

Age at marriage and modernisation in sub-Saharan Africa

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Abstract

The study reviews levels, trends and factors of female age at first marriage in 32 sub-Saharan African countries over the past five decades. Data were provided by the World Fertility Surveys and the Demographic and Health Surveys. Estimates of the median age at first marriage were calculated by 5-year birth cohort, for urban and rural areas separately. Results confirm that median age at first marriage is still low, in the 15–19 age band for most countries, with the exception of three Southern African countries (Namibia, Botswana and South Africa), where it is much higher. In most countries the median age at first marriage tended to increase for cohorts born after 1950, usually after a period of steady levels, or sometimes after a period of significant decrease, and exceeds the 20 years threshold for cohorts born after 1975 in several countries. In only a few countries, the median age at first marriage remained stable over time. The increase in median age at first marriage was small in rural areas, and more pronounced in urban areas, sometimes exceeding by 3 to 8 years earlier estimates. Main factors of increase in age at marriage were level of education and income, plus a small residual time trend. Main factors of lower age at marriage were religions (Islam and Christianity), polygyny, and urbanisation after controlling for income and education. Results are discussed in light of social changes occurring in Africa over the 20th century, and the course of this new nuptiality transition.

Keywords

Marriage, nuptiality, age at first marriage, polygyny, level of education, income, religion, Christian, Islam, socio-economic determinants, sub-Saharan Africa

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INTRODUCTION

Female age at first marriage is an important characteristic of population dynamics. With respect to fertility, age at marriage is a critical element of the susceptibility to childbearing, even though a significant proportion of women now have children prior to the first marriage. First marriage also determines in part the social status life cycle, and the dynamics of family formation. With respect to health, age at first marriage is an important factor of exposure to multiple sexual partnerships, and as a consequence to sexually transmitted disease (STDs), in particular to HIV/AIDS. Early marriage (at age 15–19 years) is usually associated with higher fertility, larger families, lower numbers of sexual partners, and fewer STDs. Early marriage was most common in traditional societies of Africa and Asia prior to 1950, and is still the dominant pattern in many countries in these continents. Late marriage (above age 25) seems to be a common feature of modern western societies and Japan at the end of the 20th century, as well as some atypical Southern African societies (South Africa, Namibia, Botswana). Other developing countries and transitional societies seem to be in general in the 20–24 age band, with large variations at the individual level (UN yearbook; Singh and Samara 1996; Westoff, Blanc and Nyblade 1994, Althaus 1991).

Age at marriage appears often stable for long periods of time, and at the same time is susceptible to rapid changes with modernisation, and in particular with prolonged schooling and new attitudes towards partnership. Age at marriage is also quite responsive to economic crises, and in periods of economic hardship marriage is often delayed by a few years, though these effects tend to not last for long periods of time. Patterns of marriage may also differ between urban and rural areas. Polygyny is prevalent throughout Africa, and is assumed to reduce the female age at first marriage, primarily by providing more marriage opportunities to women. Other factors of early marriage, often neglected in the demographic literature, are monotheist religions of Middle Eastern origin, in particular Christianity and Islam. Both give a high value to marriage and to chastity of women prior to marriage, and may therefore have an effect on age at first marriage.

Sub-Saharan African societies went through major social changes in the 20th century, with great diversity between countries. European colonisation affected the whole continent, brought some economic development and initiated economic growth in a number of countries. According to Maddison (2003), 35 of the 48 countries surveyed had some significant growth in income

per capita over the 1950–2000 period, where income was measured in gross domestic product in parity purchasing power (GDP–PPP). Christian missionaries devoted much time and effort to promote modern education, especially between 1930 and 1960. This effort was later taken over to a large extent by the newly established states, and by the time of independence (around 1960 for most countries), virtually all countries had a national system of primary and secondary schools, often working side by side with missionary schools.

More recently, Islamic schools developed, especially in West Africa, with subsidies from Arab countries. According to the United Nations recent review (UNPD 2002), urbanisation developed rapidly in Africa in the second part of the 20th century, tripling from an estimated value of 11.5 per cent in 1950 to 34.3 per cent in year 2000. Monotheist religions also expanded during the 20th century. Islam expanded further south from its traditional base in the northern part of the Sahelian band going from the Senegal River to Egypt. With the Catholic and Protestant missionaries, Christian religions expanded rapidly in most of sub-Saharan Africa south and east of the rain forest, and converted numerous populations in southern, central and eastern Africa, as well as in Madagascar. As it will be seen below, all these changes had effects on the age at marriage.

In his seminal work on marriage in sub-Saharan Africa, Van de Walle (1967) analysed a variety of censuses and surveys available at that time, and paid great attention to the quality of data. He noted the frequent age misreporting around the age at first marriage, in particular under-reporting of women in their teens and over-reporting of women over age 20, which suggests that young married women preferred to appear older than they were. Despite this bias, the singulate mean age at marriage (SMAM), estimated from proportions of ever married women by age in censuses, was found to be low (below age 20) in most countries investigated, ranging from 15.2 in Niger to 19.4 in Mozambique, with the exception of Burundi where the SMAM was 22.1 years. He also found significant variations by regions within the same country. In further work on the same topic, using World Fertility Survey (WFS) data and Demographic and Health Survey (DHS), the same author (Van de Walle 1993) observed a similar range of the median age at marriage (from 15.6 to 19.7 years) in more recent periods, and a relatively close relationship with the SMAM found in censuses, though the latter tended to be usually somewhat higher. At the end of a careful analysis of uncertainty in the

data, the author concluded that age at first marriage has tended to increase since the beginning of data collection, and that in eastern and southern Africa it was breaking the threshold of 20 years. Changes in age at marriage could explain in part the differences between median age estimated from surveys and SMAM estimated from censuses.

