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Title: Social change, population policy and the Akan reproductive model (Ghana and Côte d'Ivoire)¹

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Introduction

The literature on fertility change in the Developing World has evolved around various hypotheses (Kirk, 1996; Pollak and Watkins, 1993). Two of such hypotheses emphasizes on one hand cultural values, as opposed to material aspects (socioeconomic adjustment) on the other. However, these two approaches are not as opposed as they may seem. Interactions between the associated factors are very likely. Changes in living conditions may impact on cultural values, and vice-versa, and in turn, these changes may lead to fertility decline. This may be interpreted as a convergence of both approaches². This interpretation relies on two main assumptions: 1) fertility or reproductive models are cultural in nature; and 2) these models change over time following socioeconomic changes and/or with population policies (Ofusu, 1992).

In fact, these two hypotheses correspond to two different patterns of fertility variation; at least in Africa. Indeed, in traditional African societies where the social structures are not conducive to huge differentiation in living standards, the most important factors of fertility differentials were cultural values related to reproduction. And these values are ethnic specific (Ofusu, 1992; Lesthaeghe, 1989). Thus, each ethnic group had its own traditional reproductive model.

However, since colonial penetration, African societies (most of which were tribes, i.e. having an ethnic basis) have undergone many structural transformations which also impact on fertility models. This leads Shapiro and Tambashe (1997) to conclude that in the past, fertility was essentially affected by ethnicity, while presently, fertility differentials in Kinshasa are mainly explained by female education (a socio-economic factor).

The aim of this study is to analyze the changing patterns of the reproductive model of the Akan in Ghana and Côte d'Ivoire. We assume that the Akan of both countries had the same traditional reproductive model (broadly speaking) and that the patterns of change in this model are different from one country to another due to variations in socioeconomic development and population policies between both countries. More specifically we intend to:

- 1) describe and compare the changes that occurred in the Akan reproductive model; and
- 2) assess the contribution of social change and population policy to these changes.

This paper is divided into four main sections. The first one includes background information on the Akan and the literature review related to the impact of social change (or modernization) and population policy on fertility. The second section presents the data used and analytical methods adopted in this study. The third section presents the results with a description of the changes in the reproductive model and their determinants. The final section discusses the results and concludes the study.

² Piché and Poirier (1990) have discussed the issue of convergence of various fertility transition approaches, but not necessary in the same way as we put it here.

I Background information on the Akan

1.1 Social organization, marriage and reproduction

In Côte d'Ivoire and Ghana, there are groups who identify themselves as "Akan". They occupy a continuous space around the southern part of the border of both countries. Despite some controversy over whether all these groups belong to the Akan ethnic group (Bohaen, 1974; Roberts et al. 1973; Murdock, 1959), they are all considered as such. More so because they share various identical institutions and cultural traits which characterize their traditional social organization. There are major similarities in Akan family and kinship structures, religion, economic organization and political organization. Like most of African traditional societies, the key element of social organization of the Akan is lineage. It provides the context within which the domestic group operates (Roberts et al., 1973). Lineage among the Akan is formed by members tracing descent from a common female ancestor. The tracing of matrilineal descent is important in almost every aspect of the Akan's social life, in establishing personal status as royal, commoner, or slave, in validating the right to succeed to political office, in claiming citizenship of a particular state, in the utilization of the lineage farm land and houses and in the inheritance of property (Radcliffe-Brown and Forde, 1987). The matrikin is considered as a corporate group which implies joint ownership of property, mutual assistance, etc. (Oppong, 1981).

Marriage is considered as a contract between two lineages, not just a union of a man and a woman (Amon d'Aby, 1960). Girls marry only after puberty, which is officially acknowledged in a public ceremony. Most of the girls enter their first union between 16 and 18 years of age (Radcliffe-Brown and Forde, 1987; Clignet, 1963:95). Marriage gives to the husband exclusive sexual rights and claims to the domestic services of his wife. The wife earns rights to economic support for herself and her children by her husband (Oppong, 1981). Other functions of marriage include providing the husband with the labor force he needs to increase his economic assets, and the wife enough children for the perpetuation of her lineage (Amon d'Aby, 1960). This later objective has an important consequence on fertility behaviour. Indeed, in the Akan societies the survival of the lineage depends on the childbearing capacity of women. Because this reproductive capacity has biological limitations, the matrilineal system seems more vulnerable than patrilineal one. The offspring of the latter depends only on the economic and social ability of males to get new spouses. Matrilineal seems therefore more favourable to high fertility than patrilineal (Vimard, 1993). The consequence of that may be shorter breastfeeding period and postpartum sexual abstinence in matrilineal societies than in patrilineal societies. But a shorter breastfeeding period is also thought to be due to the economic value of women Clignet (1963: 209). Breastfeeding is stopped just before the second anniversary of the child. Duration of breastfeeding is therefore less than 24 months in traditional Akan societies. Polygamy is an admitted practice in Akan marriage systems which are virilocal, with patrilocal residence. The main characteristic of this marriage is its precarity (Amon d'Aby, 1960; Oppong, 1981). The marriage is exogamous (Bohaen, 1974; Radcliffe-Brown and Forde, 1987). However endogamy is tolerated in some groups (Etienne, 1974: 204; Okali, 1983).

