HUMAN SCIENCES RESEARCH COUNCIL

A Quantitative Study on Fertility Trends in South Africa, and their Relationship with the Introduction of Child Support Grant

PREPARED FOR DEPARTMENT OF SOCIAL DEVELOPMENT PRETORIA.

Drs Monde Makiwane and Eric O. Udjo
Child, Youth, Family and Social Development (HSRC)
Private Bag X41
Pretoria 0001
South Africa
Phone:27-12-302 2239; Fax: 27-12-302 3347 Email:mmakiwane@hsrc.ac.za

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EXECUTIVE SUMMARY

The aim of this study is to determine the baseline for fertility in South Africa by completing a trend analysis in fertility with respect to age, location, race and income over a ten-year period from 1994-2004 and complete a comparison of the national fertility rates with that of other similar countries.

Data for this study came from October Household Surveys 1995 and 1998, Demographic and Health Survey 1998 and from Census 2001. Relational Gompertz Model was used to estimate age-specific fertility rates.

The overall fertility in South Africa declined for the period 1980-90 from around 4.6 in1980 to about 3.8 births per woman in 1990. A comparison of South African fertility levels with those of selected developed countries shows that between 2000 and 2005 the Total Fertility Rate (TFR) of Sweden (1.6) and the United Kingdom (1.6) was lower than that of South Africa (2.6), while that of other developed countries like the United States (2.1) was only marginally lower. Within mainland sub-Saharan Africa, data shows that Southern Africa has a lower fertility level, with South Africa having the lowest.

South African fertility level differs considerable according to race, with Africans having highest fertility rate, followed by Coloureds, Indians and Whites have the lowest. Among Africans, overall fertility has been declining over the period, and births to teenage women have been increasing. Among the other population groups the overall births to women have also been declining, and with the exception of those classified Coloured, births to teenage women have been increasing. Among Africans, Whites and Indians, significant shifts in age-specific fertility towards younger women have been observed.

In urban areas, while the total fertility rate has remained more or less constant since 1995, the age pattern of fertility has been shifting towards the younger population. Rural areas have been characterized by a decline in overall fertility as a result of women at older ages stopping giving birth earlier than before.

As mentioned above, teenage fertility has been rising between 1995 and 2005. Further analysis shows that the increase is concentrated at late teen ages, with pre-teen and early teen years having a fairly stable fertility level.

Access to the child support grant (CSG) has been rising sharply since the late 1990's. Higher proportion of beneficiaries stay in rural than in urban areas. Below the age of 30 fewer CSG beneficiaries than women who gave birth, whereas above 30 there are more beneficiaries. There are few teenage CSG beneficiaries.

The major finding of the study is that early (pre-teen and early teen) fertility has been constant, while youth (late teenage and early twenties) fertility has been rising, and late fertility has been declining. The rise in youth fertility is unlikely to be related to the introduction of the CSG, as few young people are recipients of the CSG, and the surge in youth fertility includes a bigger coverage than that of the CSG. The shift towards youthful fertility is common in countries where there is a decline in fertility, and secondly, the South African age-specific fertility patterns were, over the years, abnormal in that they peaked at later years of the reproductive careers of women than is the general norm. A downward shift in the age of childbearing is a natural corrective measure.

List of Abbreviations

A.S.F.R.	Age-Specific Fertility Rate
CSG	Child Support Grant
SADHS	South African Demographic Survey
SOCPEN	Social Pension Fund System
TFR	Total Fertility Rate

1 INTRODUCTION

The aim of this study, as stated in the terms of reference of the Department of Social Development, is to determine the baseline for fertility in South Africa by completing a trend analysis in fertility with respect to age, location, race and income over a ten-year period from 1994-2004 and complete a comparison of the national fertility rates with that of other similar countries.

Objectives of the study:

- To determine the fertility rates and trends over a ten year period from 1994 to 2004.
- To determine the fertility rates for each age category over the stipulated period.
- To determine the fertility rates and trends for women in rural and in urban areas in the different age category over the ten year period.
- To determine the fertility rates for women in the different age categories amongst the different race groups over the ten-year period.
- To determine the fertility rates and trends for women in the different income quartiles over the ten year period
- To assess the impact of the Child Support Grant on teenage fertility.

The main contribution of this study is threefold. The first contribution is to document fertility trends in South Africa from the mid 1990's to the year 2005. Secondly, it is to examine trends in teenage fertility in South Africa during the same period and lastly to assess the relationship between fertility and the Child Support Grant.

2 DATA AND METHODS

The datasets used in this study are the 1995 and 1998 October Household Surveys, and the 2001 Census. 1995, 1998 October Household Surveys and the 1998 South African Demographic and Health Survey

1995 and 1998 October Household Surveys

The 1995 October household survey was carried out on a national sample of 30, 000 households drawn from 3, 000 enumeration areas. Ten households were selected in each enumeration area. The sample was stratified by province, urban and non-urban areas and population group. Hirschowitz and Orkin (1996) provide detailed methodological information regarding the 1995 October Household Survey. It collected birth histories from women less than 55 years old and thus can be used to examine age specific fertility rates.

The 1998 October household survey was similar in design to the 1995 October household survey except that the sample size was reduced to 20,000 households in 1998. As in the 1995 October household survey, the 1998 survey collected birth histories from women less than 55. It is thus possible to examine age specific fertility rates using this data.

The 1998 South African Demographic and Health Survey (SADHS)

The 1998 SADHS was the first nation-wide study of its kind to be conducted in South Africa. Fieldwork was conducted between late January and September 1998, during which time 12,247 households were visited, 17,500 people throughout nine provinces were interviewed. The study included questions on birth histories of women.

