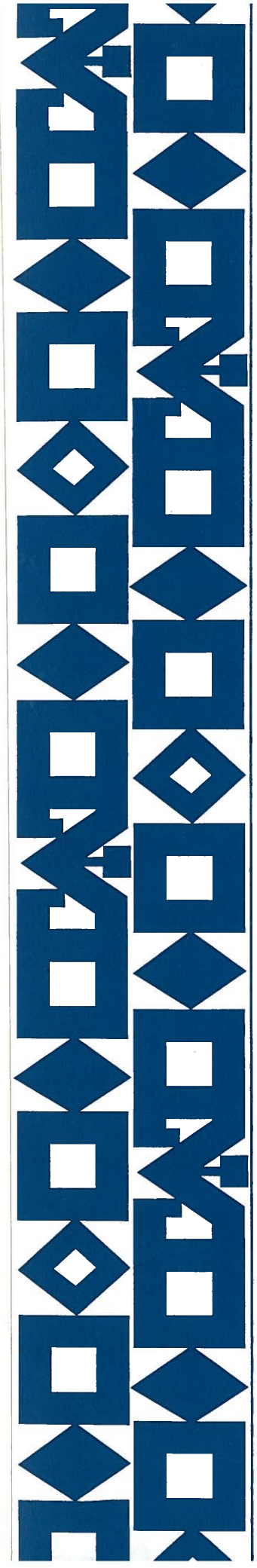

ZIMBABWE FURTHER ANALYSIS

Trends and Differentials in Fertility in Zimbabwe, 1980-1994

DHS
Demographic and Health Surveys
Macro International Inc.

Zimbabwe Further Analysis

Trends and Differentials in Fertility in Zimbabwe, 1980-94: Analysis of the 1988 and 1994 DHS Surveys

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This report summarizes the findings of one of five further analysis projects for the 1994 Zimbabwe Demographic and Health Survey (ZDHS). Macro International Inc. coordinated and provided technical assistance for the further analysis project. Funding was provided by the U.S. Agency for International Development (USAID).

The ZDHS further analysis is part of the worldwide Demographic and Health Survey (DHS) programme, which is designed to collect data on fertility, family planning, and maternal and child health. Additional information about the Zimbabwe further analysis project may be obtained from the Central Statistical office, P.O. Box 8063, Causeway, Harare, Zimbabwe (Telephone: 706-681, Fax: 708-854). Additional information about the DHS programme may be obtained by writing to: DHS, Macro International Inc., 11785 Beltsville Drive, Calverton, MD 20705 (Telephone 301-572-0200 and Fax 301-572-0999).

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Preface

One of the important contributions from the 1994 Zimbabwe Demographic and Health Survey Project is the series of collaborative analyses emanating from the survey. These analyses were funded by USAID/Zimbabwe and are envisaged to inform health and family planning policy development.

A significant objective of the further analysis effort was to facilitate a collaborative link between individuals and institutions in Zimbabwe and researchers working in the international arena. The present paper represents one of the important "fruits" of that investment. It presents the findings of an analysis entitled "Trends and Differentials in Fertility in Zimbabwe, 1980-94" and uses both the 1994 ZDHS data and data from the previous 1988 ZDHS to characterize the downward trend in fertility as well differences in fertility levels and trends among populations subgroups.

We extend our thanks to the Central Statistical Office for collecting the ZDHS data and thus making this analysis possible.

Martin Vaessen
DHS Project Director

Introduction

Since the publication of the results of the 1988 Demographic and Health Survey (DHS), Zimbabwe has been identified as one of the few countries, along with Botswana and Kenya, in sub-Saharan Africa to have experienced a substantial decline in fertility (Cohen, 1993). Recent results of the 1994 DHS indicate an acceleration of the rate of decline. However, the pace of decline, particularly before 1988, has been questioned (Thomas and Muvandi, 1994), a response by Blanc and Rutstein (1994) and a further reply by Thomas and Muvandi (1994)). The extent to which the decline can be regarded as structural, resulting from changes in the educational or other composition of the population of reproductive age, rather than dynamic resulting from changes within population groups, has also been questioned (Thomas and Muvandi, 1994).

This paper presents the results of a further analysis of the 1994 DHS that was not included in the earlier debate. Conducted in the context of other available data it is intended to clarify the major characteristics of fertility decline in Zimbabwe. Muhwava and Timaeus (1996) reach broadly similar conclusions to those presented in this paper.

Data

The primary sources of data used in this analysis are the 1988 DHS and 1994 DHS which were conducted using very similar survey methodologies. A birth history was collected from each woman aged 15 to 49 living in sampled areas, although the 1994 survey collected more extensive data on recent contraceptive use and marital unions. Summary information is also used from the 1982 Census, the 1984 Reproductive Health Survey, and the 1992 Population Census.

Fertility Trends at the National Level

Fertility is often measured in terms of the total fertility rate[1] (TFR) for a particular year or period of years. TFR is a useful measure for trends because it has a particular time reference; it is based on births and person years lived in a particular time period. However, fertility can also be measured in terms of lifetime fertility.[2] Lifetime fertility is not as easy as TFR to interpret in terms of temporal trends because the measures span different time periods, but in settings where fertility is measured using retrospective surveys rather than birth registration data, lifetime fertility has measurement advantages. The most important advantage is that measures of lifetime fertility are unaffected by errors in the reported timing of past births. The most important disadvantage is that failure to report births at all may be most pronounced for the births that occurred the longest time ago to the oldest reporting women. Given possible data quality advantages of lifetime fertility and interpretational advantages of period fertility, both measures will be examined separately, and then the two will be compared for consistency.

A. Lifetime Fertility

Table 1 shows average numbers of children ever born (CEB) reported by women classified by 5-year age groups from six data sources covering the period 1982 to 1994. The 1982 and 1992 censuses, the 1984 Reproductive Health Survey (RHS), and the 1987 Intercensal Survey (ICS) used summary birth history (questions numbers of children ever born) whereas the 1988 and 1994 DHSs used full birth histories. Differences in data collection methodology may give rise to differences in data errors as well.

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[1] The total fertility rate is the number of children a hypothetical woman would bear if she experienced the period's age-specific fertility rates from the beginning to the end of her reproductive life.

[2] Lifetime fertility is the average number of children born alive by women of a particular age, for instance 25-29 or 45-49. It captures the experience of a cohort of women as they pass through various time periods.

