yes	5	6

[6] Risk gap calculated as age at marriage minus age at first sexual encounter
[7] Expanded gap calculated as age at marriage minus age at first sexual encounter for those married and current ages minus age at first sexual encounter for those not yet married.

In order to analyse these results further a regression logistics model is used. This examines the probability of a specific group of women having a risk gap of 3 years or more compared to a reference category. The results are presented in terms of odds ratios and are shown in table 7.

TABLE 7: Logistics: Odds ratios for risk gaps at 95% confidence interval

	GAP				***EXTENDED GAP***			
	Odds Ratio	***P>|z|***	***[95%***	***CI]***	***Odds Ratio***	***P>|z|***	***[95%***	***CI]***
Age groups								
15-19 (ref)	1.00				1.00			
20-24	3.62	0.00	[1.78	7.36]	7.20	0.00	[5.97	8.69]
25-29	6.43	0.00	[3.21	12.87]	8.53	0.00	[6.99	10.40]
30-34	7.38	0.00	[3.70	14.74]	6.84	0.00	[5.60	8.34]
35-39	7.63	0.00	[3.83	15.22]	5.69	0.00	[4.67	6.93]
40-44	7.20	0.00	[3.60	14.41]	5.18	0.00	[4.20	6.39]
45-49	8.11	0.00	[4.03	16.32]	5.18	0.00	[4.12	6.51]
Residence								
Urban (ref)	1.00				1.00			
Rural	0.74	0.00	[.630	.88]	0.72	0.00	[.629	.814]
Province								
Western Cape (ref)	1.00				1.00			
Eastern Cape	1.96	0.01	[1.23	3.11]	1.74	0.00		
Northern Cape	2.81	0.00	[1.61	4.89]	2.23	0.00	[1.46	3.42]
Free State	1.60	0.05	[1.00	2.57]	1.05	0.78	[.745	1.48]
KwaZulu Natal	3.49	0.00	[2.16	5.63]	2.42	0.00	[1.72	3.40]
North West	2.50	0.00	[1.53	4.08]	1.91	0.00	[1.34	2.72]
Gauteng	2.78	0.00	[1.72	4.49]	1.68	0.00	[1.19	2.38]
Mpumalanga	2.45	0.00	[1.52	3.97]	1.99	0.00	[1.41	2.82]
Limpopo	0.99	0.98	[.610	1.62]	0.78	0.17	[.55	1.11]
Educational Attainment								
No education (ref)	1.00				1.00			
Incomplete primary education	1.30	0.02	[1.04	1.62]	1.34	0.00	[1.11	1.62]
Complete primary education	1.53	0.00	[1.17	2.0]	1.48	0.00	[1.17	1.85]
Incomplete senior education	2.15	0.00	[1.72	2.69]	2.31	0.00	[1.91	2.79]
Complete senior education	3.48	0.00	[2.55	4.74]	3.28	0.00	[2.58	4.18]
Higher education	3.30	0.00	[2.26	4.81]	3.03	0.00	[2.26	4.07]
Telephone								
No (ref)	1.00				1.00			
Yes	0.97	0.80	[.76	1.20]	1.05	0.54	[.89	1.24]

Apart from the age group characteristic the odds ratio results are almost identical between the risk gap and the extended risk gap. Therefore only the results of the risk gap will be discussed. As expected, the characteristic of age group in this particular model is not very useful due to the fact that most women in the reference group were not married and neither had they had any sexual experience at the time they were interviewed. The results show that urban

women are about 24% more likely to have a risk gap of 3 years or more than are rural women. Since the Western Cape is the reference province the above results show that all provinces except the Limpopo Province (which is insignificant) are more likely to have a risk gap of 3 years or more, with Kwa-Zulu Natal having the greatest and highest differential. The results also suggest that those with no education are less likely to have a gap of 3 years or more than any of the other levels of educational attainment. Somewhat surprisingly, those with complete senior education have a higher probability of having a gap of at least 3 years as opposed to those with higher education. The odds-ratios for having a telephone are highly insignificant which suggests that having a telephone may be a poor and oversimplified proxy for income. These results are generally in line with the calculated medians presented in table 6. Obviously the determinants of the risk gap for each characteristic are a combination of that characteristic's determinants of the timing of first marriage and first sexual encounter.