The 2001 Population Census

The 2001 population census was the second post-apartheid census in South Africa that attempted to canvass the entire country. One of the fertility questions in the 2001 census for women aged between 12 and 50 at the time of the census was:
If (the person) has ever given live birth: when was (the person's) last child born?

Used appropriately in conjunction with other variables, the answers to this question can be employed to examine age specific fertility rates.

Social Pension Fund Grant System (SOCPEN)

The data used to estimate the national CSG distribution was obtained from SOCPEN, a government electronic system that records government welfare transactions. Available data from the SOCPEN system are from the year 1999. When CSG started in 1998, it was in the form of a cash transfer payable to a primary caregiver of poor children aged 0-7 years. Since 2003, the eligibility for the grant has been extended until age 14 and is to be phased-in over a period of three years until 2005/6.

Methods

Because retrospective reporting on fertility surveys and censuses often contain reporting errors, age-specific fertility rates directly computed from such data are often biased. Thus, there is a need for appraisal and adjustment for such errors using indirect methods. One such method is the Relational Gompertz Model. The Relational Gompertz Model has been chosen because it is a sufficiently rigid model to reveal error deviations but flexible enough to follow the real significant features of the observation. (Brass, 1981). This method was applied in the present study to estimate age-specific fertility rates. Details of the method are given in Appendix 1.

The appropriate variables for the evaluation and indirect estimation of age-specific fertility rates were extracted from each of the data sets listed above and were then appraised using the Relational Gompertz Model. Estimates of age-specific fertility rates for the years 1995, 1998 and 2001 were then computed based on the estimated Gompertz parameters for these periods. For the year 2000, the values were obtained by linear interpolation while, for the year 2005, they were obtained through extrapolation by linear regression.

Age-specific fertility rates have several related utilities ranging from the purely demographic to providing insights into the evaluation of policies and programmes related to fertility. The rates are defined as the number of births in a specified year per thousand women in specified reproductive groups at mid-year. From a purely demographic stand point, they

constitute one measure of the level of fertility. Since they control for the age-sex composition of populations, and any variation in fertility within the reproductive age group, they may provide insight into the impact of policy interventions and programmes relating to fertility, that is, where such interventions have been made and appropriate data are available. The results were then graphically examined for trends in age-specific fertility rates for the periods 1995, 2000 and 2005. The figures show a standardised age-specific fertility rate (ASFR). This means that the sum contribution of all age groups has been made to be 1. For example, if the A.S.F.R. of age group 15-19 years is found to be 0.3, it means that 30% of all births in South Africa in that year were from women in the age group 15-19.

In the context of the debate surrounding the impact of social welfare benefit on fertility, the quantum and tempo effects (which could arise from changes in the proximate determinants of fertility) need to be isolated from the "real" impact of social welfare benefit if any. A carefully designed study that incorporates fertility and social welfare benefit variables might shed more light on this matter. There are broadly two kinds of factors that influence fertility – direct (proximate) and indirect factors. Changes in fertility are brought about by one or more proximate factors, as indirect factors (such as education, social grant for example) do not influence fertility directly, but must operate through one or more proximate factors (such as contraceptive practice, breastfeeding, proportion in sexual unions etc). In the debate about social grant and fertility, an extension to this study would be to look at how the CSG may be operating through direct determinants to influence fertility.

3 HISTORICAL FERTILITY RATES IN SOUTH AFRICA

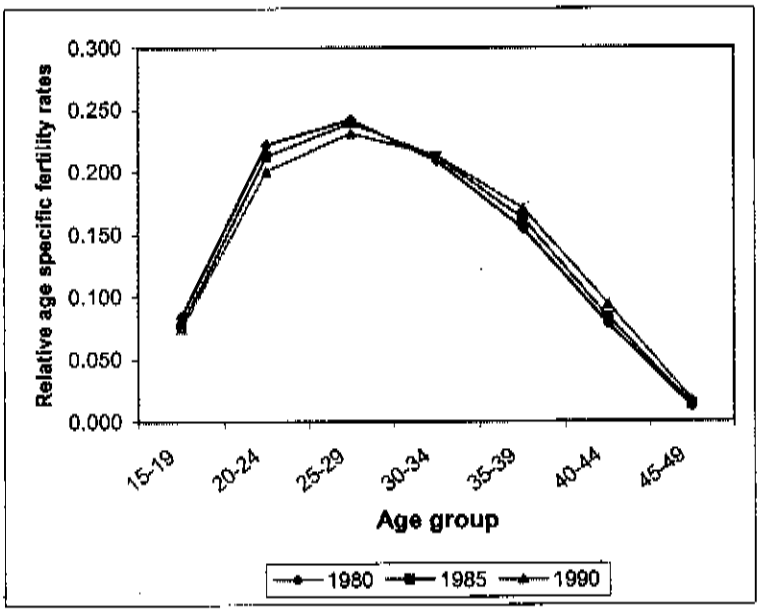
The fertility measure that has been used in this paper is the Total Fertility Rate (TFR), which is the number of children a woman would have by the end of her reproductive years if she were to bear children at the current observed age-specific-rates. This is the most commonly used measure of fertility to assess the overall level of childbearing in society. Age-specific fertility rates have also been used to indicate the number of children born to 1000 women within a particular age group. The Tables below show comparisons in the TFR and ASFR for the age group 15-19.