A great deal of attention has been devoted to the quality of data on age at first marriage, age at first birth, and age at first sexual intercourse in WFS and DHS surveys (McCarthy 1982; Blanc and Rutenberg 1990; Gage 1995). In WFS and DHS surveys, marriage includes in principle both formal marriage (whether legal in the modern sense or traditional) and consensual unions with cohabitation. In most countries throughout Africa, first cohabitation is usually synonymous with first marriage, and this is virtually universal in rural areas. However, in large cities many young women now cohabit with a partner before the first marriage, especially in the recent years. The WFS surveys included a question on “type of union”, which allows comparison of “common law unions” with “formal marriages”, whether modern or traditional. In six out of ten African surveys, only formal marriage was taken into account by the fieldworkers as a “union” (Cameroon, Ghana, Kenya, Lesotho, Nigeria, Sudan). In two WFS surveys, common law unions were rare compared to formal marriages (Benin: 8 per cent, and Senegal: 0.1 per cent). In the remaining two countries (Cote d’Ivoire and Rwanda) a large proportion of unions were not coded as formal marriages (22 per cent and 41 per cent respectively). The case of Rwanda, a very Catholic country, seems doubtful, and it seems likely that most of these unions were equivalent to what was called “traditional marriage” elsewhere. The case of Cote d’Ivoire seems different, and in the 1999 DHS conducted in the same country, a relatively high proportion of women currently in union declared to not be formally married (25 per cent), a proportion similar to that of first unions in the 1980 WFS survey. In any case, the mean age at first marriage and the mean age at first informal union appeared similar in all cases investigated: in two countries (Benin and Cote d’Ivoire) there was no significant difference (18.7 and 18.4 years respectively, $P= 0.33$ in Benin; 17.4 and 17.6 years respectively, $P= 0.16$ in Cote d’Ivoire), and in Rwanda the difference was very small, without any practical implication (19.2 and 18.9, $P < 0.05$). Due to very small numbers ($n= 5$ common law unions), the same comparison could not be conducted in Senegal. In summary, estimates of age at marriage in WFS and DHS surveys seem robust to marriage definitions, and consistent with SMAMs.

In WFS and DHS surveys, the date of first marriage was usually taken as the date of first cohabitation in union, although two countries (Senegal and Burkina Faso) used the date of marriage consummation as a reference. In these two countries, where marriage is universal and early, the two dates are likely to be very similar, and if anything the definition chosen could only reduce the median age at marriage by a few months. In DHS surveys, date of birth and date of first marriage are reported for all women in month and year, and age at first marriage is computed from these dates. Further crosschecking is conducted with the date of the first birth and the interval between first birth and first union. Therefore, one can expect a good accuracy of age at marriage data, and internal consistency with birth histories. In general, data on age at first marriage were found of good quality in WFS and DHS surveys, with details on dates by month and year in a large majority of cases. The proportion of cases where the year of marriage had to be imputed was low in almost all countries, with the exception of Malawi, 1992 and to a lesser extent of Tanzania, 1991 (Gage 1994). Some heaping on date of marriage was noted, though with a relatively minor incidence in most surveys, with an index on date heaping ranging from 0.97 (Rwanda) to 1.39 (Nigeria).

Further investigation conducted for this study showed that only the "15 years" milestone attracted many women as an age at first marriage in DHS surveys, and otherwise the distribution of age at marriage by single year for age 10 to age 30 was smooth, and close to a Poisson distribution. While investigating trends, Gage (1995) also found evidence of small increases in age at marriage in a number of African surveys, and some irregularities in others (such as Nigeria, Kenya and Sudan), interpreted as age misreporting, although formal trend analysis and testing differences were not conducted.

The aim of this study is to provide a new look at trends in age at marriage in sub-Saharan African countries, by using more data than were available 10 years ago, and by attempting to relate changes in age at marriage, as well as differences between countries, to the modernisation processes. By modernisation, we mean here large social changes susceptible to have an effect on age at first marriage, such as level of education, income, and urban residence; we also included some cultural factors susceptible to change over time, such as polygyny and religion. This study is part of a more comprehensive investigation of the factors of premarital fertility in sub-Saharan Africa.

DATA AND METHODS

This study utilised all WFS and DHS data sets from sub-Saharan Africa available in early 2004: 10 WFS surveys, and 58 DHS surveys, covering 32 countries and about 85 per cent of African populations. Most of these surveys were based on samples of women aged 15–49 years of any marital status, though two surveys were based on ever-married women (Lesotho 1977; Sudan 1989). For these two surveys, the median age was not considered for the most recent cohorts, because of the selection bias inducing a lower median age at marriage than in the whole population. However, since most women were ever married by age 25, the median age at marriage could be studied for earlier cohorts in both of these countries.

