ANALYSIS OF FAMILY BUILDING PATTERNS IN KENYA WHEN FERTILITY HAS STALLED

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Abstract

The absence of any further decline in Kenya in recent past has alarmed the demographic community. While such phenomenon is not new, it is also possible that the observed fertility as measured by TFR maybe due to flaws in the in distortion of TFR from changes in the timing of childbearing. On the other hand, there may have been a real reversal in fertility decline that could arise from change in fertility preferences. However, tracing fertility trends by traditional measures (such as TFR) in early stages of demographic transition is speculative and uncertain even if data is of good quality. This study uses birth history data from the 1998 and 2003 KDHS to examine trends in family building patterns. The main conclusion is that fertility rates increased among women in the middle age (25-34) for those in parities 4 and 5 but declined for both younger and older women.

Introduction

The fertility dynamics in Kenya has always been a puzzle. The rapid rise in fertility levels in the early periods of 1970s reached TFR of 8.1 in 1978/79 one of the highest in the world was followed by rapid decline in the 1980s reaching a TFR of 4.7 in 1998. The rate of fertility change was about 0.34 births per annum between 1989 and 1993, and 0.14 births per annum between 1993 and 1998 an indication that the rate of fertility decline had been slowing up (Blacker, 2002). Blacker (2002) suggested that total fertility rate in Kenya would level out at about 3 births per woman, but only in the relatively short-term future – say the next 20 or 30 years. This conclusion is supported by the fact that in other countries in the intermediate fertility category such as Bangladesh and Malaysia, fertility declines apparently stalled at about this level.

The 2003 KDHS reported almost the same level as that of 1998 KDHS. The absence of any further decline has alarmed the demographic community. While such observations are not new; countries such as Colombia in 1990s, Bangladesh and the US in 1950s (Bongaarts, 1999) and China in 1986-87 (Luther et al, 1990) also showed similar scenarios. Several sets of questions might be asked? Was the observed fertility as measured by TFR due to flaws in the in distortion of TFR from changes in the timing of childbearing? This fact may arise when observed TFR may be inflated relative to the actual fertility of cohorts of women during the periods when age at childbearing declines for successive cohorts (Bongaarts and Feeney 1998; Bongaarts 1999). Such apparent effect can either affect the TFR observed in 1998 or that observed in 2003. There are other structural issues such as changes due to the distribution of women in the surveys by level of education. The effect of education of fertility is undoubted. Women with higher education have lower fertility and those with low or no education have higher fertility levels. The sample representation of the different proportions of women by various educational levels may cause a significant variation (Thomas and Muvandi, 1994; Sibanda, 1999; Westoff and Cross, 2006). Have there been significant shifts in the distribution of women by level of education across the different DHS samples?

Data on fertility from DHS is obtained from women in the age group 15-49 in each household. Some biases often arise on the misclassification of women in the extreme age groups 15-19 and 45-49. It is plausible that the differences in misclassification (Arnold 1992) between the surveys could be one of the possible sources of the observed trends. The possible under/over representation of young and older women could possible source of the observed trends. Are there possibilities arising from the representation of women who belong to same cohort being over/under-represented at either end of the age distributions in either of the surveys?

Apart from the structural effects, there are possibilities of real reversal in fertility decline that could arise from change in fertility preferences. In addition, there may be possibilities arising from constrained access to contraception the major proximate determinant of fertility in the last decade. Given the above issues it is therefore important to examine the dynamics of fertility in the last decade using indicators that are not likely to be distorted by changes in timing of childbearing (Pandey et al 1997; Brass 2004, Udjo, 1998; Bongaarts 1999, Sibanda, 1999). Tracing fertility trends by traditional measures in early stages of demographic transition is speculative and uncertain even if data is of good quality (Brass, 2004). The fertility dynamics could be influenced by changes in the timing of lower and/or higher order births, child spacing patterns and proportions remaining childless and any other combinations. Previous studies have indicated that birth spacing norms as opposed to stopping were the main driving force in the rapid fertility decline in Kenya (Sibanda, 1999; Otieno, 2000). The analysis of the pace of childbearing (Brass 1995; 2004; Sibanda, 1999; Otieno 2000) supported an earlier assertion that the rise in demand for family planning was for delaying the onset of reproduction and birth spacing rather than for limiting (Caldwell et. al., 1992).

