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FERTILITY LEVELS AND DIFFERENTIALS IN TANZANIA*

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Fertility Levels and Differentials in Tanzania

A. Introduction

Fertility rates are still higher in sub-Saharan Africa than in other major regions of the world. Analyses of the Demographic and Health Surveys (DHS) data collected during the period 1990-95 suggest that most of the countries in sub-Saharan Africa have a total fertility rate (TFR) of more than six children per woman, with only South Africa, Zimbabwe, Botswana, Lesotho and Kenya having TFRs below 5.0 (Mboup and Saha, 1998). Despite these high rates, fertility declines have recently been documented for several countries (Cohen, 1993; Cleland et al., 1994) In their recent review of fertility trends in sub-Saharan Africa, Kirk and Pillet (1998) characterised the United Republic of Tanzania as a country with high fertility levels but with a regular TFR trend showing a modest fertility decline during recent years.

The first objective of this paper is to assess fertility levels and trends in Tanzania during the period 1967-1999. Two sets of data sources are used for this purpose: the three post-independence population censuses conducted in 1967, 1978 and 1988; and the national demographic surveys conducted in 1991-92, 1994, 1996 and 1999. The second objective is to identify the major determinants of fertility change in Tanzania, and to discuss the implications of changes in these determinants (both proximate and distant) on observed fertility. Third, the paper will consider the prospects for further fertility decline in the near future.

B. Tanzania's country profile

The United Republic of Tanzania is located in eastern Africa. Officially, this consists of the union of the mainland of Tanzania (erstwhile Tanganyika) and the islands of Zanzibar. However, for convenience, in this paper we shall use the description 'Tanzania' to refer to the United Republic, including Zanzibar. Tanzania is one of the largest countries in sub-Saharan Africa, covering approximately 940, 000 square kilometres. Administratively, the mainland of Tanzania is divided into 20 regions and Zanzibar is divided into five regions. The national language of Tanzania is kiswahili, which is spoken by the majority of people. There are, however, more than a hundred local tribal languages. Tanzania is a poor country with a mixed economy in which agriculture plays a key role. The United Nations (1999) estimates the population of Tanzania to have been 32.1 million in 1998. The most recent population census of Tanzania was conducted in 1988 (though the National Bureau of Statistics is now in the advanced stages of conducting another census), and it enumerated 23.1 million people. These two figures imply an annual growth rate between 1988 and 1998 of 3.3 per cent.

Four out of five Tanzanians live in rural areas (National Bureau of Statistics and Macro International Inc., 2000) and almost half of them (49 per cent) are illiterate (Komba et al.., 1991). Mortality rates are still high but a declining trend has been observed (Mturi and Hinde, 1995). There were 155 infant deaths per 1,000 live births in 1967, but the 1996 Tanzania Demographic and Health Survey (TDHS) estimated an equivalent figure of 88 (Bureau of Statistics and Macro International Inc.,1997; National Bureau of Statistics and Macro International Inc., 2000).

C. Trends in Tanzanian fertility

The three population censuses of 1967, 1978 and 1988 collected two types of data which can be used for fertility estimation. First, women were asked questions regarding the number of children they

had ever borne (that is, about their lifetime fertility); and, second, they were asked how many children they had borne in the twelve months prior to the census (the answers to which question provide data on current fertility).

An assessment of fertility data that were collected during the censuses revealed the usual problems of fertility data from censuses conducted in Africa (Mturi, 1996). These include under-reporting of births in the year prior to the census and omission of children ever born for women in their late 30s and 40s (United Nations, 1983). A variety of indirect methods have been applied to data from all three censuses in order to overcome these problems. Mturi and Hinde (1994) discuss these various estimates of the TFR, and argue in favour of a series of estimates made from each census using the same P/F ratio method. Their preferred estimates are 6.9 in 1967, 7.2 in 1978 and 6.5 in 1988. This series appears to indicate that fertility peaked sometime around the late 1970s, and that a modest decline had set in during the 1980s.