Median age at first marriage (the age by which 50 per cent of a cohort is ever married) was systematically computed for each survey by 5-year birth cohorts, from women born in 1925–1929 to women born in 1975–1979, whenever available. When several surveys were available for the same country, data were merged for the same cohorts. Cohorts of less than 100 women were ignored, to avoid large fluctuations due to sample size. Data cover some 50 years of social change, and a large part of the second part of the 20th century, since most of these women would have married between 1940 and 1999. Some countries with both WFS and DHS surveys (Benin, Cameroon, Cote d'Ivoire, Ghana, Kenya, Nigeria, Rwanda, Senegal, Sudan) are better documented than others, since they cover almost the whole period, and others with only one survey (either WFS or DHS) allow only limited analysis (Botswana, Burundi, Chad, Central African Republic, Comoro Islands, Ethiopia, Gabon, Guinea, Lesotho, Liberia, South Africa).

Demographic data on median age at first marriage were matched with a series of social and economic data: income, level of education, urbanisation, polygyny, and religion. Data on income per capita were derived from the OECD data bank (Maddison 2003). They are expressed as the gross domestic product, corrected for parity purchasing power (GDP–PPP), converted into constant 1990 USD. Income data were grouped by 5-year period, and were matched with cohort marriage data by shifting the former by 20 years. For instance, income data for 1950–1954 were considered the income conditions prevailing at the time of marriage of the 1930–1934 cohort.

Data on urbanisation were derived from the databank gathered by the United Nations Population Division (2002). Here again period values were fitted to cohort data by shifting the cohort values by 20 years, as for income.

The proportion urban in the surveys were compared to the UN data and found to be consistent with respect to the ranking of countries, though systematically 7 per cent higher than the survey estimates. This may be due to selection biases induced by the surveys focusing on female adults in their reproductive ages, who are more likely to be urbanised than the total population.

Other modernisation data were derived directly from the WFS and DHS surveys. For education, the mean number of years schooling was computed for each 5-year birth cohort. The prevalence of polygyny was expressed as the proportion of currently married women aged 15–49 in a polygynous union. Religions were grouped into three categories: Christian, Muslim and other and unknown, the last category grouping primarily traditional religions prevailing in Africa before the arrival of monotheist religions. The proportions of Christian and Muslim women were used in the analyses.

Consistency between the surveys was tested by comparing the estimates of the median age at first marriage for the same cohorts between successive surveys. Consistency was high altogether and no systematic bias was found. Out of the differences between the 159 pairs of estimates of median age at first marriage matching the same cohorts in the same country, most were small (on the average ± 6 months), and not statistically significant (109/159) using a simple test ignoring the design effect of each sample survey. When a design effect of 1.8 was used, a common value for DHS surveys, only 36 differences remained significant. No difference exceeded 18 months, and most differences were within ± 12 months (147/159). When needed, trends in median age at marriage were also systematically tested on segments when they were monotonic by using linear regressions on time period.

Multiple regressions were used to evaluate the net effect of income, education, time period, urbanisation, polygyny and religion on levels and trends in median age at first marriage.

RESULTS

Levels

Estimates of the median age at first marriage derived from DHS surveys were consistent with earlier estimates, though they covered a wider list of countries and more time periods (Table 1). Most estimates by country lay within the 15–19 age band when all cohorts were combined. The main outliers were Namibia, Botswana, and South Africa, with median ages at marriage averaging 24 years. Only three other countries exceeded 19 years on the average:

Rwanda, Burundi, and Gabon. On the low side, only two countries had an average median age at first marriage below 16 years: Niger and Chad. The clusters of high values in southern Africa (Namibia, Botswana, South Africa), and to a lesser extent in central Africa (Rwanda, Burundi), as well as the clusters of low values in north-western Sahelian Africa (Mali, Niger, Chad) suggest links with cultural factors, and in particular with ethnicity and religion. The other countries investigated fitted well with common knowledge of low median age at first marriage and high homogeneity, in the range of 16–18 years. The overall average was 18 years, which was also the modal value of the distribution by country.

Table 1 Median age at first marriage, by birth cohort, selected African countries

Country	Women's year of birth (cohort)										
	1925– 29	1930– 34	1935– 39	1940– 44	1945– 49	1950– 54	1955– 59	1960– 64	1965– 69	1970– 74	1975– 79
Benin		19.5	18.8	18.3	18.0	18.0	18.5	18.4	18.6	18.7	18.9
Botswana			22.2	25.3	23.2	22.3	24.4	25.5			
Burkina Faso				17.7	17.3	17.4	17.4	17.3	17.4	17.4	17.5
Burundi			20.3	19.3	19.4	19.5	19.4	19.8			
Cameroon	18.1	18.0	17.0	16.9	16.4	16.8	16.9	17.0	17.2	18.1	18.6
Cen'l Afr'n R.					17.3	16.5	17.6	17.3	17.3	17.3	
Chad					15.2	15.6	15.7	15.9	15.8	16.0	16.4
Comoro Is.					17.7	17.7	17.8	18.3	20.1	20.7	
Cote d'Ivoire		17.5	17.7	17.6	17.4	17.8	17.6	17.8	18.2	19.2	20.2
Ethiopia						15.6	15.7	15.7	15.8	16.9	18.1
Gabon						17.8	19.1	19.3	19.9	20.4	20.1
Ghana		18.5	18.0	17.8	18.1	18.3	18.4	18.7	18.9	19.4	19.5
Guinea						16.1	16.2	16.9	16.2	16.3	16.5
Kenya	17.9	18.6	17.4	17.8	17.6	18.2	18.4	18.8	19.7	20.3	
Lesotho	18.1	18.4	18.7	18.6	18.5	18.4					
Liberia			16.2	16.5	16.5	17.3	17.4	18.3			
Madagascar				17.3	17.4	17.9	18.1	18.3	19.0	18.8	18.8
Malawi				18.0	18.3	18.1	17.2	17.6	17.5	18.0	18.3
Mali			15.6	15.8	15.6	16.0	15.9	16.1	16.1	16.4	16.6
Mozambique					16.6	17.3	16.6	16.8	17.5	17.3	17.3