Table 1 show that overall fertility in South Africa declined for the period 1980-1990 from around 4.6 children per woman in 1980 to about 3.8 births per woman in 1990 (Udjo 2003). The figures below are comparable to those produced by Sibanda et al. (1999), who estimated TFR in South Africa to be 4.5 in 1985, 4.2 in 1990 and 2.9 in 1995. Dorrington et al. (1999) estimated TFR to be 3.2 in 1996. Not only has the overall number of births per woman been declining, births to teenage women have also been declining during this period, as shown by a decline from 84 births to 1 000 teenage women in 1980 to about 59 births in the year 1990.

Table 1 TFR and ASFR (age 15-19) for the overall population of South Africa, 1980-1990

Year	TFR	ASFR (births to 1000 women of age 15-19)
1980	4.69	84
1985	4.09	63
1990	3.85	59

Figure 1 Historical trend in estimated relative age specific fertility rates (TFR=1), African



Source: Udjo 2003

Table 2 below shows age-specific fertility rates for the three years preceding 1998. Generally, fertility in urban areas is lower than in rural areas. Another feature of South African fertility is that rural women continue to bear more children at later ages than urban women do. Amson et al. (1999) noted that South African fertility rates differ from other sub-Saharan African countries because it peaks later (at age 25-29 years) as against the norm of peaking at 20-24 years.

Table 2 Age-specific fertility for the three years preceding 1998

Age group	Urban	Non-urban	Total
15-19	56	99	76
20-24	113	178	139
25-29	123	174	143
30-34	88	149	109
35-39	53	111	74
40-44	18	50	29
45-49	1	24	9

Source Udjo 1999

4 COMPARISON OF SOUTH AFRICAN FERTILITY WITH SELECTED COUNTRIES

A comparison of South African fertility levels with those of selected developed countries shows that between 2000 and 2005, the TFR of Sweden (1.6) and the United Kingdom (1.6) was lower than South Africa's (2.6), while that of other developed countries like the United States (2.1) and Chile (2.4) was only marginally lower than the TFR of South Africa. Generally, sub-Saharan Africa (excluding Mauritius) has a much higher level of fertility than the rest of the world. Within mainland sub-Saharan Africa, Southern Africa has a lower rate of fertility, with South Africa having the lowest. Nevertheless, a fertility decline has been observed in most parts of Africa since the seventies, with Southern Africa experiencing the fastest rate of decline.

Fertility levels are related to the rate of natural population change (changes in population size if the effect of migration is discounted). Fertility levels in conjunction with mortality levels determine natural population growth. According to the U.S. Census Bureau (2006) in 2005, there were 18 births for every 1,000 people in South Africa; as against 21 deaths per 1,000 people in the same year. The decline in fertility in conjunction with the rise in mortality mainly due to AIDS-related deaths has resulted in stalling of the natural population increase in South Africa.

Sub-Saharan African adolescent fertility rates are generally higher than those found in other parts of the world (Table 3). Average adolescent fertility rates in Africa (127 births per 1000 women in the age band 15 to 19) are considerably higher than that of other developing regions. Many European and other more developed countries have rates under 25 births per 1000 women, although the adolescent fertility rate in the United States (61) is almost equal to the overall average rate for the developing world (63). South Africa's adolescent fertility rate is about 66, slightly below that of Latin America's, which is estimated at 71 births to 1,000 women.

Table 3 Comparisons of teenage fertility from different parts of the world

Region	**2000-2005**
Sub-Saharan Africa	127
Middle East/North Africa	39
South Asia	56
East Asia/Pacific	18
Latin America/Caribbean	71
Least developing Countries	127
Industrialised countries	24
U.S.A.	61
Developing Countries	63
World	50
South Africa	**66**

Source: UN Population Division 2000

As seen above, South African fertility rate is among the lowest in Africa, and in the same range as many middle-income countries which generally have higher fertility rates than more developed countries. A similar picture prevails with adolescent fertility. South Africa has a lower adolescent fertility than most African countries, comparable to many middle-income countries. It must be noted, though, that although the fertility gap between more and less developed countries has been narrowing rapidly, the adolescent fertility gap remains high.

5 TRENDS IN AGE-SPECIFIC FERTILITY RATES BY POPULATION GROUP

Generally, South African fertility patterns differs remarkably among different race groups. Fertility levels of whites mirror fertility trends in more developed countries where the transition from high to low fertility has been completed. The Indian and Coloured population is near completion of fertility transition. Although fertility levels of Africans have been higher than other population groups, they have recently experienced the highest rate of fertility decline. It is with this background that the age-specific fertility rates of different population groups is examined below.

Figures 2-5 below show the estimated trend in relative age-specific fertility rates (i.e. with total fertility rate equal to 1) by population group. Note that total fertility rates in South Africa have been declining in the past few decades (see Chimere-Dan, 1993, for example). Udjo (2003) estimated that the total fertility rate in South Africa declined from about 4.9 in 1970 to about 3.2 in 1998.

Figure 2 Trend in estimated relative age specific fertility rates (TFR=1), African

