PERIOD AND COHORT DYNAMICS IN FERTILITY NORMS AT THE ONSET OF THE DEMOGRAPHIC TRANSITION IN KENYA 1978–1998

R. G. WHITE, C. HALL and B. WOLFF

Journal of Biosocial Science / Volume 39 / Issue 03 / May 2007, pp 443 - 454
DOI: 10.1017/S0021932006001416, Published online: 17 May 2006

J.biosoc.Sci, (2007) **39**, 443–454, © 2006 Cambridge University Press
doi:10.1017/S0021932006001416 First published online 17 May 2006

PERIOD AND COHORT DYNAMICS IN FERTILITY NORMS AT THE ONSET OF THE DEMOGRAPHIC TRANSITION IN KENYA 1978–1998

R. G. WHITE*, C. HALL* AND B. WOLFF*†

**Centre for Population Studies, London School of Hygiene and Tropical Medicine and*
†Medical Research Council Programme on AIDS, Uganda Virus Research Institute, Uganda

Summary. A characteristic of African pre-transitional fertility regimes is large ideal family size. This has been used to support claims of cultural entrenchment of high fertility. Yet in Kenya fertility rates have fallen. In this paper this fall is explored in relation to trends in fertility norms and attitudes using four sequential cross-sectional surveys spanning the fertility transition in Kenya (1978, 1984, 1989 and 1998). The most rapid fall in the reported ideal family size occurred between 1984 and 1989, whilst the most rapid fall in the total fertility rate occurred 5 to 10 years later, between 1989 and 1998. Thus these data, spanning the fertility transition in Kenya, support the traditional demographic model that demand for fertility limitation drives fertility decline. These data also suggest that the decline in fertility norms over time was partly a period effect, as the reported ideal family size was seen to fall simultaneously in all age cohorts, and partly a cohort effect, as older age cohorts reporting higher ideal family sizes were replaced by younger cohorts reporting lower ideal family sizes. These data also suggest that a new fertility norm of four children may have developed by 1989 and continued until 1998. This is consistent with, and perhaps could have been used to predict, the stall in the Kenyan fertility decline after 1998.

Introduction

In Notestein's original formulation of the demographic transition, individuals in high fertility societies are prisoners to the views, attitudes and actions of the society in which they live: the 'fertility props' (Notestein, 1953) that would slow down any change in fertility. Theoretical developments in the last few decades, particularly in anthropology, have increasingly emphasized the porous and shifting nature of social norms and the important role of individual negotiation in the subtle but continuous process of redefining social codes of behaviour (Hammel, 1990; Lockwood, 1995). In

Table 1. Survey questions to estimate ideal family size: Kenya Fertility Survey (KFS), 1978; Kenya Contraceptive Prevalence Survey (KCPS), 1984; Kenya Demographic and Health Survey (KDHS), 1989 and 1998

Survey	Questions
'Ideal fertility' questions (used for estimation of ideal family size)	
KFS and KCPS	(Same question to all women) 'If you could choose exactly the number of children to have in your entire life, how many would that be?'
KDHS	(Question for zero parity women as above; question for others as follows) 'If you could go back to the time when you did not have any children and choose exactly the number of children to have in your entire life, how many would that be?'
'Desire to stop' questions	
KFS	'Would you like to have another child sometime?'
KCPS	'Do you want to have children in the future?'
KDHS	'Would you like to have another child, or would you prefer not to have any more children?'
'Desire to space' questions (the KFS did not contain a fertility spacing question)	
KCPS	'If it were entirely up to you when would you prefer to have your next (first) child?'
KDHS	'How long would you like to wait from now until the birth of another child?'

structural–functionalist theory, in which classic demographic theory is rooted, adherence to social norms is viewed as a non-negotiable condition of a group membership, to the degree that social norms and individual behaviour were almost identical (Lockwood, 1995). There are differing views on the shift to controlled fertility practices as being either a new, but still society maintained, small family norm, or liberation of general views to allow the freedom of individual choice. Bledsoe *et al.*'s work, for example, has demonstrated that 'natural fertility' patterns found in the Gambia hide deliberate and widespread attempts to manipulate fertility directly or indirectly – extending to the strategic use of modern contraception (Bledsoe *et al.*, 1994, 1998).