Country	Women's year of birth (cohort)										
	1925– 29	1930– 34	1935– 39	1940– 44	1945– 49	1950– 54	1955– 59	1960– 64	1965– 69	1970– 74	1975– 79
Namibia				23.1	23.9	24.5	24.7	25.8	26.9		
Niger				14.7	14.8	15.0	14.9	15.0	14.9	15.5	15.7
Nigeria		17.7	17.4	17.2	16.8	16.5	16.4	17.0	17.6	19.2	19.7
Rwanda		19.9	19.3	18.4	19.0	19.4	20.0	20.3	21.1	21.1	20.7
Senegal		15.7	15.7	15.7	15.9	16.2	16.7	16.8	17.5	19.0	
South Africa					23.4	22.5	23.0	23.8	25.2		
Sudan	15.9	16.0	15.6	16.0	15.6	16.1	16.4	17.6	17.2		
Tanzania				17.0	16.5	17.7	17.1	18.3	18.8	19.3	18.9
Togo			18.6	18.6	18.3	18.6	18.4	18.8	18.8	18.9	21.9
Uganda			16.5	16.8	16.8	17.1	17.0	17.5	17.7	17.8	17.9
Zambia				17.0	16.5	17.1	17.1	17.5	18.2	18.6	18.5
Zimbabwe			19.0	18.2	18.4	18.9	18.7	18.7	19.7	19.7	19.7
Weighted ave.		17.7	17.3	17.2	17.5	17.4	17.4	17.9	18.3	18.5	18.7

Source: Calculated from WFS and DHS data

Compared to estimates of the singulate mean age at marriage in censuses published by Van de Walle (1993), the estimates of the median age were in close relationship (correlation coefficient = 0.87), which cross-validates the two approaches. Estimates of median age tended to be lower by 1.2 years on the average than estimates of singulate mean age. This was somehow expected since in a Poisson distribution of mean equal to 18 years the median tends to be 0.7 years lower than the mean. Given the inaccuracies on age in censuses and the confidence intervals associated with estimates in sample surveys, these estimates of age at first marriage can be considered as equivalent. Furthermore, most trends noted by Van de Walle were consistent with the trends noted below (Botswana, Burundi, Ethiopia, Ghana, Kenya, Liberia, Rwanda, Senegal, Tanzania, Zimbabwe).

Trends

Trends in median age at first marriage are displayed in Table 1, by country and birth cohort. The variety of situations is remarkable. The most common case is a stable level followed by an increase in the recent years. A majority of countries (20/32) showed a steady increase in age at marriage, sometimes only

in recent cohorts (Chad, Comoro Islands, Cote d'Ivoire, Ethiopia, Gabon, Kenya, Liberia, Madagascar, Mali, Mozambique, Namibia, Niger, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe). In Togo, the increase was limited to the most recent cohort, and was highly significant ($P < 0.0001$). Another group of five countries showed no obvious trends: Burkina Faso, Burundi, Central African Republic, Guinea, Lesotho (although data stop in 1977 for the latter). A third group (6 countries) had first declining age at marriage for the earlier cohorts, and then increasing age at marriage for the later cohorts (Benin, Botswana, Cameroon, Ghana, Nigeria, Rwanda). The last country (Malawi) seemed to show declining age at first marriage until the 1970 cohort, though it should be remembered that many dates of marriage were imputed in the first survey, and are therefore not genuine. In some cases, the increase in the median age at first marriage was quite dramatic in absolute value, in particular in Togo (+3.6 years), in Senegal (+3.3 years), in Nigeria (+3.2 years), in Comoro Islands (+3.0 years), and in Rwanda (+2.7 years).

Trends in urban areas

Trends in urban areas were stronger and more consistent (Table 2). In all countries investigated, the increase in median age at first marriage in urban areas was marked and significant for the recent cohorts, even in countries where no trend was seen for the country as a whole, because of a high proportion of the population living in rural areas. In some countries however, the trend was declining for the first cohorts, and increasing later (Benin, Botswana, Ghana, Liberia, Nigeria, Sudan, Togo). In one country (Burundi), the sample of urban population was too small for making a useful assessment of trends in age at marriage. Differences between urban and rural estimates were quite large given the overall range of variation. On the average, there was virtually no difference between urban and rural areas for the earlier cohorts (1930–1934), the difference was about 1 year for women born in the 1950s and 2.6 years in the recent cohorts (1975–1979), and increasing fast. Recent increases in urban areas of some countries were quite dramatic, compared to the baseline bottom values: +8.2 years in Senegal, +6.5 years in Ethiopia, +5.2 years in the Comoro islands, +5.0 years in Kenya, +4.5 years in Cote d'Ivoire, and +4.4 years in Niger (Figure 1). Even in countries with a low level of female education, such as Burkina Faso, Ethiopia, Mali, Niger and Sudan, dramatic increases in urban age at marriage did occur.