Table 1 Lifetime fertility by age group and source: Zimbabwe, 1982-1994

Age group	Average number of children ever born by all women					
	1982 Census[1]	1984 RHS[2]	1987 ICS[3]	1988 DHS[2]	1992 Census[4]	1994 DHS[2]
15-19	0.228	0.303	0.170	0.188	0.189	0.169
20-24	1.466	1.649	1.311	1.299	1.119	1.101
25-29	3.065	3.205	2.983	2.894	2.537	2.364
30-34	4.653	4.631	4.533	4.346	4.021	3.885
35-39	5.878	6.219	5.913	5.537	5.278	5.127
40-44	6.802	7.037	6.770	6.399	6.262	6.078
45-49	7.188	7.464	7.262	6.872	6.738	6.567

Sources:
(1) Central Statistical Office (1985) 10% sample data. Table VI.8.
(2) Tabulations from individual level data files made for this report.
(3) Central Statistical Office (1992) Combined Demographic Analysis. Table 3.2.
(4) Central Statistical Office (1994) Census 1992. Zimbabwe National Report. Appendix Table A8.1.

Taking the average number of CEB of women aged 45-49 as an indication of completed fertility, there appears to have been a decline of slightly more than half a child from the early 1980s to the mid 1990s. For younger women, the declines are as large or larger: average CEB for women aged 25-29 declines from around 3.1 in the early 1980s to around 2.4 by the mid 1990s. The 1982 and 1984 CEB distributions are similar, but from 1984 to 1994, the average CEB declines in almost every age group for almost every period, suggesting a fertility decline at all reproductive ages.

B. Age-Specific Fertility Rates

Table 2 shows age-specific fertility rates for various time periods preceding the data collection exercises reported on here. As with lifetime fertility, the data collection methodology varied between sources. The 1982 Census, 1984 RHS, 1987 ICS, and 1992 Census included questions on the month and year of a woman's most recent live birth. The 1988 and 1994 DHSs, on the other hand, collected full birth histories with dates of birth of every live-born child.

Table 2 Age-specific fertility by age group and source: Zimbabwe, 1982-1994

Age group	Age-specific fertility rates for all women					
	1982 Census[1]	1984 RHS[2]	1987 ICS[2]	1988 DHS[2]	1992 Census[3]	1994 DHS[4]
15-19	0.091	0.131	0.069	0.103	0.099	0.099
20-24	0.258	0.289	0.213	0.247	0.223	0.210
25-29	0.253	0.299	0.240	0.247	0.204	0.194
30-34	0.225	0.263	0.214	0.219	0.177	0.172
35-39	0.165	0.220	0.168	0.160	0.141	0.117
40-44	0.093	0.092	0.084	0.086	0.074	0.052
45-49	0.038	0.011	0.041	0.036	0.026	0.014
TFR	5.615	6.525	5.145	5.490	4.720	4.290

Sources:
(1) CSO (1985) 1982 Census. 10% sample data. Table VI.5.
(2) CSO & Macro Systems (1989) Demographic & Health Survey 1988. Table 3.3.
(3) CSO (1994) Census 1992. Zimbabwe National Report. Appendix Table A8.1.
(4) CSO & Macro International (1995) Demographic & Health Survey 1994. Table 3.3.

The period age-specific fertility rates show little evidence of fertility decline in the 1980s, with TFRs ranging from 5.1 to 6.5 and similar age patterns of fertility. It should be noted, however, that none of the TFR estimates approaches the level of lifetime fertility of more than 7.0 shown in Table 1 for women aged 45-49 in the 1982 Census and 1984 and 1987 surveys. Possible explanations for this difference include: the women 45-49 overreported their lifetime fertility; fertility had already started to fall, so that period fertility was lower than lifetime fertility; errors in locating births in calendar time (or failures to report most recent births) distorted the period fertility estimates. The substantial fluctuations in period fertility for similar time periods from one survey to another suggest that the last explanation mentioned above, of time location errors, is at least partly correct.

The TFR estimates for the 1990s show a clear downward trend, falling as low as 4.3 for the period 1991-94 on the basis of data from the 1994 DHS. Since period fertility estimates for the 1980s appear to be distorted by errors, the apparent decline in the 1990s may also be partly due to error. Comparisons of lifetime and period measures of fertility can illuminate this issue.

C. Comparisons of Current and Lifetime Fertility

Since lifetime fertility measures do not depend on the quality of reporting of dates of events, comparisons of lifetime measures from one survey to the next will not depend on such reporting either. Particular interest attaches to cohort comparisons of one 5-year age group at one survey with the next higher age group at the next survey 5 years later. In the absence of sampling (and age reporting) errors and selection effects, the women for example, aged 25-29 in 1990 are the survivors of the women aged 20-24 in 1985. Changes in their average CEB reflect fertility between 1985 and 1990, but measured in a way that does not depend on the reporting of event dates. A synthetic distribution of lifetime fertility for a specific time period can be built up by summing cohort CEB increments from the lowest age groups to the highest. The synthetic lifetime fertility distribution can then be compared to age-specific fertility rates for the period calculated from births reported for the intersurvey period at the second survey to assess data quality (United Nations, 1983). The age-specific fertility rates are cumulated and interpolated to obtain measures comparable to average parities for women in 5 year age groups.[3] The technique can be applied to the 1984, 1988, and 1994 surveys, since they are separated by periods approximating 5 years. Table 3 shows cumulated parity increments from 1984 to 1988, and from 1988 to 1994, and their comparison to cumulated age-specific rates for the corresponding periods.

The first part of Table 3, comparing 1984 and 1988 data, suggests some inconsistency in reporting lifetime fertility. Women aged 45-49 in 1988 report lower average lifetime fertility than women aged 40-44 in 1984, giving a negative increment in column (1); the increment from 35-39 in 1984 to 40-44 in 1988 is also suspiciously low. Either the 1984 survey overreported average CEB, or the 1988 survey underreported CEB. Either way, the result is a set of period "lifetime" fertility measures in column (2) that fails to rise above age 35, and a series of ratios of period "lifetime" fertility to cumulated current fertility in column (4) that is below 1.0 above age 40 — as low as 0.83 for the 45-49 age group. At younger age groups, however, the ratios are somewhat above 1.0: 1.06 for the age group 20-24, 1.02 for the age group 25-29, and 1.01 for the age group 30-34. The value for the age group 15-19 is not discussed explicitly because it is sensitive to methodological problems, even though it agrees in this case quite closely with ratios for the next higher age groups. The ratios close to unity for women aged 20-34 suggest no major problems with the recording of fertility in the period 1984-88 by the 1988 DHS. The fact that the ratios are slightly greater than 1.0 is consistent with fertility decline over the period: the cumulated parity increments refer to the period 1984-88, whereas the cumulated current fertility rates are for the period 1985-88, thus the former would be higher than the latter if fertility were falling.