Data and Methods

This analysis uses birth history data from the 1998 and 2003 to examine trends in family building patterns. A simple and robust way to examine these trends is to use parity progression ratios (PPR) (Brass, 1993; Brass and Juarez 1993; Brass 1998). However, PPR is useful for women who have completed childbearing. The DHS samples have data for women aged 15-49 majority of whom have not completed their childbearing. The birth history thus represents the trajectory of reproduction for women with incomplete history. When parity progression ratios are computed, they will be incomplete. Furthermore, effects of censoring, truncation and selection have to be accounted for. A simple measure following Rodriguez and Hobcraft (1980) is to use incomplete parity progression ratios (Brass, 1983; Brass and Juarez 1983). This is the proportion of women of parity p-1 who move to the next parity p within n months (B_n) by standard life table methods. Empirical studies (Rodriguez and Hobcraft 1980; Brass and Juarez 1993; Brass 1998) show that a convenient summary measure is when n is 60 months (B_{60}). Although B_{60} describes the intensity of childbearing (quantum), it approximates to the parity progression ratios. The speed of reproduction (tempo) can be described by the average duration between the $(p-1)^{th}$ and p^{th} birth often measured by the median. A more refined measure is however the conditional mean called the trimean[1] since the median is influenced by both those who go to the next parity and those who don't (open intervals).These measures combined have been described as robust (Rodriguez and Hobcraft, 1980).

Preliminary Analysis of trends in family Building patterns

Tables 1a and 1b (annex) shows the trends in family building patterns without controlling for age for 1998 and 2003 KDHS respectively. The data is restricted

[1] The trimean is computed by first normalizing the proportions who progress to the next parity within 60 months to 1. Using the normalized values, new quartiles (q_1,q_2,q_3) are computed. The trimean equals $(q_1+2q_2+q_3)/4$.

between periods 1981 - 93 for 1998 KDHS and 1986 - 2003 for the 2003 KDHS respectively. The trends in B60s appear consistent except for some slight aberrations. What is noticeable is the change in quantum especially at lower and middle parities in the late 1980s. The proportion moving from one parity to another in the lower parities (1 to 2, 2to 3) declined from about 90 percent to slightly below 80 percent. These declines were more prominent from the 2003 birth history data.

Figures 1 and 2 are derived from the data in the annex and are restricted to 5 and 10 years prior to survey date. PPRs were lower for the 2003 data except for parity 2 to 3 and parity 6 to 7 respectively. The smoothened 10 year data however show that PRRs declined overall from the 1998 to 2003 data.

Figure 1: parity progression ratios (PPRs) restricted to 5 years prior to survey.