Implications of the Risk Gap for South Africa

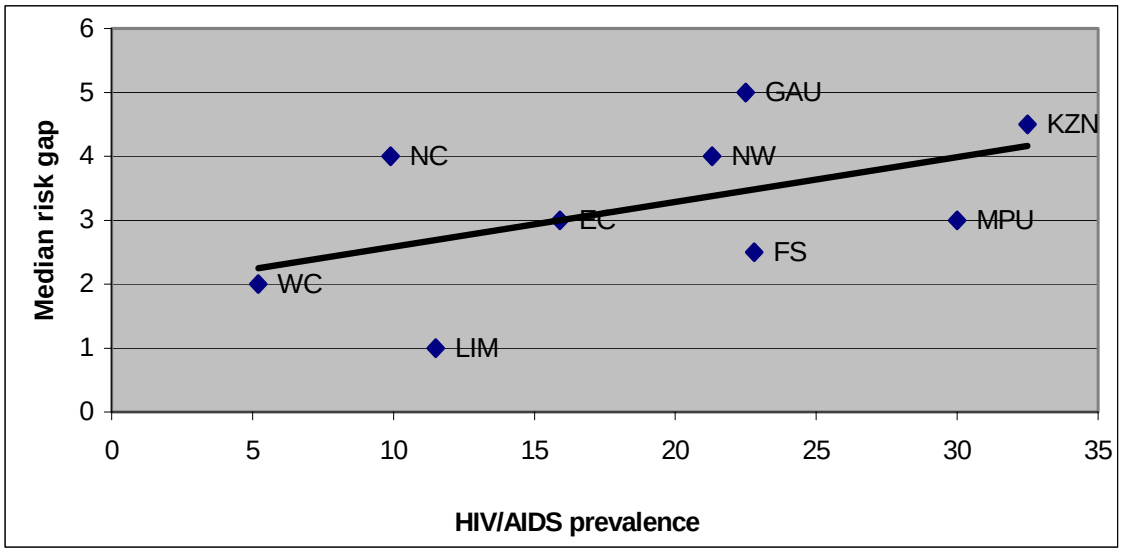
One might ask what is the importance of this risk gap and how does it fit into the larger economic framework? The risk gap has far-reaching economic and social implications. These are the relationship of the risk gap to HIV/AIDS, teenage pregnancies, and the social structure of South Africa.

Impact of Risk Gap on HIV/AIDS

While marriage in South Africa may not be the only avenue to sexual relations, it is still a comparatively safer sexual environment, since those married are generally not exposed to as many sexual partners as those women not married. This suggests that those having sex but who are not yet married are exposed to a higher risk of contracting HIV and other sexually transmitted diseases (STDs). This is not surprising as sexual behaviour plays an important role in the transmission of HIV (Foote, Hill, Martin, 1993). The findings of this paper suggest that there is a relationship between the risk gap and the transmission of the HIV/AIDS virus. Figure 9 is a scatter plot of the provincial median risk gap and the provincial HIV/AIDS prevalence rates[8].

[8] Note that only the risk gap was used, as this proved to be an appropriate measure of premarital sexual behaviour. For proof of this see Appendix 1

FIGURE 9: Scatterplot of risk gap and provincial prevalence rates[9]



This suggests that the risk gap is positively related to the provincial level of HIV/AIDS. This by no means suggests a definite causal effect or that this is the sole determinant, since other determinants of prevalence such as migration, population mobility, cultural practices and education have been found also to hold explanatory power (Department of Social Development, 2000: 63). However there does seem to be a direct relationship between the provincial prevalence rates and the median of that province's risk gap. In other words, provinces with high median risk gaps generally also have high levels of HIV/AIDS. The trend line in figure 9 represents the average relationship between the provincial prevalence rates and the gap medians. Therefore from a closer look at figure 9 it can be seen that those provinces which lie below the trend line for a given median risk gap have a higher than expected prevalence rate. The inverse is true for those provinces that lie above the trend line.