An independent, but closely related issue, is how best to measure fertility norms. The standard survey instrument frequently used to estimate fertility norms is a question originally developed for the World Fertility Survey core questionnaire: 'If you could choose the exact number of children you could have in your whole life, how many would that be?' This formulation received criticism at both methodological and theoretical levels and the question was subsequently rephrased for the Demographic and Health Surveys as shown in Table 1. Most prominent amongst the theoretical critics is Caldwell who described the approach as misdirected at least if not completely invalid (Caldwell, 1985). If elder males exert the strongest influence on fertility behaviour, then the preferences of women of childbearing age will be a weak predictor.

On a methodological basis, the question assumes a certain level of numeracy (Van de Walle, 1992), while the phrasing of the question may test the limits of respondents, unused to hypothetical reasoning. It also leaves open to interpretation whether fertility ideals reflect the current material and reproductive constraints facing the respondent, or if these too are being idealized, i.e. 'If I had $1,000,000 and unlimited childcare, how many children would I have?' (Lightbourne, 1985). From this perspective, shorter and less abstract questions about whether the respondent wants any more children would be more reliable indicators of individual fertility intentions, although not fertility norms. A final methodological weakness is the demonstrated tendency of respondents to rationalize existing family size. In Costa Rica, for example, Stycos found that ideal family size increased for 72% of women in a panel study who had experienced a birth between the first and second enumeration (cited in Lightbourne, 1985).

The ideal family size measure has proved to be a reliable indicator of current fertility demand as well as an indicator of future fertility trends since collection began nearly three decades ago (Freedman *et al*., 1975; Hermalin *et al*., 1979; Tan & Tey, 1994; Westoff, 1994). The generally high average ideal family size in many sub-Saharan African settings, for example, has been used to challenge the classic demographic assertion that high fertility reflects a biological imperative for community survival, rather than individual desires; and that most families would choose moderate fertility given the option (Mason, 1997; Cleland, 2001). Urban/rural differentials in the ideal family size in pre-transitional and transitional settings are reliably matched by differences in the total fertility rate, and the reported desired family size declined with the actual family size where sequential surveys have been collected (Rutstein, 1998). To the extent that fertility norms do exist then, the ideal family size question has measured them adequately enough to plan family planning programmes (Bongaarts, 1991).

In this paper, the relative timing and sequence of changes in ideal and actual fertility in Kenya is examined using a sequential set of surveys collected over a 20-year period spanning the onset of the first documented fertility decline in sub-Saharan Africa. These data are unique, since fertility transition had begun in all regions of the world with the exception of Africa, before 'Knowledge, Attitudes and Practice' surveys began; and few, if any, countries collected national level surveys at regular intervals coinciding with the onset of fertility change (Blacker, 2002).

Classic demographic transition theory predicts that a decline in actual fertility should lag behind decline in ideal family size. This lag may be longer in rural areas compared with urban ones due to more restricted access to family planning services (Campbell & Campbell, 1997). Alternatively, the example of Taiwan is used by Cleland and Wilson to show a country where fertility decline began without any evident reduction in the ideal family size (Cleland & Wilson, 1987). This case demonstrated the autonomy of fertility norms from fertility practice in this context, and the possibility that the diffusion of family planning practice may erode pronatalist norms. Kenya has commonalities with Taiwan: strong extended family structure, high stated family desires, and a strong family planning programme, endorsed by the state. If this hypothesis holds in Kenya, fertility should decline before ideal family size. Therefore, whether fertility norms declined before, during, or after the fertility transition in Kenya is firstly explored.

Secondly, whether attitudes towards important social behaviours, such as fertility, are fixed at a point in early life and maintained by birth cohorts over time is explored (as suggested by Lesthaeghe & Surkyn, 1988). Alternatively, attitudes may change in women of all ages simultaneously. The 20-year span of data collection allows analysis of fertility ideals in birth cohorts to distinguish between these hypotheses in the Kenyan context.

Thirdly, how fertility change may have been realized is explored. Caldwell proposed that the African fertility transition is essentially unique in its emphasis on spacing rather than fertility limitation (Caldwell *et al.*, 1992). Therefore trends in the desire to postpone and stop childbearing are compared.