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[3] The basic idea is that cumulating age-specific fertility rates for standard 5-year age groups gives implied lifetime fertility at exact ages 20, 25, etc. Interpolation between values for exact ages then approximates average lifetime fertility for women 15-19, 20-24, etc. The interpolation method used here is that from United Nations Manual X (UN, 1983).

Table 3 Period lifetime fertility compared to cumulated current fertility, Zimbabwe, 1984-88 and 1988-94

	Intersurvey CEB increments, cumulated increments, cumulated fertility							
	1984-1988				1988-94			
	Parity increments				Parity increments			
Age group	Cohort	Cumulated	Cumulated fertility	Ratio	Cohort	Cumulated	Cumulated fertility	Ratio
Column #	1	2	3	4	5	6	7	8
Source:	1	Col. 1	2	Cols. 2&3	1	Col. 5	3	Cols. 6&7
15-19	0.188	0.188	0.180	1.05	0.169	0.169	0.176	0.96
20-24	0.996	1.184	1.118	1.06	0.913	1.082	1.013	1.07
25-29	1.245	2.429	2.375	1.02	1.065	2.147	2.035	1.06
30-34	1.141	3.571	3.554	1.01	0.991	3.138	2.967	1.06
35-39	0.906	4.477	4.497	1.00	0.781	3.919	3.689	1.06
40-44	0.181	4.658	5.067	0.92	0.541	4.461	4.096	1.09
45-49	-.164	4.493	5.436	0.83	0.168	4.629	4.268	1.09
TFR		4.52*	5.49			4.66*	4.29	

*TFR calculated as P(45-49)*1.007

Sources:
(1) Table 1.
(2) Tabulations of fertility rates for period 1984-88 from the 1988 DHS made for this report.
(3) Tabulations of fertility rates for period 1988-94 from the 1994 DHS made for this report.

The second part of Table 3 compares 1988 and 1994 data. In this case, there are no obvious inconsistencies in the lifetime fertility data, with all the cohort increments being positive. This consistency between 1988 and 1994 may be an indication that the 1984-88 inconsistencies were due to problems with the 1984 data rather than with the 1988 data. Ratios of cumulated parity increments ("lifetime" fertility) to cumulated period fertility for the period 1988-94 are shown in column (8). With the exception of the ratio for women aged 15-19 (suspect for methodological reasons), these ratios are remarkably consistent, all lying between 1.06 and 1.09. There is a remarkable degree of consistency between the lifetime fertility increments from the 1988 survey to the 1994 survey on the one hand and the cumulated age-specific fertility rates for the period 1991-94 as recorded by the 1994 survey alone. The fact that the ratios are above 1.0 is again consistent with declining fertility since the parity increments cover the period 1988-94, whereas the cumulated current fertility rates refer to the period 1991-94. On the basis of these comparisons, there is no reason to doubt that the TFR was close to 4.7 for the period 1988-94 and close to 4.3 for the period 1991-94.

D. Variations by Education of Mother

One of Thomas and Muvandi's concerns about the fertility decline to 1988 was an apparently erroneous distribution of women by educational category in 1988 (Thomas and Muvand, 1994). A second concern was that a substantial proportion of the decline observed in 1988 could be viewed as "structural" — the result of increasing proportions of better-educated women with lower fertility, rather than the result of fertility decline within education categories. Because almost all women in Zimbabwe complete their education before starting childbearing, education of the mother can be regarded as a permanent characteristic and the analysis presented above for Zimbabwe as a whole can be repeated for educational categories. The three categories used in this analysis are: women with no education, women with primary education, and women with secondary or higher education. Table 4 shows the period "lifetime" fertilities, cumulated reported fertility rates, and their ratios for the three educational categories for 1984-88 in Panel (a) and for 1988-94 in Panel (b).

Table 4 Comparisons of period "lifetime" fertility (P) and cumulated current fertility (F) rates by education of mother. Zimbabwe.

		No education			Primary education			Secondary education		
Age group		P	F	P/F	P	F	P/F	P	F	P/F
(a)	1984-1988									
15-19		0.556	0.417	1.335	0.212	0.290	0.730	0.146	0.116	1.259
20-24		2.254	1.856	1.214	1.578	1.534	1.029	0.730	0.758	0.963
25-29		3.671	3.333	1.102	2.905	2.916	0.996	1.725	1.882	0.917
30-34		5.398	4.823	1.119	4.106	4.139	0.992	2.958	2.832	1.045
35-39		6.568	5.983	1.098	5.561	5.139	1.082	3.897	3.582	1.088
40-44		5.797	6.650	0.872	6.349	5.795	1.096	4.267	3.865	1.104
45-49		5.766	7.324	0.787	7.455	6.043	1.234	4.011	3.879	1.034
Reported TFR			7.43			6.06			3.88	
(b)	1988-1994									
15-19		0.476	0.375	1.268	0.282	0.301	0.937	0.086	0.126	0.683
20-24		1.780	1.551	1.148	1.521	1.415	1.075	0.814	0.841	0.968
25-29		2.817	2.694	1.046	2.608	2.594	1.006	1.918	1.831	1.048
30-34		4.190	3.839	1.091	3.657	3.600	1.016	2.795	2.651	1.054
35-39		4.541	4.758	0.954	4.432	4.426	1.001	3.496	3.327	1.051
40-44		4.719	5.459	0.864	5.041	4.932	1.022	3.670	3.592	1.022
45-49		5.618	5.901	0.952	4.879	5.123	0.952	3.378	3.609	0.936
Reported TFR			5.96			5.14			3.61	

Source: Special tabulations made for this report from the 1988 and 1994 DHS individual data.
Note: P values are cumulated cohort parity increments from 1984 to 1988 or 1988 to 1994.
F values are cumulated period fertility rates interpolated to give averages for age groups. See footnote 3.