This relationship between the risk gap and provincial HIV/AIDS prevalence rates is crucial given the crippling economic costs associated with HIV/AIDS. AIDS kills economically active people, whom are relied on to sustain the more vulnerable generations of both old and young. For example, in South Africa in 1999 it was estimated that 250 000 people would die annually from AIDS in the next three years, leaving 600000 orphans (Department of Welfare, 1999: 6). HIV/AIDS is expected to decrease South Africa's productivity dramatically and in particular put pressure on medical aid schemes, as their viability depends on a

[9] Western Cape (WC), Northern Cape(NC), Limpopo(Lim), Eastern Cape(EC), North West(NW), Free State(FS), Gauteng(Gau), Mpumalanga(Mpu), Kwa-Zulu Natal(KZN)

healthy population (Department of Social Development, 2000: 67). The epidemic will have far-reaching social implications as gains in key population and development indicators such as mortality rates are expected to be eroded (Department of Welfare, 1999: 6).

Since the risk gap is linked indirectly to the costs mentioned above its implications and importance to South Africa's economy are immense. It could be said that the growing risk gap in South Africa could fuel the AIDS epidemic. Ultimately the risk gap is important as it can be seen as a likely determinant of provincial HIV/AIDS prevalence rates and therefore connected to the costs involved with this epidemic.

Impact of Risk Gap on Underage Pregnancies

The risk gap is also the time period when women are exposed to the risk of bearing children out of wedlock. Such pregnancies are often unwanted. This is particularly true of South Africa where, like other sub-Saharan countries, contraceptive use is generally considered to be low (Department of Social Development, 2000: 46). Even if premarital pregnancies in South Africa are becoming more acceptable they still generally carry large economic and social costs. If the woman is relatively young then a pregnancy outside of marriage normally results in limits on her education, and thus her contribution to society; and future income and often leads to a lower standard of living than otherwise could have been achieved (United Nations, 1995). Premarital and underage pregnancies have also been cited as leading to social ostracism, marital problems (Singh, 1998) and in many cases unsafe abortions[10] (Blanc and Way, 1998). Having children out of wedlock is a particularly heavy burden for poor mothers to carry, as they are unable to care for the child adequately. Thus, this is often associated with high levels of infant malnutrition, of infant and maternal mortality rates, and child abandonment (Meekers, 1994). The risk gap therefore is linked to these costs as well.

Teenage pregnancies have particularly high costs associated with them as they normally lead to young women dropping out of school, although South African law does not require this (Department of Social Development, 2000: 54). This decreases a woman's human development potential, resulting in a lower probability of her finding a job and a significant reduction in her expected

[10] Though abortion is now legal in South Africa it has been suggested that few women have an understanding of what this implies and thus unsafe abortions continue (Department of Social Development, 2000: 49)

income. Therefore it is not surprising that there is a link in South Africa between teenage pregnancies and poverty (Department of Welfare, 1999: 9). The 1998 SADHS final report found that by the age of nineteen, 35% of all girls interviewed had been pregnant at least once. This frightening statistic can partly be explained by the trend toward earlier sexual encounter as has been found in this paper and the growing risk gap in general. This is a logical conclusion since only 38% of young people between the ages of fifteen and nineteen use any form of modern contraception when having sex (SADHS 1998 Final Report). The costs associated with teenage pregnancies and premarital pregnancies in general are associated with the risk gap.

Social Impact of the Risk Gap

This paper's findings regarding the risk gap in South Africa also has social implications. The growing risk gap highlights the movement away from traditional values and the control of traditional "watchers" and thus has contributed to the phenomenon of younger ages of first sexual encounters as well as delayed marriages (Frustenburg, 1998). This does not necessarily imply that marriage is less desirable. However, the fact that the risk gap is so large, and that it is increasing does question the value of marriage as a determinant for sexual encounters and fertility in South Africa (Department of Welfare, 1999: 44).