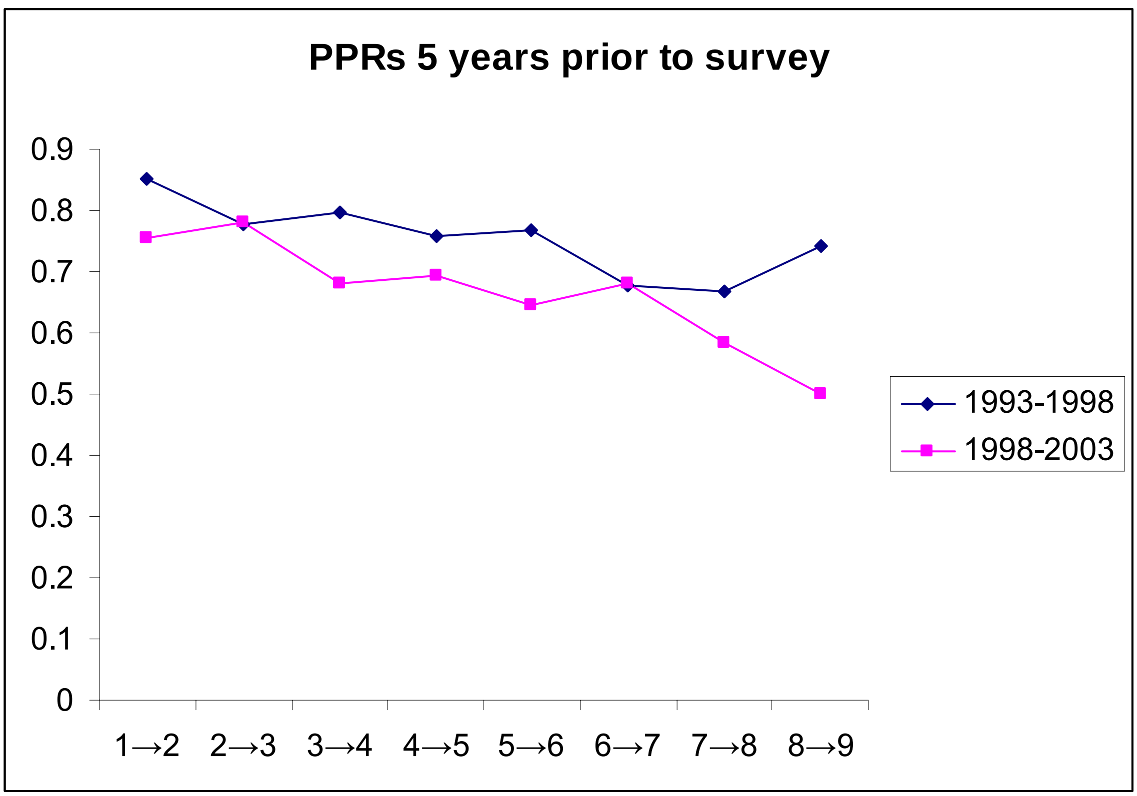
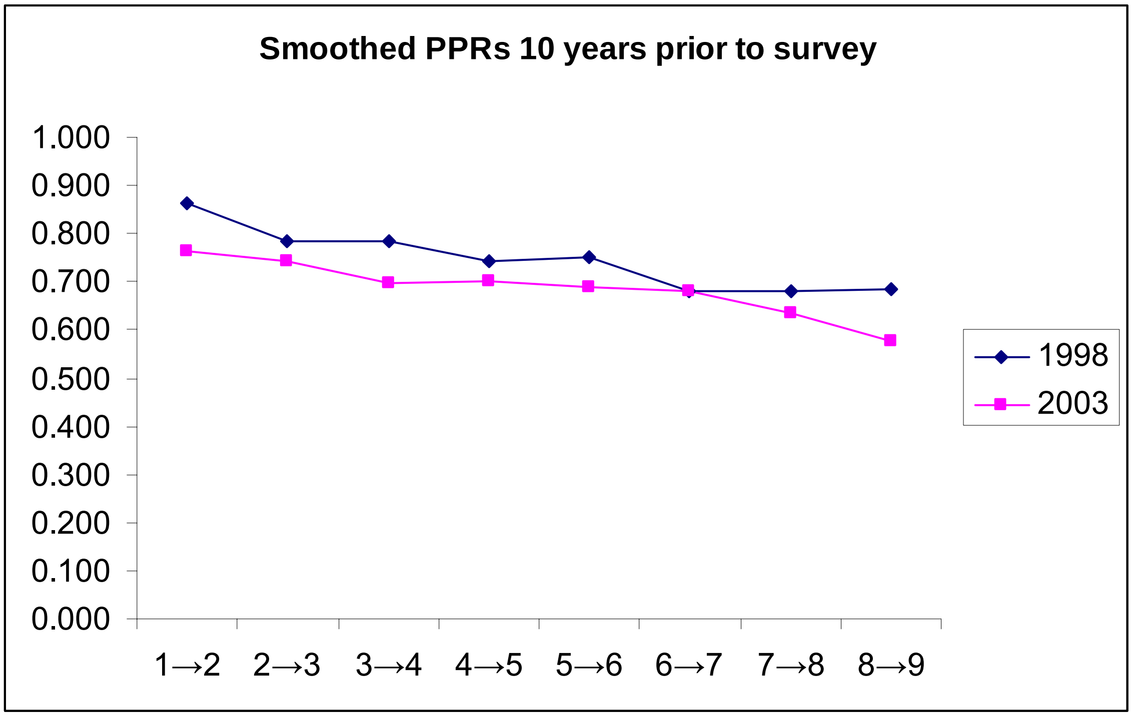
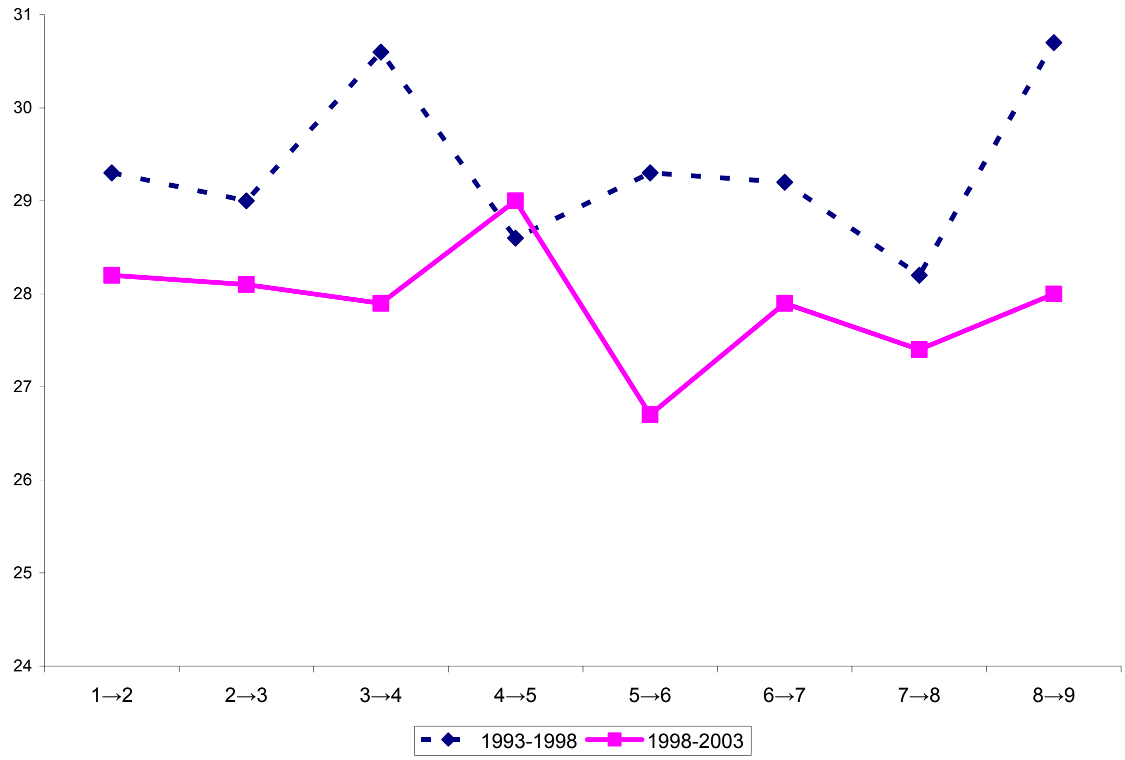