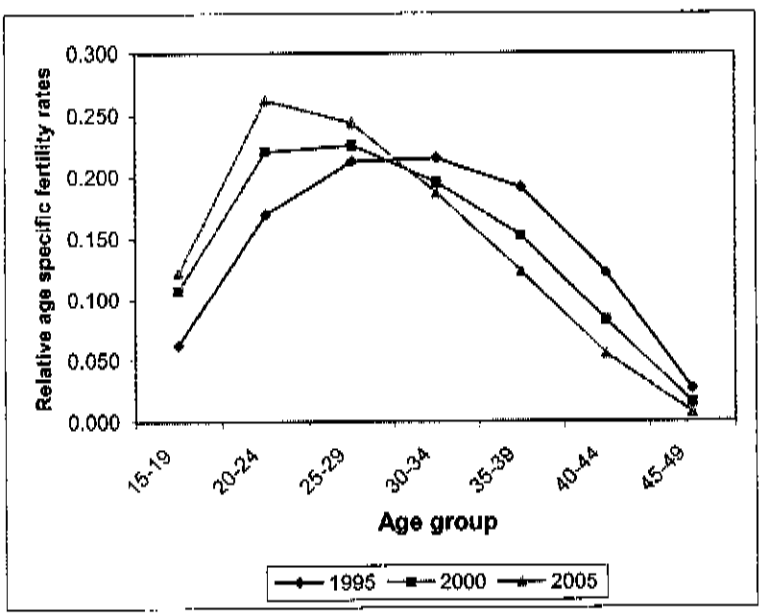


Figure 3 Trend in estimated relative age specific rates (TFR=1), Coloured

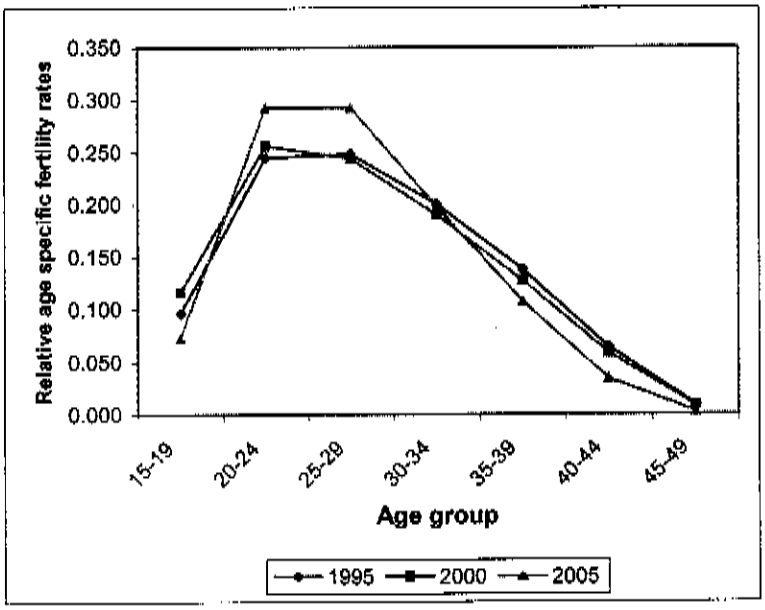


Figure 4: Trend in estimated relative age specific rates (TFR=1), Indian

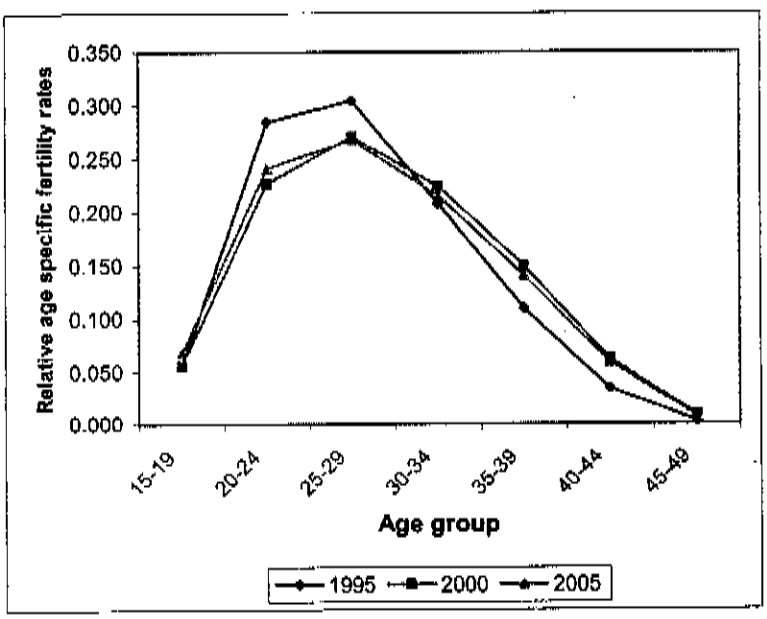
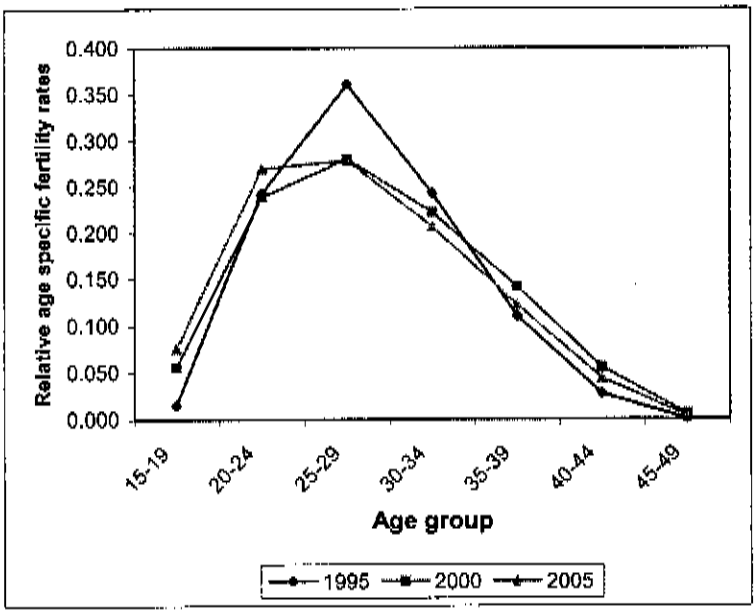


Figure 5: Trend in estimated relative age specific fertility rates (TFR=1), White



Among Africans, as seen in Figure 2 above and Table 4 below, the age distribution of fertility in 1995 was wider. That is, women gave birth over a longer period than in 2000 and 2005. This suggests that a substantial proportion of women had children until late reproductive ages in 1995 whereas a substantial proportion of women ceased to have children in late reproductive ages in 2000 and 2005.