1.2 Social changes in the Akan societies

There may have been intrinsic changes in the Akan social organization in recent history. However, changes we are dealing with are those occurred as a result of colonial contact and post-colonial policies. During the first period, factors such as colonial rule, christian missions, formal education, development of cash crop agriculture, development of towns may be considered as responsible of these changes. For over sixty years, the Akan had been subjected to the colonial policies of Great Britain and France regarding these issues (Lystad, 1959; Crowder, 1968).. In most of them, it seems that Ghana was well ahead of Côte d'Ivoire. Evidence of the magnitude of the gap between both countries in term of socio-economic development is given by Green (1971) in his comparison of Côte d'Ivoire of 1957 with Ghana of 1900. All these changes had consequences beyond their own spheres. One of the most important consequences is the impact on kinship structure (Aberle,1961; Cough, 1961; Roberts et al., 1973 and Oppong, 1981; Okali, 1983). During the independence era, three major factors may be identified as the main factors of social change during: the post-independence development policies, new family laws and population policies. Here again, major differences were observed between both countries (Berg, 1971; Gwatkin, 1973; Nortman, 1982).

II Social change, population policy and the reproductive model

2.1 Social change and the reproductive model

There is an abundant literature on this topic. This literature is concentrated on the way independent variables like education, urbanisation, religion, employment (most of which are a measure of female status), etc. affect changes in the reproductive model variables.

It has been observed that education affects the desired number of children which a couple will have (Dow et al., 1981; Appleton, 1996). The level of education also directly affects the level of knowledge and use as well as the choice of contraceptive methods (Guilkey and Jayne, 1997, Agyei and Migadde, 1995; Abdelghany et al., 1990; Shapiro and Tambashe, 1997. Increased in contraceptive practice contributes to compensating for the erosion of traditional practices by educated women. Education and other socio-economic factors has a direct impact on age at marriage and/or cohabitation and also on the duration of breastfeeding (Appleton, 1996; Chimere-Dan,1993; Trussell et al., 1992). The impact of education on breastfeeding contrasts with that observed in many Western countries where educated women are more likely to breastfeed (Trussell et al., 1992). Bonefo (1995) found that the probability for women with zero years of education to resume coitus in any month after a birth was lower than the probability for those with 6 years of schooling. As a consequence education has a negative effect on birth interval lengths in the absence of contraception (Ahn and Shariff, 1994). Education is also known to affect fertility preferences (Mace, 1998; Appleton, 1996; Hyatt and Milne, 1993; Ahn and Shariff, 1994; Onuoha and Timaeus, 1995; Courbage, 1999; Obiero, 1999; and Sonko, 1994). It has been also observed that mean age at marriage increased with educational level (Onuoha and Timaeus, 1995).

There are often significant differences between urban and rural areas as fertility is concerned. Fertility transition seems to be faster in the urban than in the rural areas (Chimere-Dan,1990; Onuoha and Timaeus, 1995; Robinson and Harbinson,1995; Mahler, 1996). Declines occurred more rapidly among better educated urban women. This means that the combination of

urbanisation and education has a stronger effect than each of them alone. Concerning breastfeeding, the duration is always longer among rural women. However, in all countries with both world fertility survey (WFS) and demographic and health survey (DHS), there has been increases in the duration of breastfeeding in the urban areas (Trussell et al., 1992).

When women engage in income earning activities their fertility behaviour is likely to change (Shapiro and Tambashe, 1997; Safilios - Rothschild, 1990; Abdelghany et al., 1990; Benefo, 1995). Employment has also been found to affect contraception use positively (Shapiro and Tambashe, 1997). According to Benefo (1995), modernisation and improved status of women led to a reduction in the length of abstinence.