It is important to remember that sampling errors may become large for population subgroups, and that both the group of women with no education and the group of women with secondary or higher education are quite small. It is therefore important not to overinterpret results by sub-group. It should also be repeated that results for the age group 15-19 should not be interpreted at all. There are patterns in the results in Table 4 that are not only fairly regular within data sets, but are also repeated across data sets. For women with no education, the P/F ratios for younger women, 20-34, are all above 1.0. The ratios then appear to decrease, being substantially below unity for the age groups 40-44 and 45-49. This pattern cannot be explained by fertility trends, since effects of trends have been removed by using "lifetime" fertility P values constructed from cohort parity increments. The most likely explanation for the observed patterns is that, for this group of women with no formal education, older women are underreporting their lifetime fertility, resulting in downwardly biased Ps, and that younger women (and probably older women too) are underreporting births in the period before the interview, probably by pushing backward in time the birth dates of recently born children. If the recorded TFRs are adjusted by the average P/F ratios for women aged 20-34, the resulting values are 8.5 for 1984-88 and 6.5 for 1988-94. These adjusted values indicate very high fertility, but also a very large decline between the two periods.

Data quality for women with primary education (from grade one to completed primary) appears to be much better. The P/F ratios are very close to 1.0 for women aged 20-34 for the first period (though higher for women aged 35-49) and are close to 1.0 for women aged 25-44 for the second period (though higher for women aged 20-24). The analysis indicates no convincing need for adjustment for this group, and it can reasonably be concluded that TFR fell from about 6.1 for 1984-88 to about 5.1 for 1988-94.

The group with secondary education is the smallest group in 1984, and results are more erratic. For 1984-88, the P/F ratios are below 1.0 for women aged 20-29, then above 1.0 for women aged 30-49, though all the values fall between 0.91 and 1.10, hence inconsistencies are small. For 1988-94, the P/F ratio for 20-24 is below 1.0, the ratios for women aged 25-44 are above 1.0, and the ratio for women over 45 is once again

below 1.0. The patterns have no obvious interpretation in terms of errors in the period fertility data, and may be due to sampling errors or to errors in the reporting of children ever born. The negative parity increment from 40-44 in 1988 to 45-49 in 1994, illustrated in Table 4 by a decline in the value of P from the age group 40-44 to the age group 45-49, suggests a problem with the reporting of children ever born by the older women interviewed, whether systematic or random. The ratios offer no clear indication of a need to adjust the period fertility data. Thus one can conclude that the reported TFRs of 3.9 for 1984-88 and 3.6 for 1988-94, can be accepted. There thus appears to have been only a small decline in fertility over the past decade among women with secondary education.

There are large fertility differentials by female education in Zimbabwe. In the period 1984-88, women with secondary education had period fertility levels about half those of women with no education, and women with primary education were roughly in the middle. Fertility fell from the 1984-88 period to the 1988-94 period, and fell fastest among the women with no education, whose TFR may have dropped by as much as two children. TFR for women with primary education fell by about one child; for women with secondary or higher education TFR fell little, by perhaps one-third of a child.

E. Variations by Residence

Unlike education, residence cannot be regarded as a "permanent" characteristic of a woman, because she can change her residence at any time by migration. Thus calculations of cohort changes for a residence group may be affected by migrations from one group to another. Results are presented in Table 5 for regions of Zimbabwe, defining regions as groupings of provinces, expecting that the magnitude of migration effects will be small at the level of these large regions for periods no longer than about 5 years. The provinces are grouped into four regions: Northern, consisting of Mashonaland East, West and Central; Southwestern, consisting of Matabeleland North and South plus Midlands; Eastern, consisting of Manicaland and Masvingo; and Metropolitan, consisting of the two major cities of Harare and Bulawayo. The regional comparisons can only be made for the period 1988-94, since the 1984 RHS did not define Harare and Bulawayo as separate provinces.

Table 5 Comparisons of period "lifetime" fertility and cumulated current fertility rates by region of residence of mother. Zimbabwe.

	Northern region			Eastern region		
Age group	P	F	P/F	P	F	P/F
15-19	0.190	0.235	0.810	0.135	0.173	0.779
20-24	1.340	1.200	1.116	1.048	1.060	0.989
25-29	2.231	2.304	0.968	2.505	2.251	1.113
30-34	3.234	3.364	0.961	3.597	3.317	1.084
35-39	4.305	4.271	1.008	4.125	4.197	0.983
40-44	4.598	4.862	0.946	4.802	4.740	1.013
45-49	4.511	5.081	0.888	4.710	5.080	0.927
Reported TFR		5.10			5.13	
	Southwestern region			Metropolitan region		
Age group	P	F	P/F	P	F	P/F
15-19	0.227	0.243	0.932	0.120	0.136	0.883
20-24	1.261	1.222	1.032	0.706	0.812	0.869
25-29	2.344	2.401	0.976	1.653	1.678	0.985
30-34	3.447	3.532	0.976	2.702	2.404	1.124
35-39	4.570	4.466	1.023	3.129	2.944	1.063
40-44	5.639	5.144	1.096	3.607	3.190	1.131
45-49	6.471	5.429	1.192	3.079	3.219	0.956
Reported TFR		5.47			3.22	

Source: Special tabulations made for this report from the 1988 and 1994 DHS individual data.
Note: P values are cumulated cohort parity increments from 1984 to 1988 or 1988 to 1994.
F values are cumulated period fertility rates interpolated to give averages for age groups.

For the Northern, Eastern, and Southwestern regions, the comparisons of cumulated cohort changes in lifetime fertility from 1988 to 1994 with cumulated period fertility rates for the same interval show irregularities from age group to age group but show no clear pattern, and average around 1.0 (the average of the ratios for the three age groups 20-24, 25-29, and 30-34 is 1.02 for Northern, 1.06 for Eastern, and 0.99 for Southwestern). This analysis supports the reported fertility levels in these three regions of TFRs about 5.1 in the Northern and Eastern regions, and about 5.5 in the Southwestern region. For the Metropolitan region, consisting of Harare and Bulawayo, however, the measures based on lifetime fertility are lower than those based on period fertility at younger ages, but then become higher at older ages (except 45-49). The ratios still average close to 1.0 for the age range 20-34. There is no satisfactory explanation for the pattern. The low ratios for young women could be due to selective migration of women with no children to the two largest cities, but there is no obvious selection mechanism that would explain the higher ratios for the older women. The analysis indicates no clear need for adjustment, and the TFR of 3.2 for the Metropolitan region for the period 1988-94 is accepted with some reservations.