Table 2 Median age at first marriage in urban areas, by birth cohort, selected African countries

Country	Women's year of birth (cohort)										
	1925– 29	1930– 34	1935– 39	1940– 44	1945– 49	1950– 54	1955– 59	1960– 64	1965– 69	1970– 74	1975– 79
Benin			19.6	19.2	19.0	18.7	19.5	19.4	20.0	19.9	20.8
Botswana				24.9	22.1	23.4	24.3	25.0			
Burkina Faso					17.4	17.7	17.9	17.9	18.5	18.7	20.7
Burundi											
Cameroon	17.2	18.8	16.7	17.2	17.3	17.9	18.0	17.9	18.2	20.2	
Cen'l Afr'n R.					16.8	15.7	17.2	17.0	17.1	17.6	
Chad					15.3	15.6	15.8	16.2	16.0	16.4	16.8
Comoro Is.					17.7	18.3	17.8	19.3	22.8		
Cote d'Ivoire		16.7	17.4	17.6	17.5	18.1	18.1	18.1	19.4	21.2	
Ethiopia						15.4	15.4	15.8	16.3	19.3	21.9
Gabon						18.6	19.4	19.3	20.5	20.8	20.8
Ghana		19.3	18.6	18.1	18.7	18.7	19.0	19.4	19.9	21.3	
Guinea						17.1	17.0	17.7	17.5	17.1	18.4
Kenya		18.4	16.3	18.2	18.4	19.5	19.5	20.2	21.4	21.2	
Lesotho			19.0	20.1	19.5	19.7					
Liberia			18.5	17.5	17.1	17.8	17.8	19.3			
Madagascar					18.9	19.8	20.0	20.4	20.8	20.6	
Malawi					17.8	18.6	18.0	18.1	18.3	18.7	19.8
Mali				15.4	15.6	16.7	16.2	17.0	17.1	17.9	18.6
Mozambique					18.1	17.9	17.4	18.4	17.8	18.2	19.0
Namibia				25.2	25.4	27.0	26.4	26.6	26.3	26.4	
Niger					15.0	15.4	15.3	15.6	16.3	17.4	19.4
Nigeria		18.4	19.8	18.4	18.3	17.9	17.9	18.7	20.2	20.5	
Rwanda						20.4	20.8	21.2	22.2	21.8	22.3
Senegal		16.2	15.8	16.2	16.7	17.5	18.4	18.9	20.6	23.9	
South Africa					23.8	23.0	23.7	24.5	26.4		
Sudan		16.2	16.5	16.1	15.7	16.4	17.5	18.7	17.8		
Tanzania				17.0	17.1	17.8	17.2	18.7	19.4	20.2	20.6
Togo				19.9	19.6	19.2	19.5	20.0	19.8	21.2	

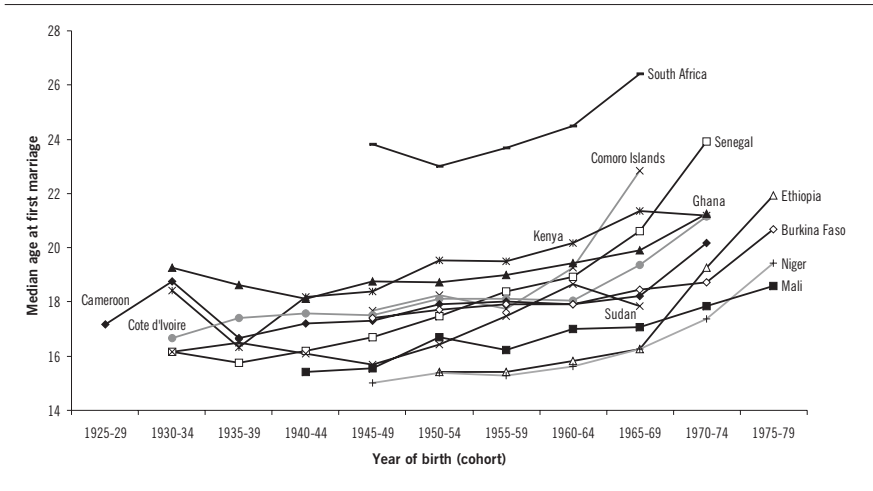
Country	Women's year of birth (cohort)										
	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79
Uganda					17.5	18.5	17.8	18.7	19.2	19.2	19.7
Zambia				16.8	16.2	17.4	17.1	17.7	19.0	19.1	19.4
Zimbabwe				19.4	18.8	19.4	19.2	19.3	20.8	21.1	20.8
Weighted ave.		18.0	18.3	17.8	18.2	18.1	18.2	18.8	19.6	20.0	20.4

Source: Calculated from WFS and DHS data

Socio-economic determinants

The regression of median age at first marriage on modernisation variables revealed the most salient factors of change in age at marriage (Table 3). Three factors had a net positive effect: time, income and education, and three factors had a net negative effect: urbanisation, polygyny and religions (both Christianity and Islam). The effect of education seems straightforward, since when girls go longer to school they tend to delay their first marriage. The effect of income was in the expected direction, and seems to reveal the effects of westernisation. This may include the image of modern roles coming from Western societies, and possibly the effect of female labour force participation: the higher the level of income, the higher the level of employment of young

Figure 1 Typical increase in median age at first marriage in urban areas of selected African countries



women, and the later the first marriage. The net effects of polygyny and of monotheist religions were also in the expected directions, and particularly strong for Islam. The net effect of urbanisation was surprising at first glance, since it was negative, that is more urbanisation in a country was associated with lower age at first marriage, once other variables were controlled for. This may reveal more marriage opportunities for women in cities, given a level of income and education. Of course, as was seen above, urbanisation per se was associated with later marriage, because cities cumulate higher income and higher education. The time trend was positive, though no longer significant after controlling for all the factors.