High fertility here is common among Moslem groups (Knodel et al., 1999; Chimere-Dan, 1990; Oheneba-Sakyi, 1990). In a research report on 'religion and reproduction', Knodel et al., (1999) report that Islam opposes contraception and they also have high fertility preferences. Oheneba-Sakyi (1990) identified adherence to non-Christian religions as one of the factors negatively affecting contraception. Chimere-Dan (1990) also found that fertility reduction was greater in the rural areas due to marital stability for all educational and religious groups with the exception of those with Koranic education, Moslem and traditional religious groups.

2.2 Population policy and the reproductive model

Population policy which lays emphasis on family planning can lead to a change in fertility behaviour. In some cases, the success of family planning programmes have depended on a coercive policy put in place by the government (Caldwell. P, 1999; Abdelghany A M et al., 1990; Robinson WC; Harbison, 1995). This has been the case of China. In other settings, a sustained political commitment at the highest levels to an effective family planning programme is the key factor for fertility transition (Caldwell. P, 1999). Bangladesh is an example of this case. Other examples are Thailand, Taiwan, Korea, etc. But in these latter cases, the family planning programmes were implemented in a context of rapid socio-economic changes. Both factors and their synergy contributed to the rapid fertility transition observed in these countries. It has been, indeed, acknowledged that the impact of each of these two factors is more important in the presence of the other (Bongaarts et al., 1990). Obviously this impact of population programmes on fertility transition operates through increasing levels of contraceptive prevalence. This has been observed by Robinson and Harbison, (1995) in Kenya where about 70% of fertility reduction is accounted for by contraception (and abortion).

From the above literature review, we may retain that the Akan traditional social organization which relies on a matrilineal system was inclined to high fertility. Since the colonial period, this social organization has been subjected to various changes, some of them having a severe impact on the matrilineal system. In so doing they may have contributed in changing the reproductive model of the Akan. However the speed of all these changes may be different in Côte d'Ivoire as opposed to Ghana. This may probably have led to a differential change in the reproductive model of the Akan, depending on whether they are in Côte d'Ivoire or in Ghana.

III Methodology

3.1 Data

We define the reproductive model in terms of the starting, spacing and stopping patterns of fertility. The related variables usually mentioned are: age at first union, age at first birth, practice of abortion, practice of contraception, duration of breastfeeding, duration of postpartum abstinence, etc. The result of the combination of these variables is the number of children a woman may have in her reproductive life span. This is usually measured by the number of children ever born or other fertility indicators such as total fertility rate. The World Fertility Survey (WFS) of the early eighties (1980-81) and the Demographic and Health Survey (DHS) of the middle of the nineties (1993 in Ghana and 1994 in Côte d'Ivoire) provide information related to these variables. The sizes of the sample of Akan women in these surveys are 1680 and 2686 in Côte d'Ivoire and 3314 and 2268 in Ghana. The corresponding proportion of Akan among all the women are 39%, 43%, 57% and 50% respectively. The characteristics of these women are shown in the table 1 below.

Tableau 1 : Distribution of Akan women according to socio-demographic characteristics