Finally it should be noted that a large and growing risk gap could have some positive implications for South Africa. This is because a larger risk gap is normally associated with a higher level of education, which bodes well for the future development of any country.

Further Work

This paper makes a valid contribution to the understanding of the dynamics of the population's exposure to risk and HIV/AIDS epidemic in South Africa. This section points out some aspects of research that need to take these findings into account. It must however be pointed out that this paper only looks at the relationship between the risk gap and HIV/AIDS prevalence rates at a provincial level. Further research needs to be done to analyse whether the HIV/AIDS prevalence rate is related to the risk gap of other population characteristics such as place of residence, educational attainment, and income. If this relationship between HIV/AIDS and the risk gap is assumed to hold for the other characteristics, one would expect a higher prevalence rate in younger cohorts,

urban areas and among the highly educated sections of the population. This however does not seem apparent and therefore should be the subject of further research in an attempt to explain these differentials. Such research however is beyond the scope of this short paper.

Policy Recommendations

The findings of this paper have implications for policy makers on the management and control of the AIDS epidemic and the reduction of the level of teenage pregnancies and the costs these involve. If indeed the risk gap is a partial determinant of provincial HIV/AIDS prevalence rates, then by manipulating this risk gap the government may have a tool to affect the level of HIV/AIDS in the country. Although this paper does not attempt to estimate numerically the economic costs of HIV/AIDS or the benefits of the policy recommendations, it does provide a theoretical framework for dealing with these issues. There seem to be two approaches in attempting to reduce the level of HIV/AIDS in South Africa. The first is the reduction of the length of the risk gap, and the second is the reduction of the amount of risk associated with this gap. Admittedly it may be difficult to alter the size of the risk gap effectively given the nature of the determinants of this gap, which have already been discussed in this paper. Even so, the risk gap is important to policy makers, as this paper has shown that people in this group are most at risk of infection from HIV and therefore should be targeted.

A first approach to the reduction of the length of the risk gap in South Africa would be to address either of the two ends of the spectrum, the age at marriage or the age at first sexual encounter; these must be changed. It is doubtful whether earlier marriages would be desirable, because of the positive relationship between later marriages and development indicators such as education (Bongaarts and Cohen, 1998). Therefore in order to reduce the risk gap, the age at first sexual encounter would have to be the focus for policy makers. The effectiveness of such a policy is debatable. Policies aimed at delaying the average age of first sexual experience in developed countries such as the United States have been considered by many to be unsuccessful (Frustenburg, 1998). On the other hand, developing countries such as Uganda boast successful results with such policies, which would in essence encourage delaying sex or even promoting chastity. This would require a close co-operation between government and non-governmental organisations (NGOs) at a grass roots or community level. This close co-operation has been noticeably absent in the past (Van der Vliet, 2001). The acceptance and adoption of this

policy at the community level, whether it be religious, cultural or ethnic, will ultimately determine the success or failure of this policy. The differentials between the provincial risk gaps call for province-specific policies. Those provinces where the risk of early sex is high, such as Mpumalanga, Limpopo Province and the Eastern Cape should be specifically targeted by this initiative. Government will need to commit itself at a national level to the mobilisation of extensive resources. If this policy were to succeed in delaying the age of first sexual encounter then this reduction in the risk gap should result in lower levels of HIV/AIDS. Teenage pregnancies and the cost they inflict on society would also be greatly reduced if this policy were to succeed. Therefore it is seems beneficial that the government design a province-specific strategy in order to reduce the risk gap by promoting the desirability of a later age of first sexual encounter.