Finally, by comparing changes in the ideal family size with stated desire to stop childbearing (which may reflect more immediate individual considerations and less normative considerations of the 'right' number) an attempt to separate fertility norms from fertility attitudes is made.

Data and Methods

The data used were taken from four cross-sectional surveys: the 1978–79 Kenya Fertility Survey (KFS); the 1984 Kenya Contraceptive Prevalence Survey (KCPS); and the Demographic and Health Surveys from 1989 and 1998 (CBS, 1980, 1984; NPD & IRD, 1989; NCPD *et al.*, 1999).

Data were collected from sample surveys in interviews with women aged between 15 and 49 years. A nationally representative sample of households was selected in all surveys with the exception of North-East Province, two districts in Eastern Province and two in the Rift Valley, which were excluded in all due to difficulty in data collection in these areas. Sample weights were employed to adjust for over-sampling of women in urban areas in each survey.

The individual level data from the 1984 KCPS were unavailable. Therefore data were analysed for the three remaining surveys and compared with data and tables from the 1984 KCPS report. Where data were only available for married fecund women in the KCPS report these were compared with data for married women in this report as no common fecundity measure across the surveys existed.

Total fertility rates for married women were calculated using weighted data for 36 months before the 1978, 1989 and 1998 surveys and excluded births below age 15. Data from the 1984 KCPS survey were excluded from the comparison because the total fertility rate was calculated using data over 12 months.

Fertility norms and attitudes among married women were estimated using three different measures: the average ideal family size, the proportion of women who want no more children, and the proportion of women who want to postpone their next birth for two or more years. There are slight differences in the wording of these questions in the consecutive surveys, as shown in Table 1, and the implications of these differences are discussed. Non-numeric responses to the ideal family size question were excluded in the calculation of mean values, and the potential bias that may have been introduced is discussed.

Validity checks were performed on the data (Bankole & Westoff, 1998). Inconsistencies were assessed between reported ideal family size and desire for more children. Data were analysed using Stata version 6 software (StataCorp, 1999).

Table 2. Trends in total fertility rate (TFR) and ideal family size (IFS) among married women, Kenya, 1978–1998

	Total fertility rate (children/woman)			Ideal family size (children)		
	TFR	Difference between surveys	Mean annual difference	IFS	Difference between surveys	Mean annual difference
1978	8·5			6·8		
1884				6·3	− 0·50	− 0·08
1989	8·2	− 0·30	− 0·06	4·7	− 1·60	− 0·32
1998	6·2	− 2·00	− 0·22	4·1	− 0·60	− 0·07

Data sources: Kenya Fertility Survey, 1978; Kenya Contraceptive Prevalence Survey, 1984; Kenya Demographic and Health Survey, 1989 and 1998; blank = not applicable/available.