Variables and categories	Frequencies							
	Ghana 1980		Côte d'Ivoire 1981		Ghana 1993		Côte d'Ivoire 1994	
	Number	%	Number	%	Number	%	Number	%
1. Age groups								
15-19 years	818	24.68	423	25.18	430	18.96	741	27.58
20-24 years	687	20.73	343	20.42	432	19.05	505	18.82
25-29 years	518	15.63	241	14.35	419	18.47	421	15.69
30-34 years	397	11.98	185	11.01	355	15.65	396	14.75
35-39 years	338	10.20	174	10.36	290	12.79	247	9.20
40-44 years	310	9.35	168	10.00	202	8.91	208	7.75
45-49 years	246	7.42	146	8.69	140	6.17	167	6.23
2 Education.								
- less than secondary school	1763	53.20	1186	70.60	2016	88.89	2172	80.86
- secondary school & more	1551	46.80	494	29.40	252	11.11	514	19.14
3. Religion								
- non/traditional religion	403	12.16	785	46.81	173	7.63	529	19.79
- Christians	2796	84.39	832	49.61	2017	88.97	1935	72.39
- Muslim	114	3.44	60	3.58	77	3.40	209	7.82
4. Place of residence								
- urban	1144	34.52	591	37.18	970	42.77	1120	41.70
- rural	2170	65.48	1089	64.82	1298	57.23	1566	58.30
5. Socialization area								
- urban	1465	44.21	485	28.87	1196	52.76	1378	51.32
- rural	1849	51.79	1195	71.13	1071	47.24	1307	48.68
6. Woman's activity								
- jobless	716	21.61	479	28.51	579	25.63	931	34.70
- professionals and managers	168	5.07	44	2.62	91	4.03	54	2.01
- skilled workers	249	7.52	31	1.85	249	11.02	91	3.39
- sellers/housemaids, etc.	834	25.17	281	16.73	581	25.72	879	32.76
- agricultural workers	1346	40.63	845	50.30	759	33.60	728	27.13
7. Husband's activity								
- jobless	11	0.43	25	1.86	57	3.21	30	1.79
- professionals and managers	485	19.00	205	15.25	290	16.34	322	19.25
- skilled workers	549	21.51	218	16.22	269	15.15	265	15.84
- sellers/houseboy, etc.	308	12.07	227	16.89	435	24.51	268	16.02
- agricultural workers	1199	46.98	667	49.78	724	40.79	788	41.10
8. Women Sector of activity.								
- Jobless	716	29.57	479	29.00	579	25.69	931	34.69
- formal sector	299	12.35	104	6.30	201	8.92	188	7.00
- informal sector	60	2.48	224	13.56	715	31.72	837	31.18
- agricultural sector	1346	55.60	845	51.15	759	33.67	728	27.12
9. Degree of modernization								
- traditional	1039	31.35	783	46.61	882	38.91	943	35.13
- quasi-traditional	1012	30.54	399	23.75	532	23.47	793	29.54
- quasi-modern	641	19.34	323	19.23	674	29.73	627	23.36
- modern	622	18.77	175	10.42	179	7.90	321	11.96
All Akan	3314	56.17	1680	38.74	2268	49.72	2686	42.72

3.2 Analytical methods

3.2.1 Measuring changes in the reproductive model

Changes in Akan reproductive model will be assessed using the Bongaart's proximate determinants model. Bongaarts (1982) retained four proximate determinants which he found to be having the most important inhibiting effect on fertility: marriage, contraception, induced abortion and postpartum abstinence. These four variables account for most of the fertility differentials within and between populations. The fertility effects of these most important intermediate variables are measured by four indices: C_m for marriage, C_a for induced abortion, C_c for contraception and C_i for postpartum infecundability. Due to data limitation only three of them (marriage, abortion, and contraception) will be retained.

The reproductive model changes with the relative contribution (R_x) of each of the intermediate variables in fertility inhibition. Changes in reproductive model may be measured by the contribution of each of the intermediate variables to the variation in total fertility rate. This is done by the decomposition of change in fertility (Bongaarts and Potter, 1983: 106). The variation of the total fertility is equal to $t = (TFR_2 - TFR_1) / TFR_1$. Change in TFR due to a given intermediate variable x is equal to $c_x = (C_{x2} - C_{x1}) / C_{x1}$. The contribution of x to the variation of the TFR is equal to c_x / t .

3.2.2 Assessing the impact of social change and population policy on the reproductive model

a Dependent and independent variables

The changes to be explained are those observed in the intermediate variables and the observed fertility. They will be measured by age at first union for marriage, duration of breastfeeding and duration of postpartum abstinence for postpartum infecundability, contraceptive practice for contraception and the number of children ever born.

The independent variables includes: religion, cultural modernization, social modernization and economic modernization. The cultural modernization variable is a combination of education and urbanization, both being important aspects of the process of modernization. This has been done by combining the variables: level of education, place of socialization and place of residence. We then distinguished four categories of women: 1) traditional women are those born in the village, who have never moved from there (i.e still living in the village), and have not reached secondary school; 2) modern women are born in urban centers, still living there, and have at least secondary school level; 3) quasi-traditional women fill only one of the above criteria and 4) quasi-modern who fill two of them. Age is added into each model as a control variable. In addition to these variables, two other independent variables can be considered if the samples are pooled. These are the dummy variables for "period" and "country". Pooling the two data sets for the same country allows for the creation of the variable "period". On the other hand we obtain the variable "country" by pooling data sets of both countries for the same period.