The second approach, which would aim to reduce the risk of both STDs (including HIV/AIDS) and premarital pregnancies, would encourage appropriate contraceptive use. This campaign should target those in the population who fall into the risk gap. Although in South Africa there is a generally wide knowledge of contraceptive use and AIDS, this has not been translated into widespread contraceptive use (Department of Welfare, 1999: 6). It has been found that in South Africa the use of contraception depends largely on the effectiveness of the health worker and the health services system (Department of Social Development, 2000: 59). Therefore this implies more extensive policies involving the promotion of appropriate contraceptive use at the community level. The risk gap differentials again call for a province-specific strategy. Those provinces which lie beneath the trend line in figure 9, such as Limpopo, Free State and Mpumalanga, should be targeted as these provinces exhibit a higher-than-expected prevalence rate for a given risk gap. Kwa-Zulu Natal should also be targeted due to this provinces high prevalence rate and low contraceptive use. These findings are confirmed by the 1998 SADHS Final Report which showed that Limpopo province, Kwa-Zulu Natal and Mpumalanga had the lowest rates of contraceptive use in the country (all under 60%). Yet again, if this policy is to work, government needs to commit itself and its vast resources at a national level. Increasing contraceptive use will undoubtedly reduce the impact that the risk gap has on South Africa, as this will make the population less vulnerable to the spread of HIV/AIDS. These policies will also reduce the levels of teenage pregnancies that have plagued South Africa. Although these policy recommendations are far-reaching, extensive and costly they are necessary if the fight against AIDS is to be won.

Conclusion

Ultimately, economics is about people. Therefore, the understanding of demographic dynamics is crucial to economics, and may hold the key too many economic puzzles. This paper has concerned itself with the risk gap and its specific implications for HIV/AIDS and underage pregnancies.

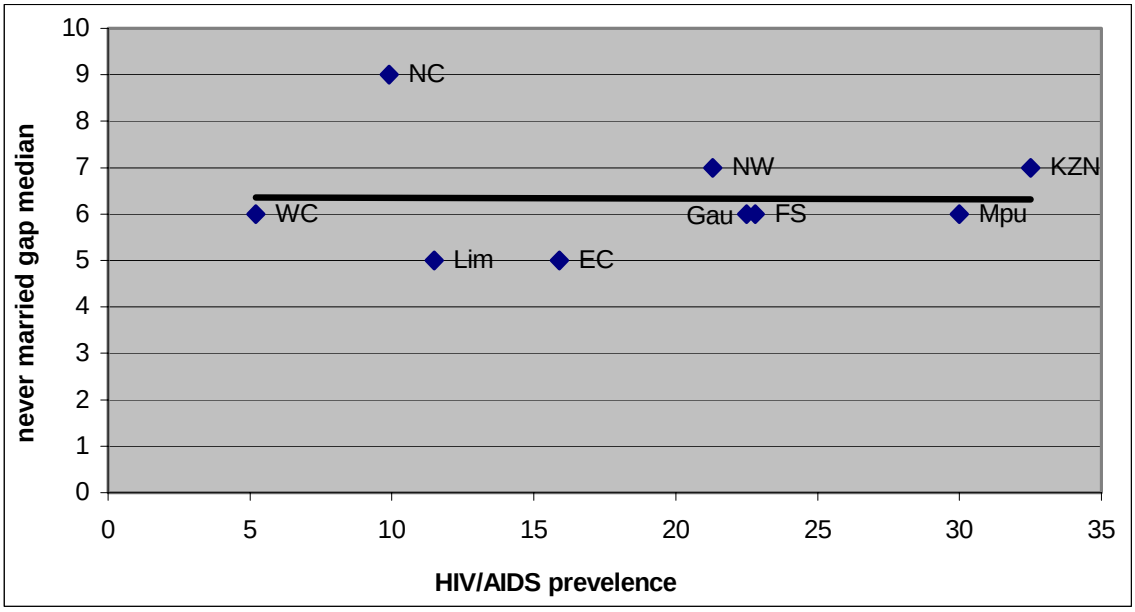
This paper looked first at the timing of marriage and sex using life-table analysis. The results indicate that there is a trend in South Africa toward later marriages. In addition it is found that women with higher incomes, higher levels of education, and those who live in urban areas, are more likely to get married at an older age. There are also large differentials between the ages at which people marry in the various provinces. Analysis of the age at first sexual encounter shows a trend in South Africa toward earlier initiation in this regard. It was also found that women, who are African, live in a rural area and have low levels of education, tend to have sexual encounters at an earlier age. Again there were large differentials between the provinces. The risk gap, as expected, is growing over time in South Africa. Analysis suggests this risk gap is likely to be larger in urban areas and among those with high levels of education. The median provincial risk gaps were also found to vary quite substantially. It is also found that the provincial risk gap is positively related to the provincial HIV/AIDS prevalence rate.