The DHS programme has helped the Tanzanian government to conduct four national surveys during the 1990s: the 1991-92 and 1996 TDHSs, the 1994 Tanzania Knowledge, Attitudes and Practises Survey (TKAPS), and the 1999 Tanzania Reproductive and Child Health Survey (TRCHS). One objective of these surveys (though by no means the only one) has been to obtain data from which levels and trends of fertility can be estimated. In three of these surveys, information on the birth histories of women aged between 15 and 49 years at the survey date was collected (the exception was the 1994 TKAPS). In other words, each woman was asked for a history of her births, including birth dates, the sex of each child, the survival status of each birth, and so on. This information can be used to estimate TFRs for periods close to the survey dates. Let us consider first the estimates for the three years just prior to each survey. The 1991-92 TDHS, based on a sample of 9,238 women, reported a TFR of 6.3 for the period 1989-92 (Ngallaba et al., 1993). According to the 1996 TDHS, which interviewed 8,120 women, the TFR had fallen to 5.8 for the period 1993-96 (Bureau of Statistics and Macro International Inc., 1997). The 1999 TRCHS interviewed a smaller sample of 4,029 women. It reported a TFR for the period 1996-99 of 5.6 (National Bureau of Statistics and Macro International Inc., 2000).

These estimates are all 'current', in that they are made using data for the period immediately prior to the surveys. However, the birth history data in the surveys can also be used to estimate the TFR with reasonable accuracy for earlier periods. As we move further back from the survey date, the fertility of a gradually widening group of older women is unobservable, as these women were aged over 49 years by the time the survey was conducted. Because the fertility of women in their 40s is a relatively small proportion of total fertility, however, we can obtain reasonably good 'historical' estimates of the TFR for periods up to about ten years prior to each survey by substituting estimates of the fertility of women aged 40-44 and 45-49 years from more recent periods for the unobserved values. Figure A displays TFRs estimated from the population censuses, and both 'current' and 'historical' estimates from the 1991-92, 1996 and 1999 surveys. The consistency shown by the estimates from different sources is reassuring. It seems fairly clear that there was no decline in Tanzanian fertility prior to the early 1980s, but that since then there has been a modest decline in Tanzania, especially during the 1990s.

Figure B shows age-specific fertility rates (ASFRs) derived from the three surveys. A clear decline in fertility at all ages is evident from the period 1977-80 onwards. The decline was initiated by a particularly pronounced fall at all age groups took place between 1977-80 and 1981-84. Since 1981-84, there have been some age-specific differences in the pattern: the decline has been sustained at ages over 25 years, but has rather slowed down at ages 20-24 years, and stopped altogether at aged 15-19 years.

The pattern of decline may also be examined in a parity-specific way. Hinde and Mturi (2000) examined parity progression ratios (PPRs) derived from the TDHSs. PPRs are more robust to errors in the reporting of dates of birth than are ASFRs (Brass et al. 1997). More specifically, Hinde and Mturi

(2000) used life table methods to calculate the proportion of women who have had a birth of order j who go on to have a birth of order j+1 within five years, or 60 months, which Brass (1996) called B_{60}. They adjusted for truncation effects using the approach of Brass and Juarez (1983). By calculating sets of B_{60}s for different birth cohorts, an indication of temporal trends in fertility during the 25-30 years before the survey can be obtained. Hinde and Mturi (2000) did not consider progression to the first birth, as the complexity of the African marriage process means that a suitable reference point from which the period of 60 months can be worked out is not obvious (Brass et al. 1997).

Brass et al. (1997) suggested that, if we assume birth intervals of about 30 months, we can locate the B_{60}s in time by supposing that women aged 20-24 at the time of the survey are making the transition to their second birth at that time. From this, it follows that women aged 25-29 years at the time of the survey are making the transition to their fourth birth at that time, and made the transition to their second birth five years before the survey (on average). This reasoning allows construction of Table 1, in which the average PPRs from the 1991-92 and 1996 TDHSs have been used for periods when both are available. The pattern revealed is of a slow decline in fertility at all parities from two to nine. The start of the decline may roughly be dated from the late 1970s. Although the magnitude of the decline is relatively small, the consistency of the trends across parities suggests it is real. The timing of the decline suggested by the B_{60}s is consistent with that suggested by the TFRs in Figure A and the ASFRs in Figure B.