b Assessing the impact of social change and population policy

The variable “period” will be considered as the main independent variable in the model for assessing the impact of social change for each country. This will be done by comparing the value of the regression coefficient of this variable in two different models: a simple model including “period” (controlled by age) and the saturated model. In fact, the regression coefficient of “period” simply measures the variation of a given dependent variable from period 1 (1980-81) to period 2 (1993-94). In the “bivariate” model, we have the total variation β , and in the complete model, we have the net variation β' , i.e that which considers the same characteristics (those related to social change variables) of the sample at the two periods. The variation from β to β' is due to the introduction of social change variables into the model. Thus the difference $\beta - \beta'$ may be considered as the part of the variation between the periods 1980-81 and 1993-94 due to these variables. And $[(\beta - \beta')/\beta]$ is the associated proportion.

This method for assessing the impact of social change variables derives from Achen's concept of dispersion importance (Achen, 1982: 74). According to the author, the dispersion importance of a given independent variable j (that is how much it contributes to the variance of the dependent variable) is measured by $\beta_j \sigma_j / \sigma_y$. For the second model, the dispersion measure is $\beta'_j \sigma_j / \sigma_y$. The relative variation between the two models is equal to $[(\beta_j - \beta'_j) / \beta_j]$.

As regards population policy, its impact is measured by “country” which is used as a proxy for availability of population policy. We apply the same principle as in the previous case, with some differences however. The impact of population policy is assessed by comparing Côte d'Ivoire and Ghana at the same period (1980-81 or 1993-94). The contribution of the population policy is measured by the net effect of the dummy variable “country”, assuming that there is no unobserved heterogeneity: β' / β .

c Analytical techniques

Different techniques of regression analysis will be used to measure the impact of the independent variables, depending on the nature of the dependent variables: linear regression for the dependent variable “number of children ever born”, logistic regression for dummy dependent variable “contraceptive practice”, and Cox semi-parametric regression model for time varying dependent variables (age at first union, duration of breastfeeding, and duration of postpartum abstinence).

IV Results

4.1 The changing reproductive model of the Akan

4.1.1 The Akan reproductive model at the end of the seventies

In 1980-81, the total fertility rate was estimated at 7,2 for the Akan of Côte d'Ivoire and 6,4 for those of Ghana, meaning that during this period, an average Akan woman in Ghana had about a child (or 11.1%) less than her Ivorian counterpart. The gap between both groups can be observed almost across all age groups as indicated in figure1. For each age group, the fertility rate is higher in Côte d'Ivoire than in Ghana, except that of the 30-34 age group. The difference is even greater at the beginning of the reproductive cycle, meaning that the precocity of fertility was more pronounced among the Akan of Côte d'Ivoire than those of Ghana.

In both countries, the fertility level would have been much higher without the inhibiting effect of marriage, contraception and postpartum infecundability (breastfeeding and postpartum abstinence). In effect, if childbearing was confined to marital unions and all women were married and remained in this state during their reproductive life, the TFR would have increased by 30% in Côte d'Ivoire and 36% in Ghana. The corresponding figures for postpartum infecundability are 29% and 32% respectively, but those of contraception are much lower, 1% and 9% respectively. We may therefore say that during the late seventies, the fertility model of the Akan of Côte d'Ivoire was totally determined by marriage and postpartum infecundability patterns. This is revealed by the respective Rx values (see table 2). In Ghana it was essentially determined by the same two, but contraception started playing a role with 10,4% of the inhibiting effect. The estimate of the total inhibiting effect is 7,5 children in Côte d'Ivoire and 9,7 children in Ghana. Hence the inhibiting effect of contraception is one child in Ghana. The absence of such an effect in Côte d'Ivoire might explain the one child difference between both countries as revealed by the TFR.