Table 4 TFR and ASFR (15-19) by race

	1995		2000		2005	
	ASFR (15-19) yrs	TFR	ASFR (15-19) yrs	TFR	ASFR (15-19) yrs	TFR
African	45	3.6	65	3.01	73	2.99
Coloured	54	2.8	56	2.54	30	2.05
Indian	28	2.49	27	2.4	30	2.2
White	6	1.99	20	1.8	24	1.59

As Amson et al. (1999) noted, among the different race groups in South Africa the African population tends to have higher childbirth rates at later ages, notably at ages 30-34. Furthermore, although the total fertility rate was higher in 1995 compared to 2000 and 2005, the relative contribution to total fertility by younger women (aged 15-29), relative to older women (aged 30-49), was lower in 1995 than in 2000 and 2005. This means that the age pattern of fertility has become younger over the years. In 1995, women aged 15-29 contributed an estimated 44% to total fertility. This increased to 55% in 2000 and 62% in 2005. In addition, whilst the overall fertility of Africans has been declining over the period, births to teenage women have been increasing. Among all other population groups (Figures 2-5 and Table 4), the overall births to women have also been declining. With the exception of those classified Coloured, births to teenage women have been increasing.

It is noteworthy that in spite of the total fertility rate being low and relatively stable amongst White and Indian women, significant shifts in age-specific fertility towards younger women are observable. The biggest shift has been observed among Africans: the increase in youthful fertility rates has been accompanied by a decline in the fertility rates of older women.

6 TRENDS IN AGE-SPECIFIC FERTILITY RATES BY URBAN/RURAL AND SOCIO-ECONOMIC STATUS

Fertility trends by urban/rural status

Generally, all over the world fertility has been lower in urban than in rural areas. This has also been found to be the case in South Africa (see e.g. Udjo 2003). Urban areas generally are associated with work opportunities that compete with childbearing. In the following section, trends in overall and teenage fertility by urban/rural status for the period 1995 to 2005 are presented.

Figures 6 and 7 and Table 5 show the estimated trends in relative age-specific fertility rates by urban/rural status. Although the estimated total fertility rate has remained more or less constant in urban areas (at about 2.6) since 1995, the age pattern of fertility has been shifting as seen in Figure 6. It would appear from the graph that, proportionately, fertility was higher among women aged between 15-19 and between 20-24 in 2005 than among women of corresponding ages in 1995 and 2000.

Table 5 Trends in age-specific fertility rates and TFR by urban/rural status

	1995		2000		2005	
	ASFR (15-19) yrs	TRF	ASFR (15-19) yrs	TFR	ASFR (15-19)	TFR
Urban	44	2.59	45	2.6	78	2.51
Rural	79	3.96	122	3.68	148	3.39

Figure 6 Trend in estimated relative age specific fertility rates (TFR=1), Urban

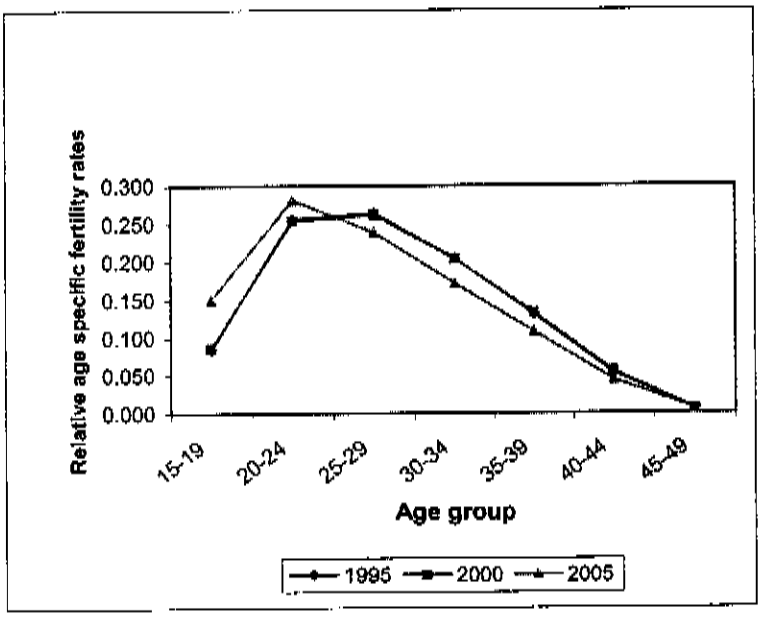
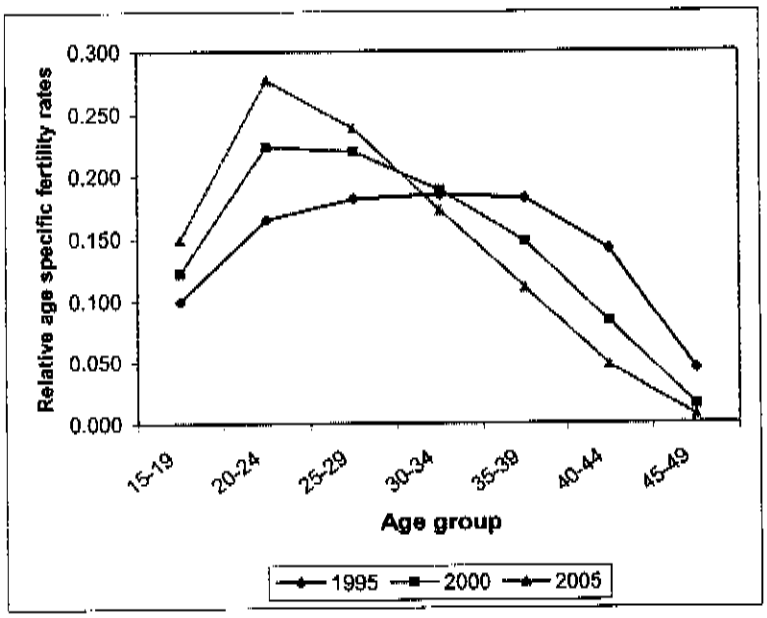