D. Determinants of fertility

1. Use of contraception

Use of contraception has been described as the most important proximate determinant of fertility (Sherris et al., 1985). Some studies have indicated that differences in levels of use of contraception explain 92 percent of the variation in fertility (Robey et al., 1992). This implies that where use of contraception is widespread, fertility is low. It is therefore unsurprising that a major cause of the declining fertility in Tanzania during the 1990s is thought to have been the slow but steady increase in use of contraceptives. This was demonstrated by Larsen (1997), who showed, using data from the 1991-92 TDHS, that women who had ever used contraception had longer waiting times to conception (median 22 months) than other women (median 15 months).. Only 23 percent of women, however, had ever used a method of family planning, and only 10.4 percent of women aged 15-49 years were using a contraceptive method at the time of the 1991-92 TDHS (Ngallaba *et al*., 1993). The current use rate doubled to 22 percent by the time of the TRCHS in 1999 (National Bureau of Statistics and Macro International Inc., 2000). The use of modern methods increased from 6 to 16 percent for all women during the same period. The main modern method used by Tanzanian men and women include injectables, the pill and the (male) condom.

Historically, contraception was first formally provided in Dar es Salaam in 1959 by the Family Planning Association of Tanzania (UMATI). However, it was initially only available in a few urban centres. The government became actively involved in providing contraception following the launch of the integrated Maternal and Child Health programme in 1974. But UMATI continued to co-ordinate all family planning activities until 1989 when the government established the National Family Planning Programme (NFPP) in the Ministry of Health. Along with the co-ordination of family planning activities, NFPP is also responsible for management and distribution of contraceptives to all service delivery points. The NFPP has benefited from a special project, funded by the United States Agency for International Development and the United Nations Population Fund, concerned with the management and distribution of contraceptive supplies. It is believed that most of the family planning services are offered through this project. There are other government departments, non-governmental organisations (NGOs) and international NGOs assisting the NFPP in providing the services (Mturi, 1996). Since the mid-1990s, the

Population Services International operated a social marketing programme in Tanzania (National Bureau of Statistics and Macro International Inc., 2000). These services include social marketing of Salama male condoms, social marketing of Care female condoms, and social marketing of mosquito bednets and insecticide. In addition, the Ministry of Health has established the National AIDS Control Programme aimed to control the spread of HIV/AIDS. The joint effort of all these initiatives has contributed positively to raising awareness of and use of contraception.

Evidence from the 1996 TDHS indicates that contraception is being used both to space births and to 'stop' having children. Birth intervals at all parities up to seven are longer for Tanzanian women who use contraception than for those who are non-contraceptors. In addition, there is evidence of stopping behaviour at parities above three.

2. Nuptiality patterns

Postponement of first marriage, and marital dissolution through divorce or widowhood accompanied by low remarriage rates are associated with low levels of fertility. There is some evidence that the age at marriage in sub-Saharan Africa is increasing as the education of women becomes widespread. This is likely to reduce fertility. Indeed in some countries (for example Sudan), postponement of first marriage has been outlined as the main determinant of fertility decline observed (Cleland et al., 1994). However, evaluating the impact of changes in nuptiality on fertility in sub-Saharan Africa is complicated. This is because, first, in some parts marriage tends to be a process rather than a single event; and, secondly, because the fertility of never-married women is by no means negligible.