Figure 1: Age specific fertility rates among the Akan of Ghana and Côte d'Ivoire

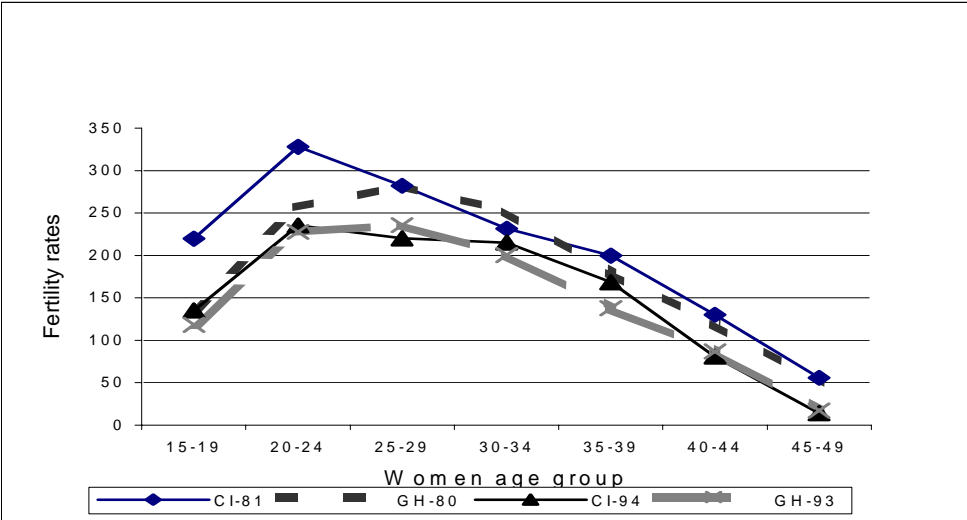


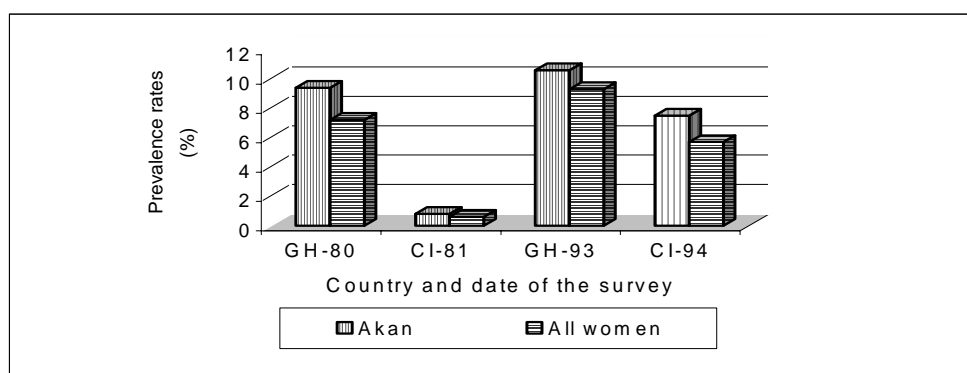
Table 2: Some reproductive model indicators among the Akan for both countries during the two different periods.

Indicators	Côte d'Ivoire			Ghana			Difference Côte d'Ivoire-Ghana	
	1980-81	1994	$\Delta 1$ 1980-94	1980	1993	$\Delta 2$ 1980-93	1980-81	1993-94
TFR	7,2	5,4	-1,8b -25,0a	6,4	5,1	-1,3b -20,0a	-0,8b -11,1a	-0,3b -5,5a
Index of marriage	0,70	0,46	-34,3a	0,64	0,55	-14,1a		
Index of contrac.	0,99	0,93	-6,1a	0,91	0,83	-8,8a		
Index of infecun. (Remaining int. Var.)	0,71	0,70	-1,4a	0,68	0,70	+2,9a		
(Intrereaction factor)	-	-	+21,8a	-	-	-0,6a		
	-	-	-6,1a	-	-	+0,7a		
Rm	50,41	64,14		48,44	52,40			
Rc	1,42	5,99		10,24	16,33			
Ri	48,17	29,87		41,33	31,27			
TF	14,7	17,9		16,1	16,0			
TN	10,8	14,5		11,4	11,7			
TM	10,3	11,6		10,0	9,3			

Note: a = relative variation; b = absolute variation.

We may therefore tentatively conclude that contraception is the factor which largely contributed to the differentials between Akan women of Ghana and Côte d'Ivoire as regards their fertility behaviour. Although not very high, the contraceptive prevalence among Akan women reached 9,4% in Ghana while in Côte d'Ivoire it hardly approached 1% (see figure 2 below). The ten year presence of a population policy in Ghana and its absence in Côte d'Ivoire is probably the reason for this difference. Thus, assuming a fixed cultural context, a family planning programme such as that of Ghana, with all its limits that we know, was able to reduce the number of children an Akan woman may have had by one child after ten years of implementation. A more effective programme would have yielded better results.

Figure 2: Contraceptive prevalence among Akan and all women



As regards the other proximate determinants, the difference between both groups is not as important. Both groups exhibit the same pattern of childbearing starting at the end of the seventies as revealed by figure 3 (the survival curve of age at first union). There is almost no difference between the two groups concerning this variable. The median age at first union is about 17 years, corresponding to the highest value in the traditional model, which implies an increase in this variable compared to the level of the traditional model of reproduction.