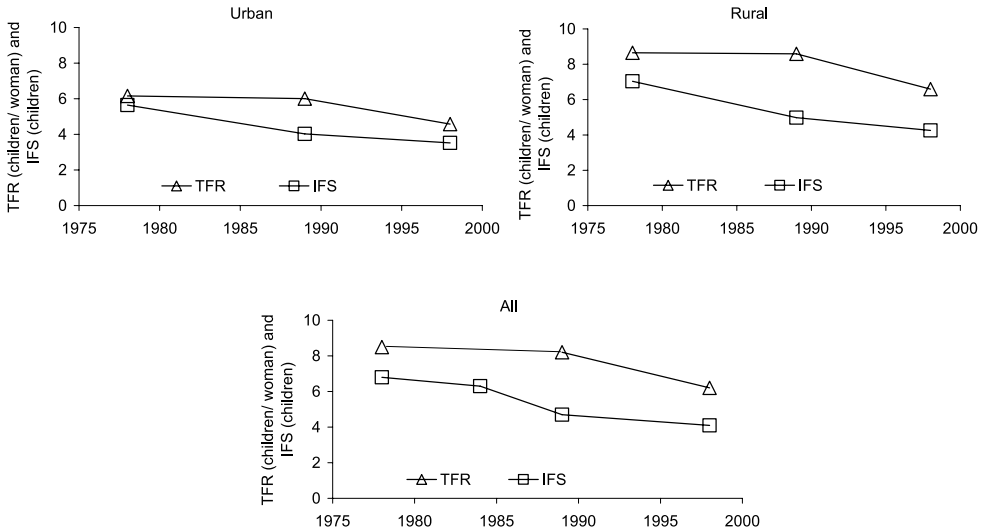

Fig. 1. Trends in total fertility rate (TFR) and ideal family size (IFS) among married women and stratified by urban/rural status, Kenya, 1978–1998. Data sources: Kenya Fertility Survey, 1978; Kenya Contraceptive Prevalence Survey, 1984, 1989 and 1998. Data only available on the ideal family size for married women in 1984.

Results

The trends in the total fertility rate and the ideal family size for married women in Kenya between 1978 and 1998 are shown in Table 2 and Fig. 1.

In line with the findings of previous studies (African Population and Policy Research Center, 1998; Macrae, *et al*., 2001; Blacker *et al*., 2005) the total fertility rate and the ideal family size fell between 1978 and 1998. The total fertility rate declined from 8·5 children per woman in 1978 to 6·2 children per woman in 1998 and the ideal family size fell from 6·8 children in 1978 to 4·1 children in 1998. This pattern was also

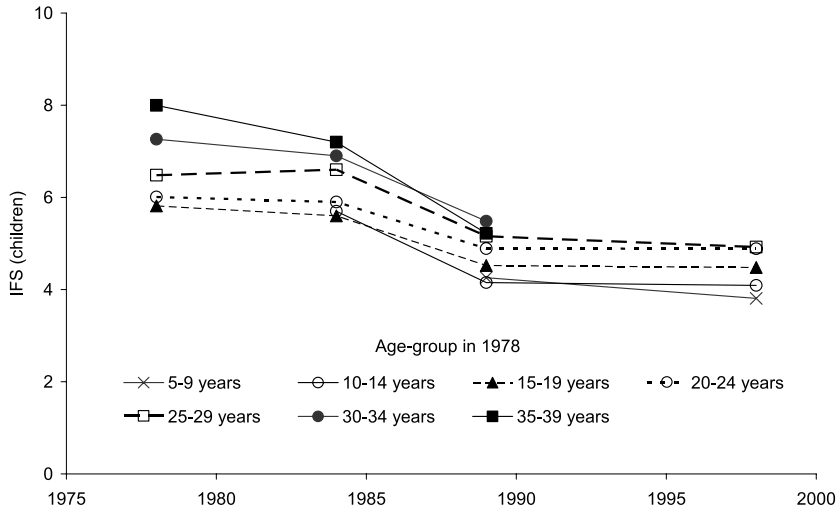

Fig. 2. Trends in ideal family size (IFS) among married women by age in 1978 in Kenya, 1978–1998.

seen when the data were stratified by residence (Fig. 1). In line with previous work, this analysis does not suggest that, over the period of study, either indicator fell earlier in urban areas than in rural areas (Fig. 1).

Relative timing of trends in ideal and actual fertility in Kenya

Table 2 and Fig. 1 also show that in urban and rural areas, the reported ideal family size fell most rapidly before the decline in the total fertility rate. The peak annual rate of decline in the ideal family size was measured between 1984 and 1989 ($-0{\cdot}32$ children per year) whilst the peak annual rate of decline in the total fertility rate was measured between 1989 and 1998 ($-0{\cdot}22$ children per woman per year). This suggests that in Kenya fertility norms changed before fertility practices.

To assess whether the large reduction in the ideal family size between 1984 and 1989 was due to the changed wording of the question, the analysis was repeated for those women who had two or fewer children and therefore may be less likely to retrospectively rationalize their ideal family size. The same pattern was seen (a drop in the ideal family size among all age groups in this period) suggesting that the reduction was not due to the changed wording (not shown). Unfortunately there were too few women with zero births (who received the same question in all surveys), especially in the older age groups, to repeat the comparison in this group.

Fertility reduction: a period or cohort effect?

Figure 2 illustrates the trends in ideal family size in 5-year birth cohorts for married women over the 20-year survey period.