Hinde and Mturi (2000) have shown that there has been an increase of more than two years in the median age at marriage from women born in the 1940s to women born in the 1970s (Figure C). We, therefore, suggest that changes in nuptiality are implicated to some degree in the decline of fertility in Tanzania during 1990s. Harwood-Lejeune (forthcoming) has estimated that, once changes in both pre-marital and marital age-specific fertility rates are taken into account, about one-sixth of the decline in Tanzanian fertility between 1984 and 1996 is due to changes in nuptiality. One reason why the rise in the average age at marriage has not had more of an effect may be that the age at first birth has not been increasing as fast as the age at first marriage (Figure C).

3. Other proximate determinants

Apart from nuptiality and contraception, variations in fertility are due mainly to induced abortion, the length of the period of postpartum non-susceptibility which is principally due to breastfeeding, and variations in the extent of infertility and sub-fertility.

Breastfeeding in Tanzania is almost universal, and the median duration according to both the 1991-92 and 1996 TDHSs was just over 21 months (Ngallaba, et al.,1993; Bureau of Statistics and Macro International Inc., 1997). Hinde and Mturi (1996) showed that, to the extent that there was a trend in breastfeeding durations, it was towards slightly shorter durations among more recent cohorts, but that the magnitude of the trend was small. An increase in the duration of postpartum non-susceptibility is, therefore, not likely to be responsible for the fertility decline.

Unfortunately, nationally representative data on abortion are not available in Tanzania and so an evaluation of the importance of abortion to the fertility decline cannot be made. This problem may be quite serious. Induced abortion is not permitted in Tanzania unless it is intended to save the mother's life. However, Justesen et al. (1992) studied 300 women with early pregnancy loss admitted to Muhimbili Medical Centre in Dar es Salaam. Nearly a third of these presented with an illegally induced abortion (most of them being young and unmarried). In a similar study which covered four public hospitals in Dar

es Salaam, Mpangile et al. (1993) found that 455 out of 965 women screened (47 per cent) were found to have had an induced abortion. It is important, therefore, to keep in mind that abortion might have a significant fertility-inhibiting effect in the country and have played a part in the recent fertility decline.

Larsen (1997, p.219) has argued that 'sub-fertility is prevalent in Tanzania' and that 'the prevalence of infertility is relatively high in Tanzania, compared with neighbouring countries'. It seems that most of this sub-fertility and infertility takes the form of secondary sterility, as only two per cent of women aged 40-49 in 1996 had borne no children (Bureau of Statistics and Macro International Inc., 1997). There is some evidence that infertility varies regionally within the country: the southern regions of Lindi and (especially) Mtwara, for example, have the lowest fertility rates in the country outside Dar es Salaam, but are far from having the highest rates of contraceptive use. They do, however, have high rates of self-reporting of sexually transmitted diseases among men.

4. Socio-economic determinants

The reason sometimes stated to be associated with high fertility in sub-Saharan Africa is large desired number of children. Some writers have suggested that African women prompt to invoke the will of God when they say their desired number of children (Caldwell and Caldwell, 1987). This implies that a woman will have as many children as she is biologically capable to bear. For the case of Tanzania, the 1991-92 TDHS showed that only 14 percent of women gave a non-numeric response such as "up to God" or "as many as possible". The proportion for 1994 TKAPS was 7 percent, the 1996 TDHS was 8 percent and it was 3 percent in 1999 TRCHS. It seems therefore that the proportion of women in Tanzania giving a non-numerical response is low and it is declining. However, on the average, Tanzanian women would ideally like to have five children (National Bureau of Statistics and Macro International Inc., 2000). This indicates that large family norm is practised in Tanzania and is likely to influence actual fertility levels.

Caldwell (1977) argued that high fertility is economically rational in traditional African economies where land is held by the lineage and increasing numbers provide the best form of investment available to control the land and its products. The tendency of most young people to take non-agricultural jobs, not only because of modernisation, but also because of a reduction in the size of landholding with time due to scarcity of land, would appear to contradict this argument. For instance, the increasing scarcity of land in northern Tanzania meant that landholding were broken down so that most sons could inherit land; in consequence land litigation among kinsmen increased, and the value of land in the highlands rose by 700 percent (Maro, 1974). However, Caldwell (1977) makes the point that even when children take jobs in non-agricultural sectors, the family ties lead them to remit money back to their families. Indeed, having many children increases the chance that one will do well in the non-agricultural sectors, and help keep the family.