Patterns of Fertility Limitation

A. National Trends

Major changes in fertility are invariably associated with fertility limitation, that is, voluntary completion of family building before the end of childbearing potential. Parity progression ratios (PPRs), probabilities of continuing on from parity n to parity n+1, provide a sensitive approach to the characterization of family limitation behavior, but can only be calculated for cohorts of women who have completed their childbearing. Pseudo PPRs, probabilities of progressing from parity n to parity n+1 within some specified time interval, typically 5 years, can be calculated using life table methods from birth history data for any group of women. Trends in family limitation can then be inferred by comparing parity progressions across age groups (cohorts) of women. However, such pseudo PPRs, often called B_{60}s, are not directly comparable between age cohorts of women. This noncomparability arises from truncation of experience. Take, for example, women progressing to a third birth. The only women progressing to a third birth among the group of women aged 20-24 at a survey will be rapid childbearers, whereas those progressing to a third birth among women aged 25-29 at the survey will include some additional less rapid childbearers as well. The B_{60} (2 to 3) calculated for women aged 20-24 might well be higher than the B_{60} (2 to 3) calculated for women aged 25-29 because of differential selection.

To avoid the selection problem, Brass and Juarez (1983) suggest comparisons of groups with similar truncations. Thus the B_{60} (2 to 3) for women aged 20-24 at survey would be compared to a B_{60} (2 to 3) for women aged 25-29 at survey, calculated discarding all information for the 5-years before the survey. In other words, the B_{60} (2 to 3) for women aged 20-24 at survey would be compared to a B_{60} (2 to 3) for women aged 25-29 at survey when these women were themselves aged 20-24, with the same truncation as the younger cohort. The resulting ratios reflect changes in fertility behavior from one 5-year birth cohort of women to the next younger cohort, and can thus be interpreted approximately in terms of change over a 5-year period. Since numbers of transitions are quite small, especially at higher birth orders, B_{60} ratios have been averaged across three parity groups: low parity (progressions from 1 to 2 and 2 to 3); medium parity (progressions from 3 to 4, 4 to 5, and 5 to 6); and high parity (progressions from 6 to 7, 7 to 8, and 8 to 9). Results for 1988 and 1994 DHSs are shown in Table 6.

The availability of two birth history surveys separated by about 5 years also provides a set of consistency checks. The B_{60}s calculated for women of a particular age cohort in 1988 should be comparable to the B_{60}s calculated for 5 years before the 1994 survey for women in the age cohort 5 years older. These two groups are from almost the same age cohort, first observed in 1988 and then observed 5 years older in 1994. This comparison is shown in Figure 1 in the form of ratios of 1988 to 1994 values for the three summary parity groups defined above. Note that age groups in Figure 1 run from right (lowest) to left (highest), so that time (the oldest cohorts represent experience the longest time ago) runs from left to right.

Table 6 Probabilities of parity progression by parity group and age cohort

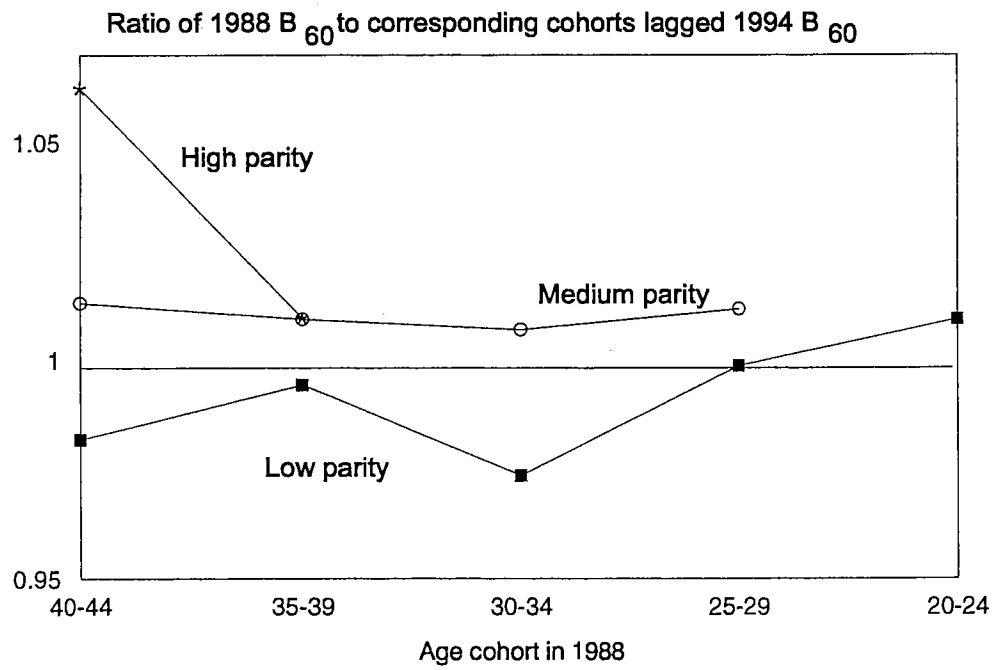
	Age cohort at survey					
	20-24	25-29	30-34	35-39	40-44	45-49
1988 DHS						
Low parity (1-2, 2-3)						
At survey	0.836	0.851	0.855	0.880	0.871	0.881
Five fears before	-	0.870	0.871	0.890	0.881	0.883
Medium parity (3-4, 4-5, 5-6)						
At survey	-	0.842	0.856	0.857	0.849	0.851
Five years before	-	-	0.909	0.890	0.878	0.862
High parity (6-7, 7-8, 8-9)						
At survey	-	-	0.835	0.803	0.804	0.749
Five years before	-	-	-	0.846	0.849	0.779
1994 DHS						
Low parity (1-2, 2-3)						
At survey	0.794	0.763	0.808	0.856	0.877	0.875
Five years before	-	0.811	0.853	0.876	0.884	0.877
Medium parity (3-4, 4-5, 5-6)						
At survey	-	0.724	0.742	0.788	0.822	0.823
Five years before	-	-	0.837	0.859	0.851	0.837
High parity (6-7, 7-8, 8-9)						
At survey	-	-	0.821	0.718	0.685	0.691
Five years before	-	-	-	0.874	0.790	0.756
No Education						
1988 DHS						
Low parity (1-2,2-3)						
At survey	.911	.889	.897	.934	.834	.869
Five years before	-	.873	.898	.940	.853	.873
Medium parity (3-4,4-5,5-6)						
At survey	-	.887	.921	.917	.866	.855
Five years before	-	-	.948	.930	.896	.868
High parity (6-7,7-8,8-9)						
At survey	-	-	.952	.837	.831	.774
Five years before	-	-	-	.668	.848	.818
1994 DHS						
Low parity (1-2,2-3)						
At survey	.931	.806	.882	.905	.901	.888
Five years before	-	.853	.902	.915	.909	.890
Medium parity(3-4,4-5,5-6)						
At survey	-	.723	.819	.864	.867	.865
Five years before	-	-	.827	.914	.886	.879
High parity (6-7,7-8,8-9)						
At survey	-	-	.925	.778	.768	.763
Five years before	-	-	-	.924	.881	.834
Primary Education						
1988 DHS						
Low parity (1-2,2-3)						
At survey	.860	.872	.863	.890	.902	.893
Five years before	-	.879	.883	.900	.906	.894
Medium parity (3-4,4-5,5-6)						
At survey	-	.867	.853	.856	.877	.860
Five years before	-	-	.899	.891	.898	.869
High parity (6-7,7-8,8-9)						
At survey	-	-	.729	.810	.807	.753
Five years before	-	-	-	.843	.865	.776
1994 DHS						
Low parity (1-2,2-3)						
At survey	.809	.826	.835	.857	.884	.884
Five years before	-	.853	.868	.874	.888	.884
Medium parity (3-4,4-5,5-6)						
At survey	-	.754	.753	.781	.830	.826
Five years before	-	-	.864	.852	.858	.840
High parity (6-7,7-8,8-9)						
At survey	-	-	.781	.707	.659	.659
Five years before	-	-	-	.850	.759	.724