Three birth cohorts were followed for the full 20-year period (groups aged 15–19, 20–24 and 25–29 in 1978) and the other cohorts were followed for a 10-year period.

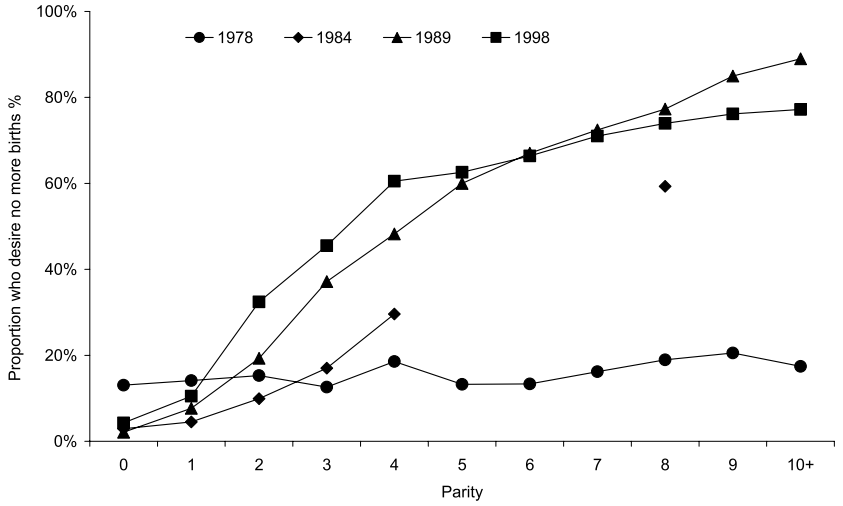

Fig. 3. Reported desire for no more births (%) among married women by current parity and survey year, Kenya 1978–1998. The 1984 data were categorized into 0, 1, 2, 3, 4 and 5+ ever-born children.

The results are striking. Each younger birth cohort reported a lower ideal family size than any older birth cohort. The ideal family size also declined within each age cohort, most notably between 1984 and 1989.

Did she space or did she stop?

To explore whether fertility reduction in Kenya may have been realized by spacing births or by stopping childbearing, data were examined regarding the desire to postpone the next child or to stop childbearing altogether. Data were not collected in 1978 or 1984, but the available data do not support increased birth spacing intentions. Between 1989 and 1998 when the total fertility rate fell most rapidly, the proportion of women reporting wanting a birth in the next two years remained unchanged at 13·6% and 13·4% respectively. In contrast, Fig. 3 shows the proportion of women who reported wanting to stop childbearing by their current parity. The data show an increasing proportion of women stating they want no more children at any given parity. In 1978 respondents rarely stated they wanted to stop childbearing. By 1998 approximately half of the respondents said they wished to have no more children after having four: a dramatic change over the 20-year period. The desire to stop childbearing appears to have increased most rapidly between 1984 and 1989, although comparison is difficult because in 1984 the responses from women with five or more births were grouped together.

Fertility norms vs fertility attitudes

Figure 4 shows the distribution of the reported ideal family size. In 1978, the most frequent ideal family size was a non-numeric response (18%), followed by a reported

preference for six children (17%). Few women wanted fewer than four children (4%), and no category was chosen by more than 20% of respondents. By 1989 there was a marked change in this distribution. The most frequently reported ideal family size was four children (40%) and relatively few women reported wanting an ideal family size of more than six children (6% in total). By 1998 the most frequent ideal family size was still four children (36%), and 32% of women reported an ideal family size of three or fewer.

By comparison, the distribution in the reported desire for no more births (Fig. 3) does not show a more step-like shape around four or five births (allowing for the death of some children) as would be expected if a increasingly large proportion women were actively trying to achieve a family size of four children.

Data validity

The validity checks suggested by Bankole & Westoff (1998) recommend investigating the desire for another birth and whether a woman has met her ideal family size. These data showed that in 1978 the proportion of women who stated they wanted another child despite reaching their ideal family size was 7%. This fell to 3% by 1998. This suggests that, in this respect at least, the internal consistency of these data is relatively good, and has improved over time.