The cultural set-up of the family structure which gives husbands the power of reproductive decision making, whilst placing most of the economic burden for raising children on mothers (Caldwell and Caldwell, 1987), together with responsibility for agricultural production (Boserup, 1985) have been outlined as the major factors influencing high fertility in sub-Saharan Africa. The argument is that, since husbands receive the advantages of status and prestige from paternity as heads of household, whilst not having to bear any economic burdens, they are encouraged to opt for large families. It can be concluded therefore that both the family structure and its consequences for power and decision making and the fact that children provide old-age security for their parents are the major socio-cultural factors causing high fertility in sub-Saharan Africa. However, the magnitude of these factors and how they change with time in a specific setting is not easily quantified.

Another recent factor affecting fertility is economic hardship. A number of authors have invoked economic hardship as contributing to fertility decline in other sub-Saharan African countries (see, for

example Rutenberg and Diamond, 1993). It is possible that economic hardship was important in initiating Tanzania's fertility decline. Tanzanians experienced increasing severe economic difficulties during the late 1970s and early 1980s. Already feeling the pinch of the hike in oil prices in the mid-1970s, the economy was subjected to further strain in 1978 by the Tanzania-Uganda war, which cost about US$ 500 million, and disrupted trade. Foreign aid (especially from the World Bank and the International Monetary Fund) was frozen. Given that around 80 percent of the government's budget depended on the foreign aid, the import of many goods became impossible, and the shops were empty. It is widely believed in the country that economic hardship resulted in couples attempting to postpone or prevent further childbearing, especially at parities above three or four. It is possible that economic difficulties have also contributed to the rising age at marriage.

The spread of education and literacy among women is believed to be fundamental to changes in reproductive behaviour. While analysing the relationship between fertility and level of education in sub-Saharan Africa, Cohen (1993) has shown that fertility is either curvilinearly or negatively related with education but does not appear very responsive to small amount of education. A more recent comparative study has shown that higher education of women is consistently associated with lower fertility (Martin, 1995). The mechanisms through which education affect fertility include postponement of age at first marriage, reduction of family-size preference, rise in contraceptive use. Martin (1995) also argues that education enhances women's ability to make reproductive choices.   There are differentials in fertility by women's level of education. The 1999 TRCHS, for example, shows that women with no education had a TFR of 6.5 whereas those who completed primary education had a TFR of 4.9. Any effort geared on educating women especially if they complete primary education can have a significant effect in reducing fertility.

5. The impact of the HIV/AIDS epidemic

Tanzania is one of the countries most seriously hit by the HIV/AIDS epidemic. The adult prevalence rate was estimated to be 8.1 percent at the end of 1999 (UNAIDS, 2000). Some analysts argue that severe HIV epidemics are likely to exert a downward pressure on fertility (Gregson, 1994). HIV/AIDS epidemic may affect fertility in several ways. First, men and women with HIV/AIDS may have reduced fecundity for a variety of reasons (including reduced coital frequency). Second, age-selective AIDS mortality may reduce the population at risk of giving birth, since most deaths from AIDS occur in the childbearing ages. Third, the HIV/AIDS epidemic is giving rise to greater use of contraceptives (especially condoms) which may lead to reduced fertility. Finally, changes in social attitudes and behaviour to avoid HIV/AIDS (including reduction of desired family size, and changed attitudes to gender roles) may have indirect fertility-reducing effects.