Continued

Table 6—*Continued*

	Age cohort at survey					
	20-24	25-29	30-34	35-39	40-44	45-49
Secondary plus education						
1988 DHS						
Low parity (1-2,2-3)						
At survey	.697	.691	.773	.735	.776	.800
Five years before	-	.815	.761	.744	.801	.809
Medium parity (3-4,4-5,5-6)						
At survey	-	-	.717	.731	.555	.697
Five years before	-	-	-	.863	.496	.451
High parity (6-7,7-8,8-9)						
At survey	-	-	-	.659	.520	.399
Five years before	-	-	-	-	.496	.451
1994 DHS						
Low parity (1-2,2-3)						
At survey	.744	.675	.669	.750	.776	.754
Five years before	-	.706	.743	.791	.801	.769
Medium parity (3-4,4-5,5-6)						
At survey	-	.622	.561	.611	.630	.572
Five years before	-	-	.765	.729	.682	.591
High parity (6-7,7-8,8-9)						
At survey	-	-	.647	.509	.578	.603
Five years before	-	-	-	.776	.607	.683

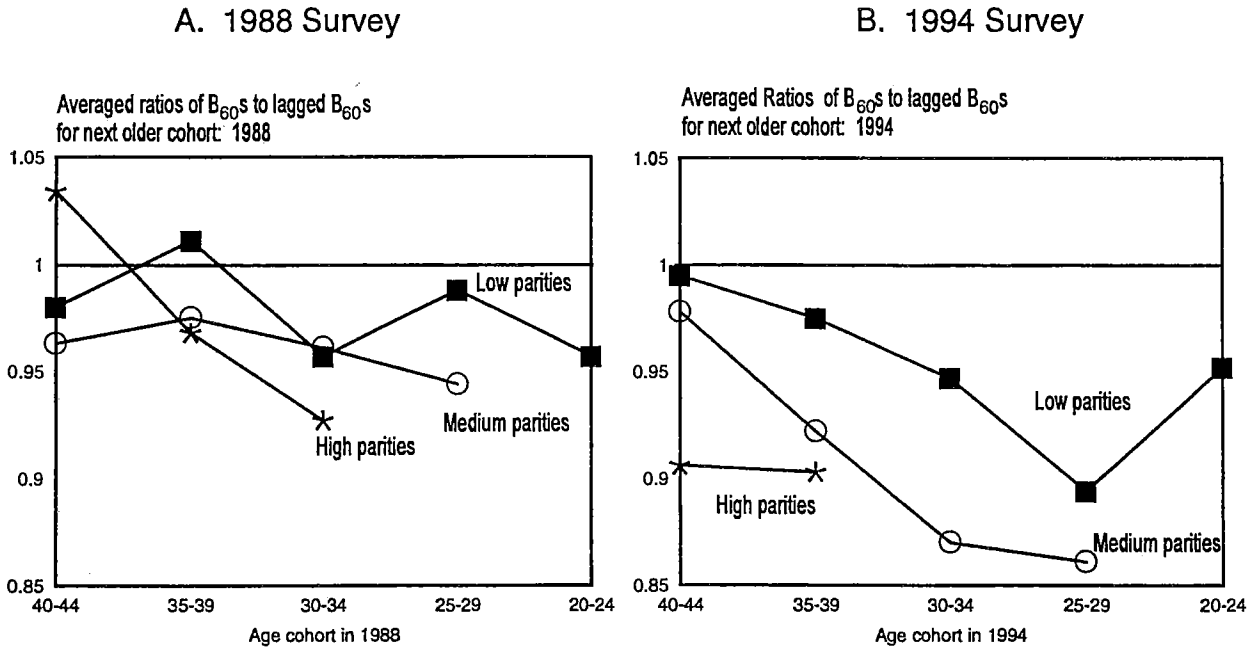
Figure 1 Ratios of B_{60}s for women of a given age cohort in 1988 to the same age cohort in 1994 lagged 5 years: by parity group.



Consistency is not perfect, but is reasonably good. For the low and medium parity groups, the ratios of B_{60}s in 1988 to the 1994 values calculated for the same cohort 5 years earlier are all in the range of 0.97 to 1.02. For high parities, consistency is less good, but the ratios are based on small numbers. These comparisons suggest that parity progressions may have been overreported by women aged 40-44 with high parity, but for most age groups consistency is satisfactory.