Discussion

Four main objectives were examined in this analysis of data spanning the fertility transition in Kenya.

The first objective was to describe the timing of changes in fertility norms in relation to the fertility transition in Kenya. As discussed by other authors (Cross *et al*., 1991; Caldwell *et al*., 1992; Robinson, 1992), the fertility transition in Kenya began during the 1980s, with a fall in the total fertility rate between the 1978 KFS and the 1998 KDHS (Table 2). The results of this study suggest that the reported ideal family size had declined before the onset of the fertility transition, and the relative timing was similar in both urban and rural areas of Kenya (Table 2 and Fig. 1). Thus, the Kenyan data support the more traditional model of fertility transition in which fertility decline is driven by fertility desires.

The second objective was to test Lesthaeghe and Surkyn's hypothesis that fertility ideals change by the slow attrition of older cohorts by younger cohorts. This was found to be part of the explanation. Each successive birth cohort reported a lower ideal family size than the previous cohort (Fig. 2). However, these data also suggested that the decline was partly a period effect, as within each birth cohort a decline in fertility desires over time was observed, suggesting that there were significant changes in the ideal family size over the lifecourse.

The third objective was to explore how fertility reduction was realized. The limited data presented here suggested that fertility limitation may have been at least party achieved by stopping childbearing not spacing births, in contrast with Caldwell's proposition (Caldwell *et al*., 1992).

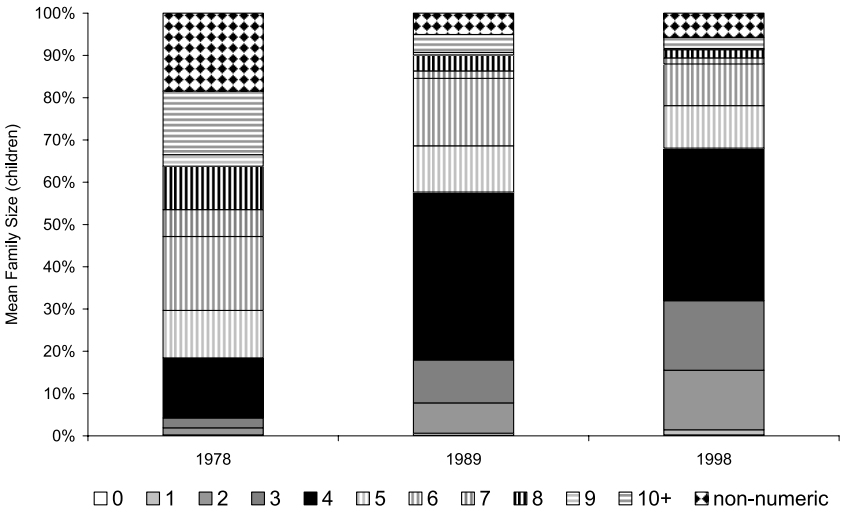

Fig. 4. Distribution of reported ideal family size by survey year among married women, Kenya, 1978–1998.

Finally, in the late 1970s, when fertility rates remained high in Kenya, the almost uniform distribution of fertility desires and the high proportion giving non-numeric responses, such as 'up to God', suggests that there was no binding numeric ideal. Family size preferences under four were rare, and family sizes from four to ten and over were normal. However, the data suggested that between 1984 and 1989 the ideal family size rapidly reduced (Fig. 2) and may have been replaced by a preference for four children (Fig. 4). What is particularly interesting is that the normative ideal family size question appears to be distinguishable from the more attitudinal question about the desire to stop childbearing. Although a norm for four children may have developed, women did not appear to be actively trying to achieve a family size of four children, at least by stopping childbearing (Fig. 3). This may reflect the fact that a four-child norm, if it exists, is a relatively newly developed ideal.

These results should be treated with some caution. Measurement error may have biased the results. Most importantly, the ideal family size question changed between these surveys (Table 1). However, as the reported ideal family size did not change between 1978 and 1984, or between 1989 and 1998 (Fig. 1), over which periods the same question was asked, it would have to be believed that the ideal family size did not fall in the entire period between 1978 and 1998, which seems unlikely. In addition, the trends in the other measures of fertility preference, such as the desire to stop having children, supported the hypotheses that there was a growing demand for fertility limitation in this period. Finally, lower parity women, who were perhaps least likely to retrospectively rationalize their ideal family size (Table 1), also reported a rapid fall in their ideal family size between 1984 and 1989. Therefore it is believed that measurement error is unlikely to be the reason for the decline in the ideal family size.