Further investigation was conducted using the same regression model, and dropping some variables. The effect of time trend and religions remained consistent in a variety of situations. The effect of education increased (from 0.405 to 0.493) when income was dropped, and likewise the effect of income increased also (from 0.00059 to 0.00076) when education was dropped. A possible explanation is that the net effect of income works primarily through employment, itself function of level of education. The negative effect of urbanisation remained when income or education were dropped separately, but disappeared and became positive (from -3.45 to +2.85) when both were dropped together. This shows that the positive raw correlation between urbanisation and age at marriage is primarily due to the net effects of education and income. Last, the effect of polygyny increased significantly in absolute

Table 3 Multivariate analysis of the factors of the median age at first marriage, by birth cohort, selected African countries

	<i>Constant</i>	<i>Cohort</i>	<i>Education</i>	<i>Income</i>	<i>Urban</i>	<i>Polygyny</i>	<i>Christian</i>	<i>Muslim</i>
		<i>Year of birth</i>	<i>Nb of years schooling</i>	<i>GDP-PPP in USD</i>	<i>Per cent urban</i>	<i>Per cent in polygamous union</i>	<i>Per cent in population</i>	
B coefficient	14.547	0.003	0.405	0.001	-3.454	-1.998	-3.572	-4.615
Standard error	20.323	0.010	0.069	0.000	1.101	0.840	0.641	0.597
Beta	0.000	0.019	0.419	0.299	-0.209	-0.136	-0.538	-0.731
T-value	0.716	0.302	5.859	5.130	-3.138	-2.380	-5.575	-7.734
Significance level	0.475	0.763	0.000	0.000	0.002	0.018	0.000	0.000

NB: Dependent variable: median age at marriage, by country and cohort

value (from -2.15 to -3.44) when education was dropped, which indicates that education modulates somewhat the impact of polygyny.

Induced effects of independent variables

The absolute effect of each variable could be measured by the impact of a change in one standard deviation for each independent variable: being born 12.7 years later would induce an increase in median age at marriage of 0.04 years, other things being equal, a small effect indeed; 2.2 more years of education would bring an increase of 0.89 years, and 1072 USD higher GDP an increase of 0.63, two notable effects of about the same magnitude; 13 per cent more urban population would bring a decline of -0.43 years, 14 per cent more polygyny would lead to a decline of -0.29 years, 32 per cent more Christians a decline of -1.14 years, and 34 per cent more Muslim a decline of -1.45 years in the median age at first marriage, the largest net effects for a standard deviation.

Another way at looking at the global effect of modernisation is to take arbitrary values of typical modernisation over a 50-year period, and to calculate the absolute change induced: increase in income from 500 of 2500 USD

Table 4 Net effect of independent variables on median age at marriage

	<i>Cohort</i>	<i>Education</i>	<i>Income</i>	<i>Urban</i>	<i>Polygyny</i>	<i>Christian</i>	<i>Muslim</i>	<i>Median age at marriage</i>
Net effect on one unit (standard deviation)								
Elasticity	0.003	0.405	0.001	-3.454	-1.998	-3.572	-4.615	
Unit (St Dev)	12.67	2.19	1072	0.13	0.14	0.32	0.34	
Net effect	0.04	0.89	0.63	-0.44	-0.29	-1.14	-1.55	
Net effect of typical development								
Before (Xi,1)	1930	1	500	0.1	0.35	0.45	0.3	
After (Xi,2)	1980	8	2500	0.45	0.1	0.55	0.35	
Induced effect								
Before (Y1)	6.09	0.41	0.3	-0.35	-0.7	-1.61	-1.38	17.3
After (Y2)	6.24	3.24	1.48	-1.55	-0.2	-1.96	-1.62	20.2
Net change (Y2-Y1)	0.16	2.84	1.18	-1.21	0.5	-0.36	-0.23	2.9

(consistent with leading countries such as Botswana or Gabon), increase in education from 1 to 8 years (consistent with countries such as Kenya or Nigeria), increase in urbanisation from 10 per cent to 45 per cent (consistent with countries such as Botswana), decline of polygyny from 35 per cent to 10 per cent, and minor change in religious affiliation (Christian from 45 per cent to 55 per cent and Muslim from 30 per cent to 35 per cent), values consistent with average trends in the continent according to DHS surveys. The change for the median age at first marriage would be an increase of 2.9 years (from 17.3 to 20.2), most of which would be attributable to education (+2.84 years) and income (+1.18 years) plus a small contribution of time trend (+0.16 years) and of the decline in polygyny (+0.50 years), and despite the negative effect of urbanisation (-1.21 years) and religious affiliations (-0.36 and -0.23 respectively for Christianity and Islam). This finding reveals the leading mechanisms of increases in age at first marriage: education and income.