Baschieri (2000) has tried to assess the effect of HIV/AIDS on fertility in Tanzania. Because both fertility and the prevalence of HIV vary regionally within the country, she first estimated district-specific HIV prevalence rates. She then used these, together with the district-specific general fertility rates (GFRs, or numbers of births per year per 1,000 women of reproductive age) to estimate what the general fertility rate (GFR) of HIV negative women in each district would have been in the absence of HIV/AIDS. A weighted average of these GFRs, where the weights are the proportions of women of reproductive age living in each district, provides the national level of fertility in a non-HIV/AIDS scenario. The overall impact of HIV/AIDS is obtained by comparing the GFR of non-HIV/AIDS scenario with the current GFR of all women. Baschieri evaluated the impact of HIV/AIDS in Tanzania at the national level, and, using a similar procedure, among four zones (classified on the basis of HIV prevalence) using the 1996 TDHS data. She concluded that the impact of HIV/AIDS on fertility in the higher prevalence zones is between three and five per cent (that is, fertility is three to five per cent lower than it would be in the absence of HIV). In the lower prevalence zones its impact is less than two per cent. Therefore, although further investigation is necessary into the effect of HIV/AIDS on fertility,

Baschieri's study suggests that only a small proportion of the observed decline in fertility in Tanzania is likely to be due to HIV/AIDS.

E.   Future prospects for fertility decline

It is not easy to speculate about the future trends in Tanzanian fertility. However, based on the discussion above, the decline of fertility can be tagged to a number of factors. It can be argued that the spread of family planning services will perhaps dictate the trend in fertility. The contraceptive prevalence rate is still very low in Tanzania and there is a lot of room to improve the situation. Unmet need for family planning is quite high indicating that there is already a demand that need to be realised. The 1996 TDHS data showed that 18 percent of all women were in need of family planning services but are not using any. The proportion declined slightly to 17 percent during the TRCHS in 1999. In other words, if all women who say they want to space or limit their children were to use methods, the contraceptive prevalence rate could be increased from 22 percent to 40 percent of all women (National Bureau of Statistics and Macro International Inc., 2000). This has a lot of implications to the level of fertility.   It can be concluded that the National Family Planning Programme has a key role to play in the campaign to reduce fertility levels in Tanzania.

The spread of education of women is another factor which can play a significant role in reducing fertility. As indicated earlier, educated women postpone their first marriage, prefer smaller family sizes, are aware and use contraception, and have greater negotiation skills on reproductive matters. A further decline of fertility in Tanzania will therefore depend on how successful the government is going to achieve in the campaign for gender equity and equality. This can go hand in hand with programmes geared on empowering women. A closer look at the existing gender policy and how to implement it, is a necessary condition in a campaign to lower fertility in Tanzania.

There is need to encourage couples to have smaller family sizes. The ideal family size of five children is quite high. However, the 1996 TDHS has shown that there is a (slow) move towards smaller ideal family sizes in Tanzania and evidence that 'wanted' fertility is now close to, or rather lower than, current levels of achieved fertility. A number of factors can be linked with this trend in smaller family size including economic hardship, people looking at the children in terms of quality and not quantity, the HIV/AIDS epidemic, etc. The change of government policies has also played a role in making couples cautious about the number of children they had. During the 1970s and early 1980s, primary and secondary school education and health care facilities used to be free in Tanzania. Since nowadays people have to pay for these services, the larger the family size, the more financial resources needed.

In conclusion, a further decline in Tanzanian fertility will depend on the performance of the National Family Planning Programme in terms of raising the contraceptive prevalence rate. The first step is therefore to make sure that the existing demand for family planning services is realised. Advocating gender equity and equality, empowering women, and making fathers take the responsibility for raising children will go a long way in reducing fertility in Tanzania.

Acknowledgements

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Table 1

Trends in adjusted B_{60}s by time period

| Progression	1996		1991		1986		1981		1976		1971
1-2	0.79	0.82	0.84	0.84	0.84	0.85	0.87	0.88	0.89	0.89	0.89
2-3	0.77	0.80	0.82	0.84	0.85	0.86	0.87	0.87	0.88	0.88	0.88
3-4	0.77	0.78	0.79	0.81	0.82	0.84	0.86	0.87	0.88	0.87	0.84
4-5	0.79	0.80	0.80	0.79	0.81	0.83	0.85	0.87	0.85	0.84	
5-6	0.74	0.76	0.77	0.78	0.79	0.81	0.82	0.82	0.83		
6-7	0.70	0.67	0.70	0.73	0.77	0.82	0.82	0.81			
7-8	0.67	0.69	0.71	0.71	0.72	0.73	0.75				
8-9	0.64	0.64	0.68	0.71	0.69	0.68					

Source. Hinde and Mturi (2000, p. 185).