The decrease in the proportion of women reporting a non-numeric ideal family size may have biased the observed decline in the ideal family size. It is most plausible

that this bias will have hidden a steeper decline in the ideal family size than was detected because women who report a non-numeric ideal family size may have higher than average fertility desires than women who reported a specific number. However, even if the reverse were true and all women who reported a non-numeric ideal family size in 1978 (18%) were assumed to want no children, and all women reporting a non-numeric ideal family size in 1998 (5%) were assumed to want 6·8 children (the mean in 1978) then the reported ideal family size would still have fallen from 5·5 to 4·2 children between 1978 and 1998. Therefore the fall in ideal family size is unlikely to be entirely due to the decrease in the proportion of non-numeric responses.

Further, although again rather improbable, the appearance of a four-child norm may be due to the change in the proportion of women reporting a non-numeric response. If all women who gave a non-numeric response in 1978 (18%) instead had chosen an ideal family size of exactly four children, then the observed increase in the proportion of women reporting an ideal family size of four births would not have been seen.

Overall though it is believed that these findings are likely to be robust to these potential biases.

The slowdown in the rate of fall in the ideal family size between 1989 and 1998, detected in this study, may have continued. An analysis of data collected in the 2003 Kenya Demographic and Health Survey, showed that between 1998 and 2003 the proportion of women reporting that they want to continue childbearing did not fall, and may have increased slightly (Westoff & Cross, 2005). In a future analysis it would be interesting to see if this trend is also seen in the ideal family size.

So what may explain the change in preferences between 1984 and 1989? Historical factors specific to Kenya could have played a role. The available literature do not suggest significant changes in population or family planning policy in this period but instead focus on economic reasons for change, such as a growing perception of the relative costs and benefits of child rearing combined with an economic downturn during the 1980s (Blacker *et al*., 2005). It would therefore also be interesting for further research to explore the role economic factors have played on family size decision-making in Kenya, and whether this has changed over time.

References

African Population and Policy Research Center (1998) *Fertility Decline in Kenya: Levels, Trends and Differentials*. Population Council, Nairobi.

Bankole, A. & Westoff, C. F. (1998) The consistency and validity of reproductive attitudes: evidence from Morocco. *Journal of Biosocial Science* **30**, 439–455.

Blacker, J. (2002) *Kenya's Fertility Transition: How Low Will It Go? Completing the Fertility Transition.* Department of Economic and Social Affairs, Population Division, United Nations Secretariat, pp. 457–468.

Blacker, J., Opiyo, C., Jasseh, M., Sloggett, A. & Ssekamatter-Ssebliba, J. (2005) Fertility in Kenya and Uganda: A comparative study of trends and determinants. *Population Studies* **59**(3), 355–373.

Bledsoe, C. H., Banja, F. & Hill, A. (1998) Reproductive mishaps and Western contraception: an African challenge to fertility theory. *Population and Development Review* **24**(1), 15–58.

Bledsoe, C. H., Hill, A. G., D'Alessandro, U. & Langerock, P. (1994) Constructing natural fertility: the use of Western contraceptive methods in rural Gambia. *Population and Development Review* **20**(1), 81–113.

Bongaarts, J. (1991) *Do Reproductive Intentions Matter*? Population Council, New York, pp. 223–248.

Caldwell, J. C. (1985) Strengths and limitations of the survey approach for measuring and understanding fertility change: alternative possibilities. In Cleland, J. & Hobcraft, J. *Reproductive Change in Developing Countries*. Oxford University Press, pp. 45–63.

Caldwell, J. C., Orubuloye, I. O. & Caldwell, P. (1992) Fertility decline in Africa: a new type of Transition? *Population and Development Review* **18**(2), 211–242.

Campbell, E. K. & Campbell, P. G. (1997) Family size and sex preference and eventual fertility in Botswana. *Journal of Biosocial Science* **29**, 191–204.