Figure 2: Smoothed PPRS 10 years prior to survey date.



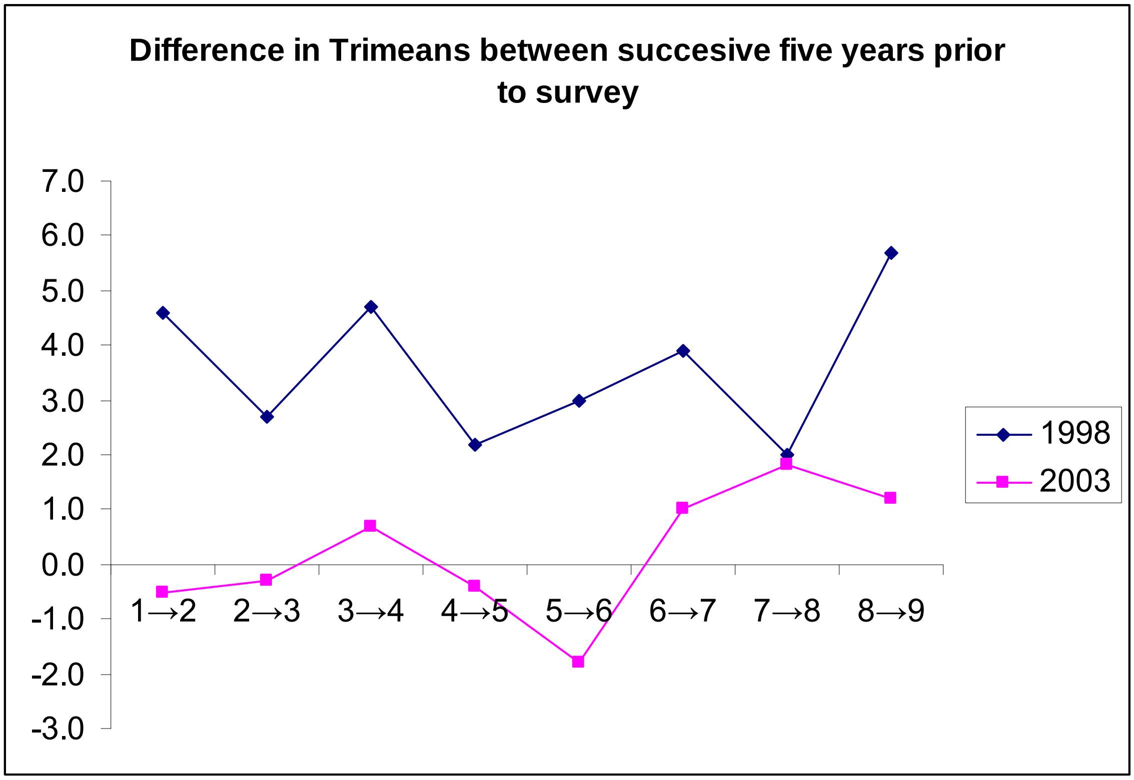
However, when the pace of reproduction is considered (measured by the trimeans), the period immediately before the 1998 KDHS shows a higher average birth intervals (average of 29 months) compared to only 28 months from the 2003 KDHS (see tables 1a and 1b in annex). The results for the average birth intervals are indicated in figure 3. The average birth intervals are consistently higher from the 1998 data except for parity 4 to 5. This implies that those who ever progressed to the next birth did it much faster than the earlier group.