Figure 2 shows the ratios of B_{60}s by age cohort to those of the truncated experience of the preceding age cohort for the 1988 DHS (panel A) and for the 1994 DHS (panel B). The differences are clearly visible. In 1988, for low or medium parities the ratios all lie between 0.94 and 1.01, and suggest a slight downward tendency, indicating slight declines, somewhat more pronounced among younger women, in 60-month progressions even at low parities relative to 5 years before. In 1994, the ratios trend steeply downward both for low parity group, dropping to 0.90 for women aged 25-29 (indicating a 10 percent reduction in 60-month progressions even at low parities over 5 years) and especially for the medium parity group, dropping to about 0.86 for women aged 30-34 and 25-29. The ratios for the high parity group are inconsistent for 1988, but still are around 0.90 for 1994, indicating a rapid increase in the stopping of high-parity childbearing from 1988-1994.

Figure 2 Ratios of B_{60}s by age cohort at survey to truncated B_{60}s for preceding age cohort: 1988 and 1994.



In summary, the 1988 B_{60} ratios indicate a small increase in stopping behaviors, particularly for younger women of medium or high parity, but the 1994 ratios indicate large changes over only a 5-year period at all parity levels.

B. Differences by Education Group

Since education is essentially a permanent characteristic of women, fixed before they begin childbearing, trends in B_{60} ratios can be examined by education category and survey year. Given smaller sample sizes within categories, ratios can be expected to be more volatile. Results are given in Table 6.

The 1988 and 1994 B_{60} average ratios for women with no education are shown in Figure 3. In 1988, the ratios fluctuate around 1.0 for all three parity groups, indicating no change in 60-month progressions. The patterns in 1994 are quite different. All the ratios are below 1.0, except for low parity women aged 20-24. The ratios for the medium parity group are below those for the low parity group, and the ratios fall from older age groups to younger. Ratios for the high parity group are all low, around 0.9. There is little indication of fertility decline for women with no education in 1988, but by 1994, even for the lowest parities, there is evidence of reductions in parity progressions, and the reductions are larger for higher parity women.

Figure 3: Ratios of B_{60}s by age cohort at survey to truncated B_{60}s for preceding age cohort for women with no education: 1988 and 1994.

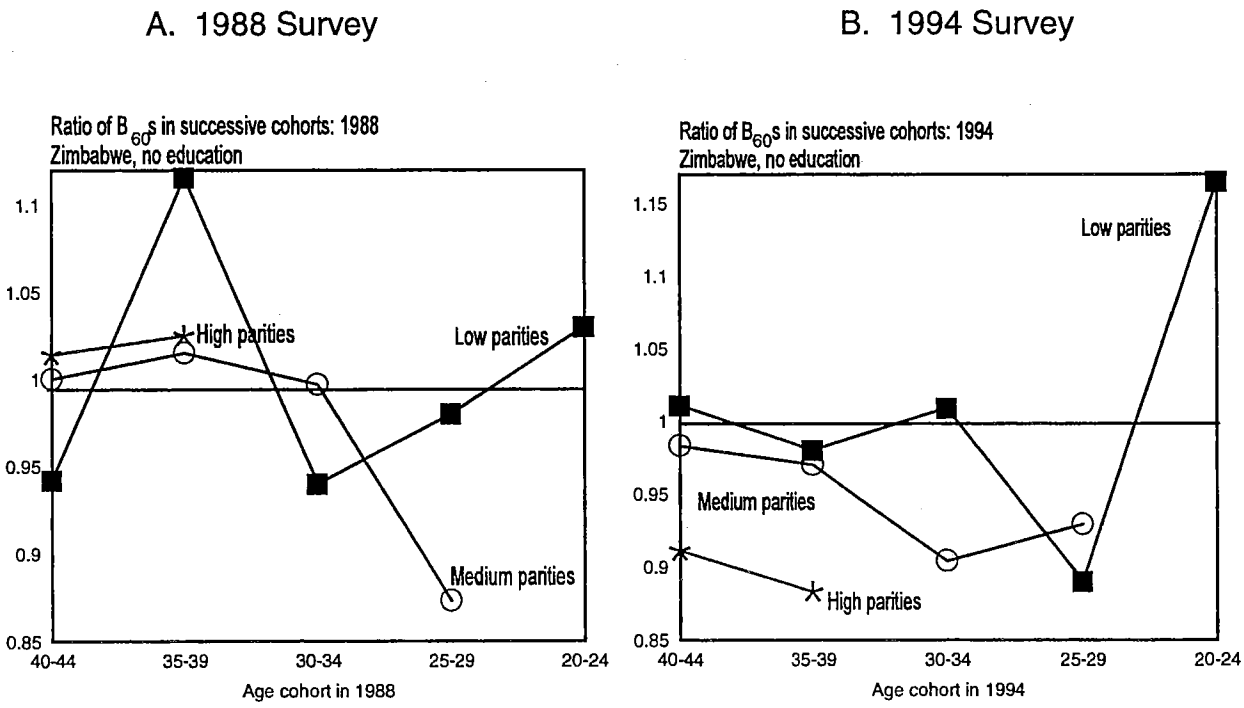


Figure 4 shows ratios for women with primary education. The 1988 ratios suggest a slight reduction of progressions at both low and medium parities. The ratios fluctuate ranging from 0.94 to 1.0. At high parities, there are ratios for only two age groups. The ratio for women aged 40-44 is greater than 1.0, but that for women aged 35-39 is well below 1, suggesting a sharp change in the years prior to the survey. However, no firm conclusions can be drawn from only two observations. The 1994 ratios, by contrast, show gradually declining progressions at low parities, sharply declining ratios at medium parities, of only about 90 percent for the age cohorts 25-29 through 35-39, and ratios around 0.91 percent for high parities for the age cohorts 35-39 and 40-44. Progressions at both medium and high parities for this group of women with primary education have declined sharply, and progressions at low parities appear to be declining slightly.

For women with secondary or higher education (Figure 5), the ratios for 1988 are rather erratic for all parity groups. There is little indication, however, of much change for women in this education category. The ratios in 1994 show little indication of a change in parity progression, except for the ratio of 0.80 for women 40-44 at high parities.

Figure 4 Ratios of B_{60}s by age cohort at survey to truncated B_{60} s for preceding age cohort for women with primary education: 1988 and 1994.