Despite the similarity between the two countries with respect to this variable the inhibiting effect of marriage is a little bit more important in Ghana than in Côte d'Ivoire. This might be due to differences in conjugal instability. The severe economic crisis in which Ghana was embedded during the seventies in contrast with the Ivorian economic prosperity during this period could partly explain this difference. The median duration of postpartum abstinence is also the same in both countries at the end of the seventies (figure 4); although the similarity is observed only on the average. The slight difference observed in the inhibiting effect of infecundability between both countries is due to breastfeeding (see figure 5).

Figure 3: Survival curve of age at first union among Akan women, Côte d'Ivoire and Ghana (1980-81)

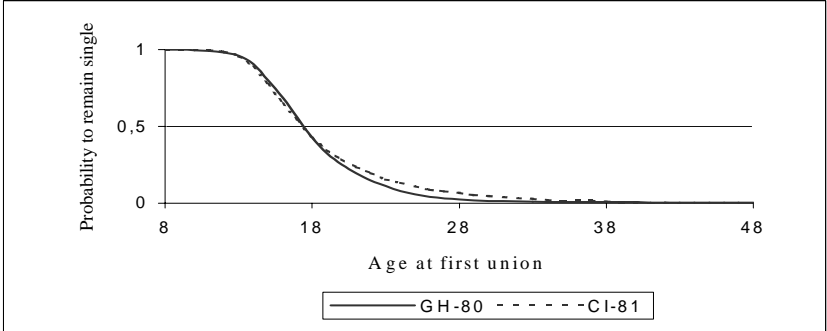


Figure 4: Survival curve of duration of postpartum abstinence among the Akan, Côte d'Ivoire and Ghana (1980-81)

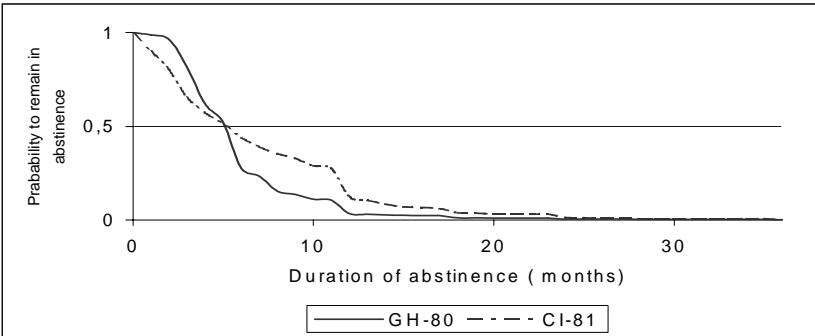
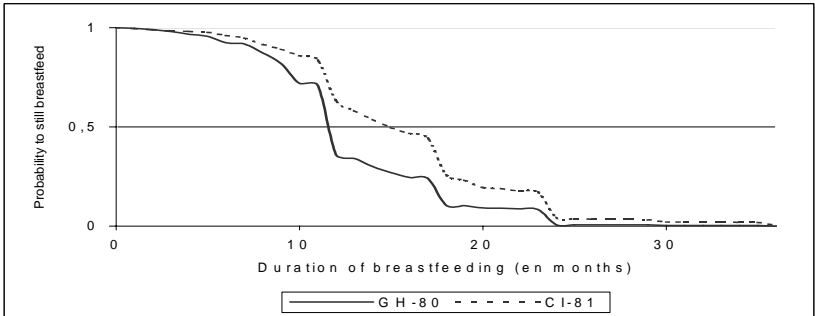


Figure 5: Survival curve of duration of breastfeeding among the Akan, Côte d'Ivoire and Ghana (1980-81)



4.1.2 The Akan reproductive model in the middle of the nineties

The total fertility rate of Akan women dropped to 5.4 in Côte d'Ivoire and 5.1 in Ghana during the 1990s. From one child difference at the end of the seventies, both groups now almost have the same fertility rates. And this might also be observed for the different age groups. The curves of the age specific fertility rates of both countries are almost overlapping, except at the 35-39 age group which must explain the slight difference (see figure 1). This insignificant difference means that the decline in fertility has been more important in Côte d'Ivoire. Here again, it may be attributed to a difference in contraceptive prevalence as there is almost no difference between both groups as regards the duration of abstinence and breastfeeding on average. The survival curves reveal only very slight differences between both groups, especially for breastfeeding. As regards the duration of abstinence, the patterns of the previous period apply here as well. The difference may also be attributed to marriage patterns as indicated by the move to the right of the Ivorian survival curve of first union compared to that of Ghana (see figure 6).