Figure 3: Average birth Intervals (in months) for those who ever progress to the next parity (Trimean) by parity



At earlier periods higher proportion moved to the next parity but longer birth interval (for those who ever moved) compared to the 2003 where slightly lower proportions progressing but among those who progressed the birth interval was much shorter. However, from tables 1a and 1b in the annex there were large differences in the average birth intervals between the intervals measured from the 5 years prior to survey date and 5-10 years prior to survey date for the 1998 data (These results are indicated in figure 4 below). The large differences for the 1998 data may be indicative of displacements in reported dates of births at the 5 year period prior to survey date. For the 2003 data, this was minimal giving an average difference of 0.2 years compared to 3.6 years for the 1998. Possible reasons may be that the interviewers may have shifted birth dates to avoid asking the health questions that pertained to children born in the last five years compared to the 2003 where it was restricted to 3 years prior to survey.

Figure 4: Differences in Trimeans (in months) for 0-5 and 5-10 years prior to survey date.



Analysis of Period and Cohort changes

Although incomplete parity progression ratios are suitable for analysis of childbearing behaviour, there is a significant problem (Brass, 1998, Hill and Marindo 1997). B_{60}s are not directly comparable across cohorts because of truncation of experience. Values for the younger cohorts are biased because the women who have attained any birth order are overweighted by the faster breeders. Brass (1998), Brass and Juarez (1983), suggest comparisons of groups with similar truncations. B_{60} from birth order 2 to 3 for women aged 20-24 at the time of survey compared B_{60} for women aged 25-29 at survey discarding all information for 5 years before survey. B_{60} calculated for women of a particular age cohort in 2003 could than be compared with B_{60} calculated 5 years before 1998 survey for women in the age cohort 5 years older.

Cohort Trends

Tables 2a and 2b presents the trends in B_{60}s relative to the oldest cohort (age group 45-49) to determine the relative changes in family building patterns. From the 1998 birth history data (Table 2a) there is a clear and consistent pattern of declines in the progressions among the younger cohorts compared to the oldest cohort except for age cohort 40-44 at higher order births (6-7 and 8-9). The trends show similar patterns as computed by Brass et al (1997) andBrass 2004 from the 1993 KDHS. There are quite regular in the sense that younger cohorts were less likely to proceed to the next birth parity cohort indicating reduced family building.

Table 2a: Trends in parity progressions by cohorts relative to age group 45-49 (1998 KDHS)

	1→2	2→3	3→4	4→5	5→6	6→7	7→8	8→9	9→10
15-19	904								
20-24	894	934							
25-29	916	893	919	898	911				
30-34	952	930	919	902	918	979			
35-39	976	973	954	925	950	994	948		
40-44	993	993	984	974	997	1017	959	1025	980
45-49	1000	1000	1000	1000	1000	1000	1000	1000	1000

Note the relative rates have been multiplied by 1000 to remove the use of fractions. Values higher than 1000 indicate increase in the proportion progressing compared to the cohort 45-49 for that parity

Data derived from the 2003 however does not show a clear decline compared to that of 1998(Table 2b). At low parities (1-3) there is a consistent monotonic decline in the proportion going to the next birth. However, some slight increase can be noticed at age 15-19 for parity 1-2 and for age 20-24 for parity 2-3 (these being changes that occurred immediately prior to the survey date). The most significant change is that of movement from parity 4 to 5 and 5 to 6 among the age cohorts 25-29 and 30-34 respectively. The results show that among these age groups who had attained parity 4 or 5 were more likely to have another birth compared to the oldest cohort at the same parity group. There was an increase in the tendency to have the next birth in the more recent period (data along the diagonals).