Note. The time locations are only approximate and depend on the assumption that the average birth interval is 30 months. For Tanzania this is a slight under-estimate.

Figure A
Trends in the total fertility rate, 1965-1999
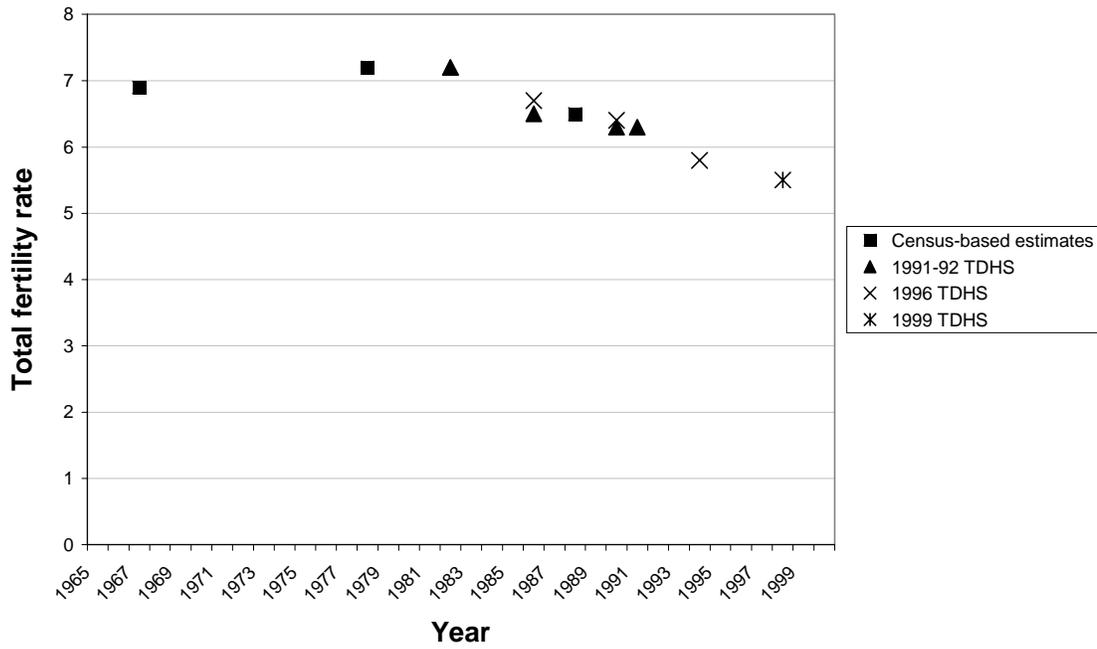
Sources: 1967, 1978 and 1988 Population Censuses of Tanzania, 1991-92 and 1996 Tanzania Demographic and Health Surveys, 1999 Tanzania Reproductive and Child Health Survey.
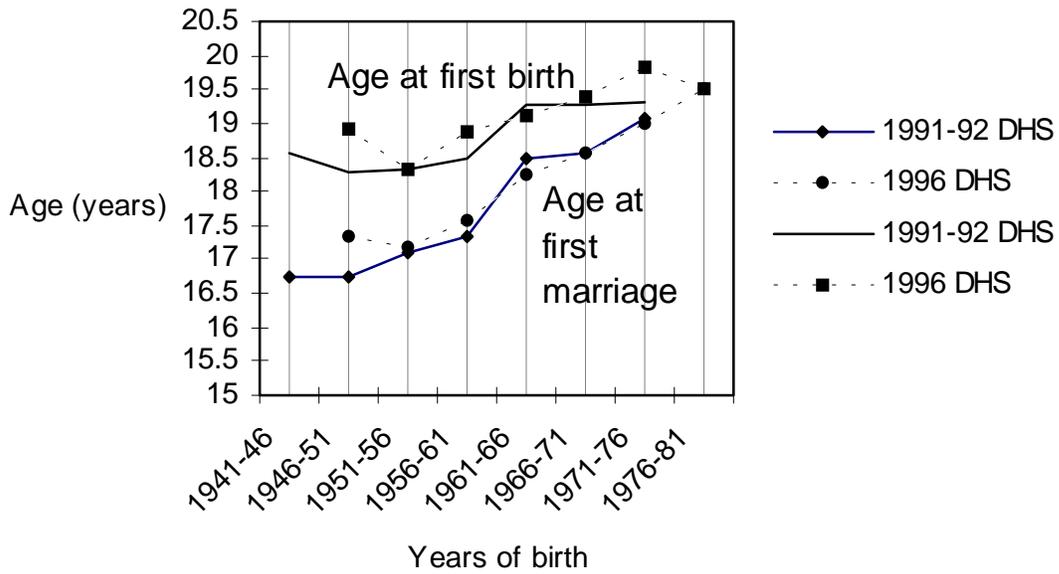