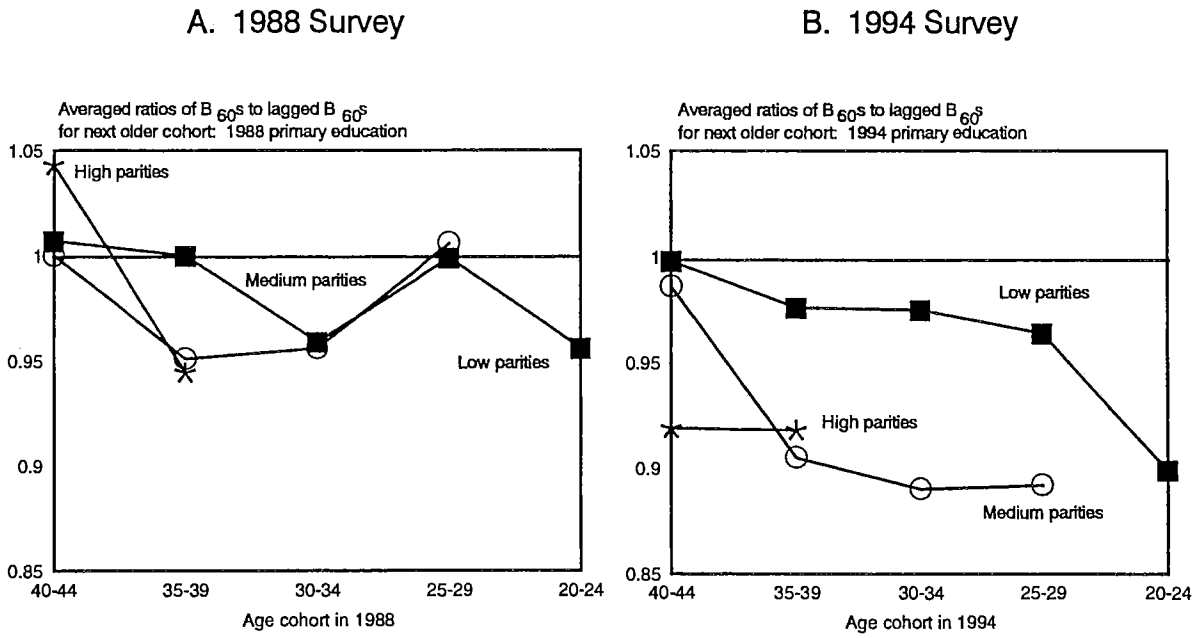
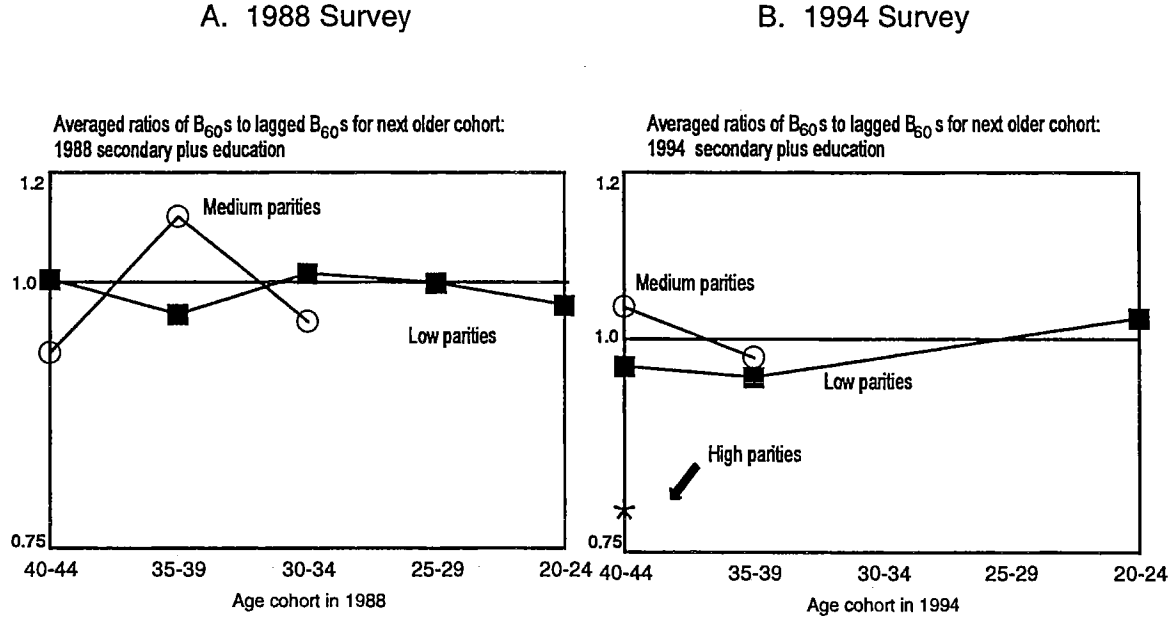


Figure 5: Ratios of B_{60}s by age cohort at survey to truncated B_{60}s for preceding age cohort for women with secondary education: 1988 and 1994.



In summary, this analysis of B_{60}s by education group supports the results of the analysis of parity increments by education group. There have been major changes in stopping behaviors in Zimbabwe, particularly between 1988 and 1994 for women with no education or primary education and medium or high parity. There have been small changes in progressions from parities 1 to 2 and 2 to 3, largely among women with primary education. Women with secondary education, whose total fertility was already below 4 in 1988, show changes similar to those of women with primary education, though rather smaller.

Conclusions

Further analysis of data from the 1994 Zimbabwe DHS, in conjunction with a parallel analysis of data from the 1988 DHS and other sources, confirms that major changes have taken place in fertility in Zimbabwe. By and large, the data are remarkably consistent between surveys, with the exception of some errors for women with no formal education. Based on an analysis of the quality of the birth history data and minor adjustments suggested by the analysis, the total fertility rate is estimated to average about 5.8 in the 4 years before the 1988 survey, and about 4.8 for the 5 years 1988-94. The pace of fertility decline appears to have accelerated between the mid 1980s and early 1990s. The largest changes in fertility were among women with no formal education, while declines for women with secondary or higher education were quite small. Changes in the educational composition of the female population between the mid 1980s and early 1990s account for about one-fourth of the estimated fertility decline, with changes in fertility within education groups accounting for three-fourths of the decline. Regional differences in fertility appear to be slight, though the Southwestern Region seems to have slightly higher fertility than other parts of the country. The metropolitan area, made up of the two largest cities, Harare and Bulawayo, has TFRs of almost two children below those of the other three regions. An analysis of family building patterns indicates that fertility decline has occurred at all family sizes, at least for women with less than a secondary school education, with declining parity progressions even at small family sizes.

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