Table 2b: Trends in parity progressions by cohorts relative to age group 45-49 (2003 KDHS)

	1→2	2→3	3→4	4→5	5→6	6→7	7→8	8→9	9→10
15-19	970								
20-24	915	921							
25-29	916	881	970	1014	1153				
30-34	930	882	935	1016	1035	964			
35-39	979	886	902	917	932	974	1009		
40-44	1009	983	951	965	970	925	989	1098	997
45-49	1000	1000	1000	1000	1000	1000	1000	1000	1000

Note the relative rates have been multiplied by 1000 to remove the use of fractions.
Values higher than 1000 indicate increase in the proportion progressing compared to the cohort 45-49 for that parity

Period Trends

An approximate representation is by organizing the measures by the diagonals of the age cohort tables. Progression from birth order 1 to 2 for cohort 20-24 years at the survey is roughly located five years after the corresponding transition for the age group 25-29 and ten years after 30-34 age groups respectively. Moves in 2.5 years can be allowed by averaging the B_{60}s in successive age groups (Brass 1997). The progression ratios can then be compared with that for the earliest period for which information can be computed (The figures are multiplied by 1000 to remove fractions). Values lower than 1000 indicate decline while values greater than 1000 indicate an increase. Tables 3a and 3b compares the trends by time periods (rearranged by time location). The origin represented by zero has been taken at the most recent age cohort for which the measures can be calculated. Tables 3a and 3b show the trends rearranged by time location.

Table 3a indicates a clear monotonic decline for most of the parities (especially the middle). Although some slight upsurge can be noticed at low order parities such a movement might just be due to sampling variations. But from the Table 3b (2003 data), a clear pattern emerges of recent upsurge especially among the parity cohorts 4 and 5.

Table 3a: Trends in parity progressions by time periods (1998 KDHS)

	Years from survey time										
parity	0		5		10		15		20		25
1-2	911	905	900	912	923	941	958	970	982	991	1000
2-3	938	917	896	915	933	955	976	986	997	1000	
3-4	919	919	919	937	954	969	984	992	1000		
4-5	910	912	914	925	937	962	987	1000			
5-6	914	917	921	937	953	976	1000				
6-7	971	979	986	997	1008	1000					
7-8	948	954	959	980	1000						
8-9	1026	1013	1000								
9-10	980	990	1000								

Table 3b: Trends in parity progressions by time periods (2003 KDHS)

	Years from the survey time										
Parity	0		5		10		15		20		25
1-2	961	934	907	907	908	915	922	946	970	985	1000
2-3	929	909	889	889	890	891	893	942	991	1000	
3-4	970	952	935	918	902	926	951	975	1000		
4-5	1032	1033	1034	983	933	958	982	1000			
5-6	1189	1128	1067	1014	961	980	1000				
6-7	1001	1007	1012	987	961	1000					
7-8	1009	999	989	995	1000						
8-9	1098	1049	1000								
9-10	997	999	1000								

The time location can be restricted to some 10 or 15 years prior to survey as to have comparisons for the most recent times. Table 4 shows the changes when in the B_{60}s of different orders over 10 years from survey for both 1998 KDHS and 2003 KDHS respectively. For the 2003, similar changes comparing 5 to 15 years have also been made simply to compare the two data sets. A trend that emerges is that while in the 10 years prior to 1998 there were declines in parity progressions ratios but in the 2003 there were slight increases across all parity cohorts. When the results are restricted to comparable periods with that of 1998 (5 to 15 years in lower row) there is lack of correspondence especially at parity 4 and 5. Evidence presented here indicates an increase in PPRs at parity 4 and 5 and particularly for age groups 25-34.