Outliers and cultural factors

A number of countries lay far away from values predicted by the regression model given their background characteristics (income, education, urbanisation, polygyny, religion). Taking the mean residuals by country, and a gap of at least 1 year between the observed and the predicted value of median age at first marriage identified a short list of 12 countries out of the 32 investigated: 6 positive outliers (observed value higher than expected) and 6 negative outliers (observed value lower than expected). Positive outliers were: Namibia (24.8 observed, 20.6 predicted), Botswana (23.8 observed, 21.3 predicted), South Africa (23.6 observed, 21.2 predicted), Rwanda (19.9 observed, 18.4 predicted), Burundi (19.6 observed, 17.8 predicted), and Comoro Islands (18.7 observed, 16.9 predicted). Negative outliers were: Niger (15.1 observed, 16.1 predicted), Liberia (17.0 observed, 18.5 predicted), Zimbabwe (19.0 observed, 20.5 predicted), Mozambique (17.1 observed, 18.6 predicted), Lesotho (18.5 observed, 20.1 predicted), and Gabon (19.4 observed, 21.8 predicted). The residual analysis underlines the heterogeneity of the sample of countries with respect to our modernisation variables, and the likely influence of specific factors, cultural or contextual, in these countries.

Accounting for declining trends in earlier periods

The declining trends in median age at marriage for earlier cohorts has not been documented so far. The regression model provides clues to understand this

unexpected finding. In Benin, the median age declined from 19.5 in 1930–1934 cohort to 18.0 in 1945–1949 cohort. This can be explained in part by the negative effect of urbanisation, which rose from 5 per cent to 17 per cent and the expansion of monotheist religions (16 per cent to 33 per cent for Christianity and 14 per cent to 19 per cent for Islam). The net effects of these three variables already explained a decline of -1.19 years in median age at marriage, 79 per cent of the total decline. This occurred in a context of steady income, and minor rise in level of education (from 0.1 to 0.9 years of schooling) which had only marginal effects.

In Cameroon, median age at marriage also declined from 18.0 in 1930–1934 cohort to 16.4 in 1945–1949 cohort. However, in this case, the model could not explain the change: the net effects added up to an predicted increase of 1.21 years, instead of the observed decrease of -1.60 years, and only urbanisation had a negative impact, though very small effect (-0.30 years).

In Ghana, median age at marriage declined from 18.5 in 1930–34 cohort to 17.8 in 1945–1949 cohort. This was associated with increasing urbanisation, and increasing proportions Muslim, both of which explain 78 per cent of the decline in median age at first marriage (-0.29 and -0.25 years respectively), in a context of minor changes in education and income.

In Malawi, like in Cameroon, the model explained little of the decline in median age at first marriage from 1940–1944 to 1955–1959 (18.0 to 17.2 years). The model predicted rather an increase of 1.02 years, and the negative effects of urbanisation and increasing number of Christians accounted only for a small fraction (28 per cent) of the decline in age at marriage. In Nigeria, median age at first marriage declined steadily from 17.7 in cohort 1930–1934 to 16.4 in cohort 1955–1959. This decline could be explained almost fully (92 per cent) by increasing urbanisation (-0.45 years) and increasing Islam (-0.65 years). However, this should have been compensated by the rise in education ($+0.94$ years) and income ($+0.39$ years), so that all factors included, the model does not predict the decline in age at marriage. In summary, the model provides some clues to understand the decline in median age at marriage in certain countries, primarily as an effect of urbanisation and religious affiliations, though is not able to explain per se all changes observed.

Accounting for increasing trends in later periods

Running a similar exercise on the 1950–1979 period, or on the last 30 years available led to some extra light in the explanatory power of the model. Over

this period, trends in median age at marriage were increasing or steady. In about two thirds of the countries investigated (19/31), the model performed well, and changes in explanatory variables with a positive effect could explain the rise in age at marriage. In nine countries, the changes in explanatory variables explained about half of the rise in age at marriage: Comoros (+67 per cent), Cote d'Ivoire (76 per cent), Ethiopia (39 per cent), Liberia (61 per cent), Namibia (54 per cent), Nigeria (49 per cent), Senegal (56 per cent), South Africa (72 per cent), and Zambia (43 per cent). In the last three cases, the model failed to fit the changes. In Gabon, the model predicted a decline of -2.6 years (instead of an increase of +2.3 years), primarily attributable to a decline in real income combined with fast urbanisation; in Madagascar and in Togo, the model predicted no change, because of strong negative effects of income and urbanisation balancing the other positive effects, whereas both countries had a significant rise in age at marriage (+1.0 years and +2.6 years respectively). If overall the model performed well, it was found quite sensitive to outstanding situations, in particular to unexpected decline in income.

For the average of the 31 countries, about half of the increase in age at marriage induced by positive variables was attributable to increase in level of education (50 per cent), the rest being attributable to decline in polygyny (22 per cent), increase in income (10 per cent), time trend (5 per cent), and to changes in religious affiliations. For Africa as a whole, the model accounted for about half of the increase in median age at marriage from cohorts 1950–1954 to 1975–1979.

DISCUSSION

This study confirmed the overall impression of low median age at first marriage in Africa compared to developed countries, and the relative homogeneity of the continent, despite some outstanding cases such as Namibia, Botswana and South Africa. It also confirmed the impression of increasing trends, especially in urban areas. However the study revealed that some other changes might have occurred earlier in the 20th century, with lowering ages at marriage in a number of countries. Unfortunately, the data were limited, and did not cover the whole century for all African countries, not counting the fact that data might be biased for earlier cohorts in some countries due to age misreporting.