Figure B
Age-specific fertility rates, Tanzania, 1973-99
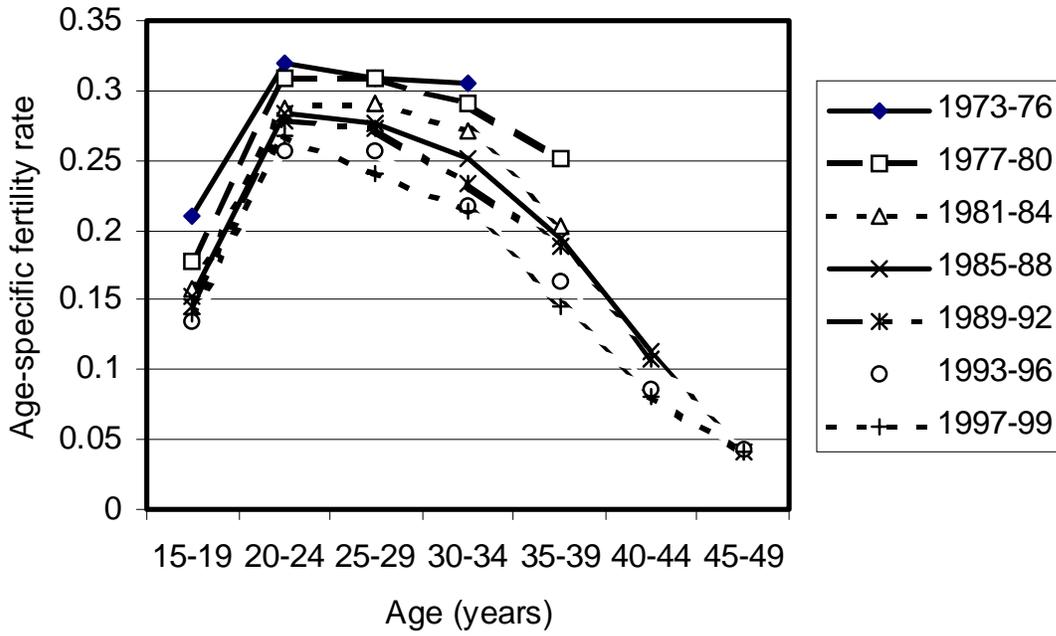
Sources: 1991-92 and 1996 Tanzania Demographic and Health Surveys, 1999
Tanzania Reproductive and Child Health Survey.

Figure C

Median age at first marriage and first birth, Tanzania

Note: These medians have been calculated using estimates of the cohort-specific survivor functions.

Sources: 1991-92 and 1996 Tanzania Demographic and Health Surveys.