Table 4: Proportional changes in parity progressions over 10 years

		1→2	2→3	3→4	4→5	5→6	6→7	7→8
1998	0to 10 yrs	987	1005	962	971	960	963	948
	% change	-1	1	-4	-3	-4	-4	-5
2003	0to 10 yrs	1059	1045	1075	1106	1237	1042	1009
	% change	6	4	8	11	24	4	1
	5to 15 yrs	984	995	983	1052	1067		

Conclusion

One clear conclusion from the family building patterns is that there was an increase in the tendency to have additional births for women of parity 4 and 5 in the recent times. This corresponded to women in the age groups 25-34. There were declines at higher order births and also among the elderly women. The decline in the propensity to enter into motherhood for younger women and decline in birth rate among the older women may have been compensated by the increased birth rate among women in the middle age and those in middle parities leading to a stall in further fertility decline in Kenya. The key question is: did this change occur due to change in the desired family size among these cohorts of women or was it due to lack of appropriate contraception?

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ANNEXES

Table 1a: Trends in birth spacing patterns (1998 KDHS)

Birth order transition	Summary measure	Period at start of interval		
		1993-98	1987-92	1981-86
1-2	B_{60}	0.851	0.878	0.916
	Median	34.8	32.7	29.0
	Trimean	29.3	24.7	24.1
	Number initially at risk	1461	1122	972
2-3	B_{60}	0.779	0.787	0.896
	Median	36.6	33.5	29.0
	Trimean	29.0	26.3	25.3
	Number initially at risk	1144	1138	1017
3-4	B_{60}	0.796	0.775	0.876
	Median	37.3	32.8	28.4
	Trimean	30.6	25.9	24.5
	Number initially at risk	856	990	856
4-5	B_{60}	0.759	0.730	0.853
	Median	38.0	35.3	29.1
	Trimean	28.6	26.4	24.5
	Number initially at risk	671	845	700
5-6	B_{60}	0.768	0.733	0.843
	Median	36.7	34.4	28.6
	Trimean	29.3	26.3	24.1
	Number initially at risk	536	677	566
6-7	B_{60}	0.678	0.684	0.823
	Median	39.4	36.3	29.8
	Trimean	29.2	25.3	24.2
	Number initially at risk	437	553	429
7-8	B_{60}	0.667	0.695	0.812
	Median	38.8	36.2	29.5
	Trimean	28.2	26.2	24.7
	Number initially at risk	305	403	303
8-9	B_{60}	0.741	0.627	0.778
	Median	38.8	38.1	30.0
	Trimean	30.7	25.0	24.1
	Number	239	279	180

	initially at risk			
9-10	B_{60}	0.733	0.565	
	Median	55.5	49.0	
	Trimean	36.6	26.7	
	Number initially at risk	170	200	

Table 1b: Trends in birth spacing patterns (2003 KDHS)

Birth order transition	Summary measure	Period at start of interval		
		1998-2003	1992-1997	1986-1991
1-2	B_{60}	0.756	0.768	0.854
	Median	35.8	36.0	32.0
	Trimean	28.2	28.7	27.2
	Number initially at risk	1520	1299	1032
2-3	B_{60}	0.781	0.705	0.796
	Median	34.8	39.0	32.8
	Trimean	28.1	28.4	27.0
	Number initially at risk	1168	1035	877
3-4	B_{60}	0.682	0.716	0.790
	Median	37.4	36.9	33.4
	Trimean	27.9	27.2	27.3
	Number initially at risk	927	766	713
4-5	B_{60}	0.693	0.713	0.756
	Median	41.6	38.6	35.1
	Trimean	29.0	29.4	27.4
	Number initially at risk	645	630	548
5-6	B_{60}	0.644	0.735	0.728
	Median	36.7	37.4	34.0
	Trimean	26.7	28.5	26.5
	Number initially at risk	446	498	404
6-7	B_{60}	0.680	0.677	0.734
	Median	36.9	37.6	34.2
	Trimean	27.9	26.9	27.0
	Number initially at risk	353	344	305
7-8	B_{60}	0.584	0.682	0.775
	Median	42.6	39.0	33.6

	Trimean	27.4	25.6	26.7
	Number initially at risk	259	242	182
8-9	B_{60}	0.499	0.656	0.658
	Median	-	37.7	40.5
	Trimean	28.0	26.8	29.4
	Number initially at risk	178	160	111
9-10	B_{60}	0.643	0.605	-
	Median	35.1	44.3	-
	Trimean	23.3	27.1	-
	Number initially at risk	95	114	-