Figure 7: Trend in estimated relative age specific fertility rates (TFR=1), Rural



As seen above in Figure 7, although the model fit to the age pattern of fertility in the rural areas is poor for the year 1995, the curves for the rural areas suggest a trend in the age pattern of fertility similar to the "African pattern" described in Figure 2. That is, a substantial proportion of women in rural areas had children until their late reproductive ages in 1995 whereas a substantial proportion of women preferred to have children at younger ages and stopped giving birth earlier in 2000 and 2005.

The impact of socio-economic status on fertility

Studies that show the relationship between fertility and income level are rare. The main reason for this is related to lack of credible income data from national surveys and censuses. In addition, there are numerous methodological and theoretical complexities that are related to estimating the combined household resource pool from the reported income of individuals who reside in a particular household. Socio-economic status is the most commonly used measure which has a bearing on income level.

In particular, mother's education has been found to be a significant factor in the reduction of fertility in most countries (Freedman 1987:784). Other authors have also emphasised the importance of a husband's education in influencing fertility behaviour in many African societies. In Zimbabwe, a husband's education was found to have a bigger impact than that of a wife (Thomas and Muvandi 1994).

Teenage fertility is also associated with socio-economic status of women. The association between deprivation and teenage fertility is well established in many developed countries (Singh et al. 2001). In addition, countries which have wider socio-economic disparities among developed countries (e.g. United States of America) have been found to have higher level of teenage fertility across all levels of socio-economic strata. Education of women have been found to be negatively associated with teenage fertility in many African countries (Villarreal 1998).

7 TEENAGE FERTILITY

In the United States and other Western societies, where there is an elaborate social welfare benefits system, teenage fertility has become a significant social problem because of the fiscal implications associated with it. In the U.S., UK and other liberal democracies, the debate and controversy surrounding teenage sexual activity in general has been dominated by attempts to claim the moral high ground. Like all other social welfare issues, the line between scientific knowledge on teenage pregnancy and personal values has been blurred, rendering scientific knowledge inconclusive at best. The various studies that have been conducted in these countries can be summarized under the rubric of two main schools of thought. Studies that have been conducted under the model, which, to all intents and purposes, is conservative, have generally found a positive association between availability and access to such social welfare benefits and such non-normative family patterns as divorce, teenage pregnancy, single-parenthood and female headship of households. In other words, from the point of view of such studies, the availability and access to social welfare benefits is the cause of teenage pregnancy. On the other hand, studies that have been done within a liberal framework have generally argued that rather than welfare benefits being the cause of teenage pregnancy, for example, they are the effect of such capitalist features as racial oppression, job discrimination and general social exclusion.

This school of thought has highlighted factors that are related to the lack of educational aspirations, non use of contraception, low self esteem, intra-family conflict etc. as mainly responsible for teenage pregnancy which appears to be selective of teenagers from economically deprived backgrounds. For example, in a three-month study of teenage pregnancy in a Staffordshire hospital, in the UK, it was found that of 113 teenage girls giving birth, only one third claimed they had intended to be pregnant. The same study found that only one of the 57 teenage girls having an abortion had intended to become pregnant (Chambers et al. cited by Tabberer et al. 2000). Tabberer et al. (2000) reported that many of the young women in their sample had not planned their pregnancies.

The introduction of the Child Social Grant in South Africa has stirred similar debates as found in countries with elaborate welfare systems. A

school of thought has developed in South Africa, which claims that the CSG has some perverse incentives, one of which is to encourage women to have more children, especially teenagers.

Teenage fertility, as shown in previous sections, is relatively high in South Africa and has risen slightly recently. A number of authors have attributed this to a number of reasons. They include the fact that the proportion of teenagers who are sexually active is high (e.g. Richter, 1996). There is also a general agreement that the teenage years in South Africa are characterised by generally socially sanctioned freedom and sexual experimentation for both genders, but particularly for young men (Wood and Tenkes 1998). While marriage in South Africa is relatively late, pre-marital sexual activity is common and has become accepted through its very prevalence (Makiwane 1998).

It must be noted, though, that teenage fertility covers fertility of women in a broad year range. The term usually includes pre-teen fertility, which is too small to be given a separate category in fertility analysis. A distinction can also be made between early teenage fertility (ages 15 to 17) and late teen at age 18 to 19. Late teen years are associated with mature age, and may not be of the same concern as under age fertility. With this background the following section looks at the distribution of teenage motherhood by age distribution so as to assess the concentration of child bearing in this group.

The Table 6 below shows that most of the incidence of teenage fertility is concentrated in the age groups from 17 to 19, and rises steeply at age 19.

Table 6 Teenage Motherhood (percentage of women age 15 to 19 who are mothers in 2001)

Age	Number of women who have ever given births per 1000 women
12	0.3
13	0.7
14	1.2
15	3.3
16	7.5
17	13.9
18	22.4
19	30.9

Source Census 2001

A further analysis of Table 7 below shows the trend of pre-teen fertility between 1998 and 2001.