The costs of the AIDS epidemic to South Africa are expected to be immense thus confirming the economic importance of the risk gap as a determinant of the provincial levels of HIV/AIDS. In the same way, the risk gap is related to the high costs involved with premarital pregnancies. This suggests that due to this relationship the risk gap might be used as a tool, which if manipulated correctly, could reduce the level of HIV/AIDS in the country and would thus have powerful policy implications. The first policy recommendation calls for the government, with the close co-operation of NGOs, to design a strategic policy at grass roots, provincial and national levels respectively, which would aim at reducing the risk gap by promoting the advantages of starting sexual activity at a later age. The second recommendation is that government design a strategic policy for specific provinces, aimed at increasing the levels of contraceptive use in South Africa, which will reduce the level of risk associated with this gap. Although this paper does not attempt to assign numbers to the economic costs of HIV/AIDS or to the benefits of the policy recommendations, it does provide a framework for dealing with these issues. This paper should form the basis of further work aimed at understanding the relationship between HIV/AIDS prevalence and economic variables in South Africa.

Appendix

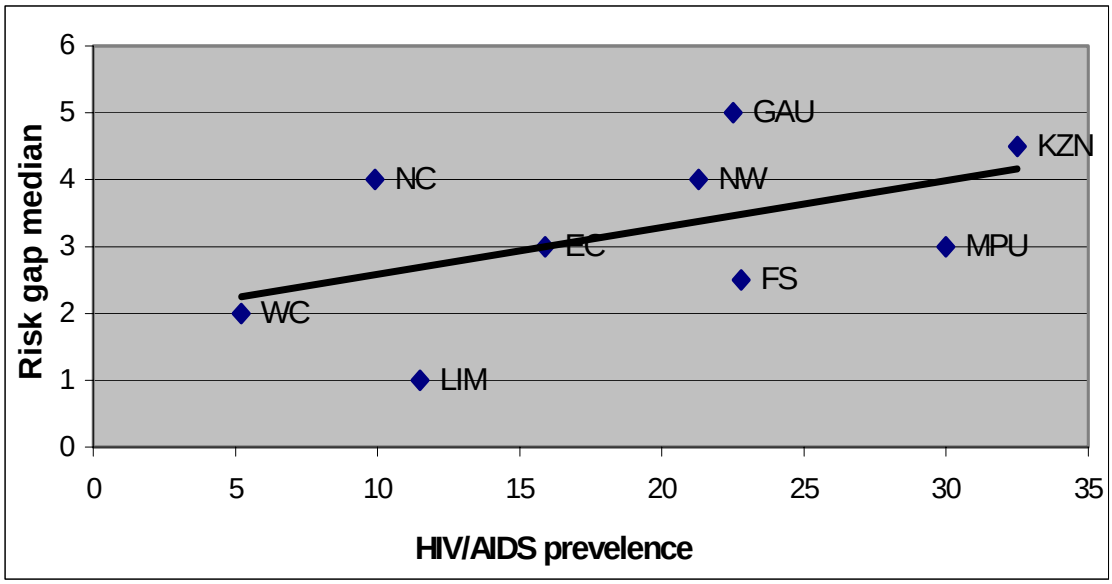
When looking at the relationship between provincial HIV/AIDS prevalence rates and the risk gap, only the median of the straightforward risk gap was used, i.e. the median of the difference in years between the age at first marriage and the age at first sex. Therefore only data relating to those who were ever married is captured. Initially this may seem like a poor measure as it captures only those already married and therefore does not take into account the sexual activity of those not yet or never married. However this is not the case. There is no or very little relationship between the never married gap median and the provincial prevalence rates. This can be seen in the scatterplot of Appendix figure1 below.