CBS (1980) *Kenya Fertility Survey 1977–78*. World Fertility Survey Programme, Ministry of Economic Planning and Development, Nairobi, Kenya.

CBS (1984) *Kenya Contraceptive Prevalence Survey, 1984*. Ministry of Planning and National Development, Nairobi, Kenya.

Cleland, J. (2001) The effects of improved survival on fertility: a reassessment. *Population and Development Review* (supplement) **27**, 60–92.

Cleland, J. & Wilson, C. (1987) Demand theories of the fertility transition: an iconoclastic view. *Population Studies* **55**, 5–30.

Cross, A. R., Obungu, W. & Kizito, P. (1991) Evidence of transition to lower fertility in Kenya. *International Family Planning Perspectives* **17**(1), 4–7.

Freedman, R., Hermalin, A. I. & Chang, M. C. (1975) Do statements about desired fertility predict fertility? The case of Taiwan, 1967. *Demography* **12**(3), 407–416.

Hammel, E. A. (1990) *A Theory of Cultural Demography.* Working Paper of the Program in Population Research No. 28, Program in Population Research, Institute of International Studies, University of California, Berkeley.

Hermalin, A. I., Freedman, R., Sun, T. H. & Chang, M. C. (1979) Do intentions predict fertility? The experience in Taiwan, 1967–74. *Studies in Family Planning* **10**(3), 75–95.

Knodel, J. & Van de Walle, E. (1979) Lessons from the past: policy implications of historical fertility studies. *Population and Development Review* **5**(2), 217–245.

Lesthaeghe, R. & Surkyn, J. (1988) Cultural dynamics and economic theories of fertility change. *Population and Development Review* **14**(1).

Lightbourne, R. E. (1985) Individual preferences and fertility behaviour. In Cleland, J. & Hobcraft, J. (eds) *Reproductive Change in Developing Countries*. Oxford University Press, pp. 165–198.

Lockwood, M. (1995) Structure and behaviour in the social demography of Africa. *Population and Development Review* **22**(1), 1–32.

Macrae, S. M., Bauni, E. K. & Blacker, J. G. C. (2001) Fertility trends and population policy in Kenya. In Zaba, B. & Blacker, J. *Brass Tacks: Essays in Medical Demography: A Tribute to the Memory of Prof. William Brass*. Athlone Press, London.

Mason, K. O. (1997) Explaining fertility transitions. *Demography* **34**(4), 443–454.

NCPD, CBS & MI (1999) *Kenya Demographic and Health Survey 1998*. National Council for Population and Development, Central Bureau of Statistics, and Macro International Inc, Calverton, Maryland.

Notestein, F. (1953) *The Economics of Population and Food Supplies. Economic Problems of Population Change*. Proceedings of Eighth International Conference of Agricultural Economics.

NPD & IRD (1989) *Kenya Demographic and Health Survey 1989*. National Council for Population and Development, Institute for Resource Development and Macro Systems Inc, Columbia, Maryland.

Robinson, W. (1992) Kenya enters the fertility transition. *Population Studies* **46**(3), 445–457.

Rutstein, S. O. (1998) *Change in Desired Number of Children: A Cross- Country Cohort Analysis of Levels and Correlates of Change*. Demographic and Health Surveys Analytical Reports No. 9, Demographic and Health Surveys [DHS], Macro International, Calverton, Maryland.

StataCorp (1999) *Stata Statistical Software: Release 6·0*. Stata Press, College Station, Texas.

Tan, P. C. & Tey, N. P. (1994) Do fertility intentions predict subsequent behaviour? Evidence from Peninsular Malaysia. *Studies in Family Planning* **25**(4), 222–231.

Van de Walle, E. (1992) Fertility transition, conscious choice, and numeracy. *Demography* **29**(4), 487–502.

Westoff, C. F. (1994) *Reproductive Preferences and Future Fertility. The Future Population of the World. What can we Assume Today?* Earthscan Publications Ltd, W. Lutz, London.

Westoff, C. & Cross, A. R. (2005) The Kenya Stall. *Population Association of America 2005 Annual Meetin*g, Philadelphia.