Table 7 Proportion of women aged 15-19 who gave birth before age 15 in year 1998 and 2001

Age Group	1998	2001
15-19	0.60	0.44
20-24	1.60	0.40

Source: 1998 DHS and Census 2001

Table 7 above must be examined with caution, as it compares low incidence events from two different data sets. Table 7 shows that, of the women who were in the age group 15-19, 0.6% gave birth before age 15, a considerable decline from the age group that precedes them, 1.6% of whom gave birth before the age of 15 (see Table 6). Census figures for the year 2001 show a lower incidence of pre-teen births amongst contemporary teenagers than reported by teenagers in 1998. In the year 2001, the 15-19 age group experienced a marginal increase of pre-teen fertility to that of the preceding age group.

Tables 6 and 7 above suggest that high child bearing among teenagers is concentrated at late teen ages, and this pattern has not changed significantly over the period of study.

8 CHILD GRANTS

This section examines first, the distribution of Child Support Grants across South African provinces and among different age groups of recipients. The aim of this section is to make a broad analysis of the distribution of grants, and later compare it with shifts in fertility patterns found in previous sections.

Distribution of recipients of Child Support Grant

Table 8 shows the proportion of children who receive grants in each province. The proportion was compiled by dividing the number of children who received the grant in March 1999 by the projections from Stats SA (2005) of the number of children in the age group 0-7 at mid-year 1999, and estimates for 2005 the number of recipients were divided by the estimated number of children in the age group 0-14.

Table 8 Proportion of children (0-14) who are recipients of the grant in each province

Province	Proportion of children getting grant, March 1999 (%)	Proportion of children getting grant, March 2005 (%)
Eastern Cape	0.30	52.08
Northern Cape	0.82	60.66
Western Cape	0.27	30.80
Mpumalanga	0.08	50.86
Gauteng	0.12	34.63
KwaZulu-Natal	0.26	46.65
North West	0.18	43.70
Free State	0.28	43.06
Limpompo	0.82	52.24
Total	0.27	44.86

Approximately 45% of all children in South Africa receive the child grant in March 2005, from a low 0.27% in 1999. The coverage has been constantly improving each year, up to the current coverage of approximately 45%. The

proportion of children who receive the grant differs significantly according to the province they reside in. The lowest proportion of children who get the grant are found in Metropolitan areas of South Africa, namely the Western Cape and Gauteng. The highest proportion is found in Limpopo and the Eastern Cape. Table 8 above confirms the rural bias of the distribution of the CSG in South Africa.

Table 8 below shows that less than 3% of teenagers have been recipients of the CSG throughout the period of existence of grants. The pattern of age distribution of recipients of child grants did not change in the eight-year period. In contrast, 15% of all births in the same year were to mothers in their teen years. Another noteworthy feature of the Table is that, below age 30, there are fewer CSG beneficiaries than women who gave birth in the year, whereas for those above age 30 there are more beneficiaries. This is in line with the pattern of care giving in South Africa; where older persons are the main caregivers of grandchildren from young mothers and hence qualify receive a CSG in respect of those children

Table 9 Estimated age distribution of persons who were CSG beneficiaries in March, 1998 and March, 2005

Age group	Beneficiaries (%) in March, 1998	Beneficiaries (%) in March, 2005	Percentage fertility contribution of different age groups
15-19	1.64	2.69	15
20-24	14.86	16.61	28
25-29	21.90	21.62	23
30-34	19.24	19.35	17
35-39	18.43	15.11	10
40-44	11.90	10.66	4
45-49	5.87	5.82	0.5
50-54	2.29	3.13	-
55-60	1.93	2.01	-
60+		2.95	-

9 DISCUSSION

In assessing the relationship between South African fertility trends and the CSG, key findings in fertility and CSG patterns are presented and evaluated with the aim of determining whether there could be any association between the observed patterns. The second approach adopted in this discussion is to compare the South African fertility trends with those commonly found in most parts of the world. Evidence that support the influence of the CSG on fertility would include concurrence of the introduction of CSG and an increase in overall fertility and teenage fertility in particular. Further prognoses include examining whether the sub-population responsible for fertility change coincides with the sub-population that is eligible for the CSG. Lastly, discordance between South African fertility trends with those generally found internationally will suggest that the CSG might not be ruled out as having an impact on South African fertility.

The main findings presented in the previous section are as follows:

- There has been a decline in overall South African fertility rate during the period 1995 –2005.
- The largest decline in fertility rates has been among Africans.
- **Early fertility** (pre-teen and early teen years) has more or less remained constant. **Youth fertility** (late teen and early twenties) has increased. **Late fertility** (mid to end of reproductive years) has declined considerably during the period under review. The dramatic reduction in fertility of women who are 35 or older is the main reason for the overall decline in fertility in South Africa.
- On the other hand, women who are 25 years or younger have been giving birth to more children during the period than before.
- This increase in fertility rates of young women has been found in most sub-groups in South Africa including White, Indian, African, rural and urban women.
- An increase in teenage fertility rates has been found in urban than rural areas.

- There has been a shift in African fertility rates towards the younger population. This has arisen as a result of the proportionate decline of fertility rates of older women and a substantial increase of fertility rates among young women.
- The proportionate increase in fertility among young women is concentrated in the late teenage years and early twenties while pre-teen and early teenage fertility rates show no evidence of increase.

On the other hand, the main findings on the patterns of CSG coverage patterns are:

- CSG coverage increased dramatically between 1998 and 2005.
- CSG coverage has a strong rural bias.
- Older women are the main beneficiaries of CSG. Teenage beneficiaries are an exception.