APPENDIX FIGURE 1: Scatterplot of never married gap and HIV/AIDS prevalence

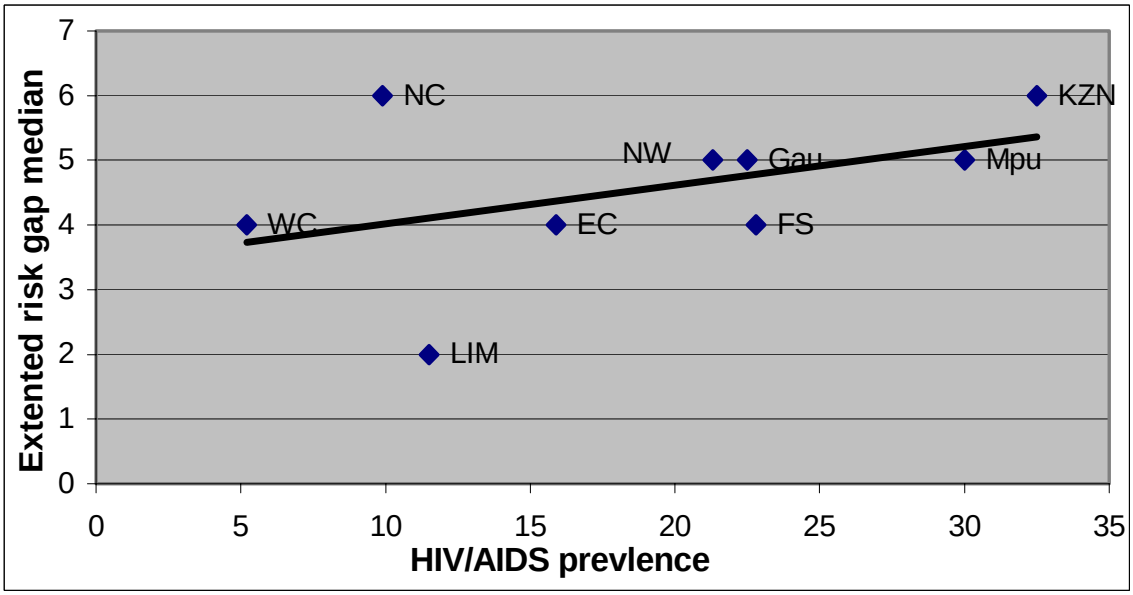


This suggests that the sexual activity of those not yet married has little bearing on the differentials in prevalence rates between the provinces. This is a somewhat surprising result and can be partly attributed to the relatively similar premarital activity of women between the provinces (except for Northern Cape which is an obvious outlier). Therefore with this in mind, it stands to reason that using only the risk gap when considering HIV/AIDS in this paper is adequate, as those not yet married will not distort the correlation. This is confirmed when comparing the risk gap to the extended risk gaps correlation with provincial prevalence rates, which is shown in Appendix figure 2 and 3. As can be seen the slope of the scatterplot remains roughly the same, except that the size of the gaps is larger for the extended gap, as is expected.

APPENDIX FIGURE 2: Scatterplot of risk gap and HIV/AIDS prevalence



APPENDIX FIGURE 3: Scatterplot of extended risk gap and HIV/AIDS prevalence



The fact that there seems to be relatively a strong relationship between the risk gap and provincial prevalence, but not between premarital sexual activity and provincial prevalence, could suggest that the age of marriage and not the age of first sexual encounter explains the differentials in provincial prevalence rates. This hypothesis however calls for further research.

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