Computations of median age at first marriage in urban and rural areas refer to current status of the interviewed women. Some women may have grown up in rural areas, married there, and then moved to town or cities with the new

husband where they were interviewed. This will tend to bias downwards the estimates of median age at marriage in urban areas, and only reinforces the value of the differences between the two areas of residence and of the trends noted in urban areas. It is beyond the scope of this paper to do a full analysis of the complex relationships between marriage, migration and urbanisation, which anyway would require more details than available in DHS surveys.

We have also used the current polygyny status at time of survey in various cohorts. Although this provided solid information for cross-country analysis, this may have biased the cohort trends, since older cohorts were older at time of the first survey, and younger cohorts were younger at time of last survey. Since polygyny changes with age, this might have introduced a bias. Furthermore, polygyny status might change over time for the same person, which could not be taken into account. Ideally, one wished to have the polygyny status at time of first marriage for all women, information not available in WFS or DHS surveys.

The study provided some quantitative elements of the effect of well-known or suspected determinants of age at first marriage. Most of those seem classic cases of the effect of modernisation on demographic parameters. It should be remembered, however, that with further modernisation these relationships might prove to be more complex and changeable. For instance, in the 1950s age at marriage for European women went down, and rose dramatically some 25 years later, for a variety of reasons which had less to do with socio-economic changes than with the new opportunities created by the end of the Second World War and later with changing norms and attitudes towards marriage.

Another finding of this study was the many negative factors of age at marriage, in particular religion and polygyny. These negative factors could explain why the median age at first marriage was declining in the early phase, before the effect of income and education could take over. In particular, the spread of monotheist religions probably had a significant impact, which seems to have been neglected so far. Furthermore, the development of a cash economy, increasing income, and new job opportunities in the second phase of colonisation (1930–1960), together with a younger age structure due to more rapid population growth associated with declining child mortality, could also have provided new opportunities for polygyny, by increasing income of older men and increasing the ratio of women aged 15–19 to older men. All these factors could have produced a lower median age at first marriage in the 1950s and 1960s, for women born between 1930 and 1949.

The net effect of urbanisation would necessitate a special study. Part of the negative effect could be due to outstanding countries, with high age at marriage and low urbanisation, such as Rwanda and Burundi which have a heavy weight in a relatively homogeneous sample, or to interaction with the early phase of development which occurred despite low levels of education and income, or to other unknown factors which had an effect on age at marriage and occurred at the same time as urban areas grew.

The positive effect of income was clear in a number of countries with steady economic growth, but difficult to interpret in cases of changing income trends. To document cases where declining income had a negative effect on age at marriage would require further investigations. Furthermore, in many cases the positive effect of income was just counterbalanced by the negative effect of urbanisation. Here again, the complex interactions between income, labour force participation and urbanisation would require more research.

We have interpreted changes in socio-economic variables as normal and desirable changes during the modernisation process, i.e. changes expected to occur with economic development, namely increasing modern education, urbanisation, and rising income. If this approach sounds reasonable for the population as a whole, the situation of the poorer strata might be different. For the poor, social change might be more the result of unwanted external pressure, than of improving situation. For instance, the pattern of circulatory migration, so prevalent in southern Africa, and in particular in the three countries with the highest age at first marriage, is primarily due to an economy organised around mining, and to a tradition of separation of spouses during the apartheid years. This situation might have induced a strong stress on families and on the society as a whole, and might be the main cause of postponement of the first marriage.

Similarly, difficult situations created by civil strife, unrest, international wars or major economic crises, might have put many persons in situations where they simply had to delay marriage. In addition, limitations on arable land, and lack of employment in cities have induced massive out-migration of young men, who would have been eligible for marriage, delaying therefore the marriage of young women. For instance, this could be an explanation for the rapid rise in age at marriage in urban Senegal. So, average for a country does not reflect all the complex individual situations. In many African countries, the local situation has not been steady and favourable to early marriage over the past 25 years. These political situations do not reflect necessarily in national

socio-economic indicators, and might hide other strong determinants of age at first marriage.

The analysis of residuals from the regressions showed that variations in the median age at first marriage could not be reduced to a series of modernisation indicators. Some large discrepancies between observed and predicted values, notably in countries of southern Africa (Namibia, Botswana, South Africa) and central Africa (Rwanda, Burundi), reveal strong social factors, and norms different from the other countries. The case of Comoro Islands is somewhat different, since this island evolved quite independently from the rest of continental Africa. Similarly, low values of median age at marriage in countries such as Niger, Sudan, Uganda, Zimbabwe and Mozambique could not be explained by the regression, and suggest independent cultural effects, which remain to be explored. The case of Zimbabwe is particularly striking when compared to neighbouring countries such as Botswana, Namibia, and South Africa.

Major changes in the median age at first marriage were already visible in a number of countries, and the 20-year threshold was already passed by 9 countries out of the 32 investigated, and by 19 countries for urban areas. Future increases in modern education and income are likely to produce more increases in the median age at marriage, and could be the catalysts for a long nuptiality transition. Future changes in the age at marriage would also change the marriage market for multiple unions and, together with the pronounced fertility decline already in course in Africa (Garenne and Joseph 2002), are likely to reduce the incidence of polygyny, which in turn will have a positive effect on age at first marriage.¹² It seems that many countries in sub-Saharan Africa are just starting a major nuptiality transition, the course of which needs to be monitored and analysed in the future.

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