This study concurs with various studies which have shown that fertility rates have been declining in South Africa in the past few decades (e.g. U. S. Census Bureau 2005). The rate of fertility decline is often accompanied by changes in the spread of fertility distribution as well as changes in the location or timing of fertility. As fertility rates decline, the spread of the fertility distribution often becomes narrower while the location or timing of fertility tends towards younger ages - as has shown to be the case in this study.

It is clear from this study, and indeed from other studies that have shown a continual decline in South African fertility (e.g. U. S. Census Bureau 2005), that the presence of the CSG has not resulted in the majority of women having more children than before in order to cash in on the grant - as fertility has continued to decline during the period. As Amson et al. (1999) noted, generally fertility rates can be affected by three phenomena, the start of child bearing, spacing between children, and stopping of childbearing at later ages. This study has confirmed that reduction of family size as shown by older women stopping having children earlier than before is the reason for the reduction in South African fertility. Youth fertility rate have increased marginally during the period of study.

There have also been suggestions that the increase in youthful fertility is a result of the provision of the CSG, presumably because of a lack of understanding of the size of the grant when compared to the cost of raising

a child. The evidence presented in this study shows that the rate of youthful fertility increase is not related to the presence of the Child Support grant for a number of reasons. First, throughout the eight years of existence of the CSG, the direct beneficiaries of the grant who were teenagers has been below 3%. If young people bore children in order to benefit from the grant, it is reasonable to expect a high proportion of teenagers taking advantage of the grant. The data presented above shows by contrast that persons who are 35 years and above, whose fertility has been declining, are more likely to be direct beneficiaries.

Secondly, the increase in youthful fertility is widespread, including sections of the society who would not qualify for the means-tested CSG. Two alternative explanations for the shift towards youthful fertility in South Africa are found in the fertility literature. The first reason is related to an observation by Amson et al. (1999) that fertility patterns in South Africa are against the norm of many sub-Saharan countries, that of peaking at 20-24 years which is different to that of South Africa, which peaks at 25-29 years. A downward shift in South African fertility rates is more likely to be a shift towards patterns similar to other countries in the region. Secondly, the rising share of births to young women is visible in most countries of the world. The general trend, worldwide, is that where fertility rates are lower, the share of births to young women is among the highest. In line with this trend, as the rate of fertility in South Africa is declines, so the rate of fertility among young women is increasing.

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Appendix 1:

The use of the Relational Gompertz Model in estimating total fertility and age-specific fertility rates

The relational Gompertz model has been developed as a means of evaluating and adjusting for errors in fertility distributions obtained from reports of births in the last year before the census/survey, vital registration and/or children ever born (Zaba, 1981). It is a sufficiently rigid model to reveal error deviations but flexible enough to follow the real significant features of the observations, that is to fit good data well but bad data badly (Brass, 1981). The model is an improvement over the original Brass (1968) P/F ratio method in the sense that not only does it reveal error deviations in the data if present, but can also be used to estimate fertility where fertility has been subject to marked trend in recent years. This is because it is not necessary to assume that fertility has been constant in recent years or that reporting error does not vary with the age of the respondent as is the case in the P/F ratio method.

The relational Gompertz model for fertility proposed by Brass (1974) summarized and expressed by Brass (1981) as

$$F(x)/F = A^{Bx}$$

Where F(x) is the cumulated age-specific fertility rates up to age x, F is the total fertility rate. A and B are constants for a particular set of rates that lie between zero and 1. Taking natural logarithms on both sides, the equation can be rewritten as

$$F(x) = F.\, e^{-e^{[\alpha + \beta Ys(x)]}}$$

And Ys(x) is defined as -ln [-ln {Fs(x)/F}] and Fs(x) is a standard cumulative fertility up to age x. α and β are parameters derived from A and B above and measure the location and spread of the fertility distribution for the particular population. The standard series of Fs(x) values have been computed by Booth (1979).

Brass also notes that for most applications, F is not known. Working under

the guidance of Brass, Zaba (1981), using a linear transformation has shown how F can be separated from the estimation of α and β using a Taylor series expansion with β =1. On the basis of Basia's work (often referred to as the ratio method), the equation for fitting the relational Gompertz model to current fertility is given as

$$z(x) - e(x) = \alpha + 0.48\,(\beta - 1)^2 + \beta g(x)$$

where z(x) is defined as; -ln [-ln {F(x)/F(x+5)}].

F(x) is cumulated age-specific fertility rate up to age x and e(x) and g(x) are tabulated standard values while 0.48 is a constant.

Similarly, for mean parities and z(i) defined as

$$-\ln [-\ln \{P(i)/P(i+1)\}]$$

the equation is

$$z(i) - e(i) = \alpha + 0.48\,(\beta - 1)^2 + \beta g(i)$$

where P(i) is the mean parity in the age group 1, and, e(i) and g(i) are tabulated standard values while 0.48 is a constant (see Brass. 1981).

In the application of the model to evaluate and adjust fertility distributions, the z(x) – e(x) or z(i) – e(i) are plotted against the g(x) or g(i) in the case of current and life time fertility respectively. α and β are then calculated from the graph or determined algebraically. If β is not close to 1, the correction term involving $0.48\,(\beta-1)^2$ is applied, thus,

$$\alpha = \text{intercept} - 0.48\,(\beta-1)^2$$

The α and β values are then applied to the standard series of z values to obtain proportional parities and estimates of F. The "best" series of F are averaged to obtain a single estimate of F. The estimated F together with the α and β values applied to the standard fertility cumulants, can then be used to smooth the age pattern of fertility (i.e. the reported age-specific fertility rates) when errors are present in such distributions.