Figure 6: Survival curve for age at first union among the Akan woman, Côte d'Ivoire and Ghana (1993-94)

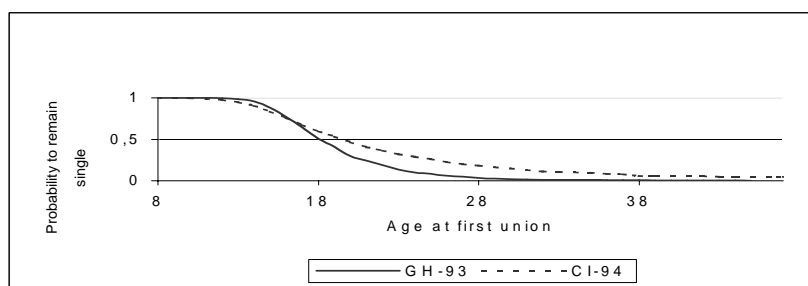


Figure 7: Survival curve of duration of postpartum abstinence among the Akan, Côte d'Ivoire and Ghana (1993-94)

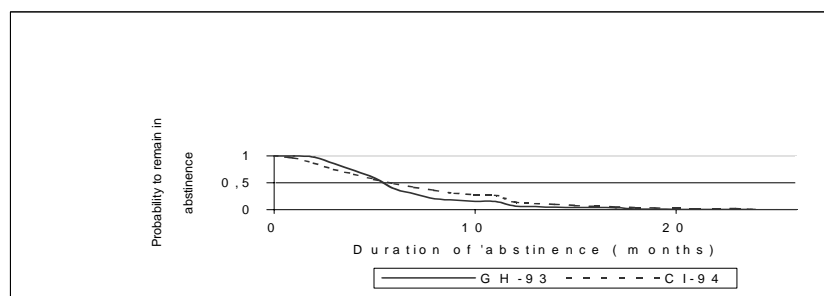
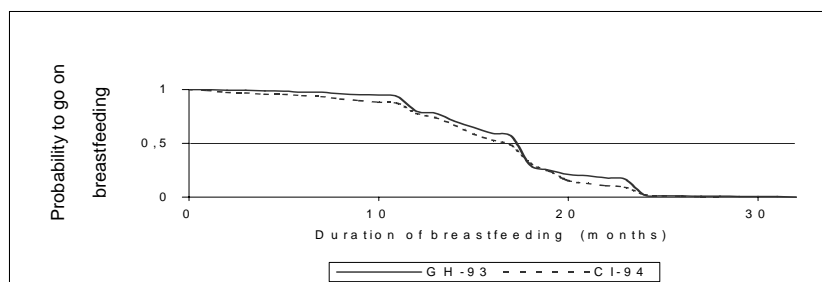


Figure 8: Survival curve of duration of breastfeeding among the Akan, Cote d'Ivoire and Ghana (1993-94)



The consequence of the trends in intermediate variables is that the inhibiting effect of marriage and contraception has increased while that of postpartum infecundability (abstinence and breastfeeding) has remained the same in both countries. If all women of reproductive age were and remained married, the total fertility rate would have been 54% greater in Côte d'Ivoire and 48% in Ghana. The figures for contraception are respectively 7% and 17%. The probable increase in TFR which can be attributed to postpartum infecundability is 30% in both countries. The fact that it remains constant while the other two were increasing leads to a decrease of its contribution to fertility inhibition which has dropped to about 30% in both groups. At the same time those of marriage and contraception have increased. Contraception reduces the fertility of Akan women by 6% in Côte d'Ivoire and by 16% in Ghana. Marriage contributes much more with 64% and 52% respectively. It is the relative late entry in union in Côte d'Ivoire compared with Ghana which contributes to this difference. Another factor may be more instability in unions in Côte d'Ivoire compared with Ghana this time, as the economic situation in both countries has been reversed.

From these figures, we may say that the fertility transition process almost reached the second phase (as suggested by the Bongaart's theoretical model) for the Akan of Ghana and Côte d'Ivoire in the middle of the nineties. At this stage the role of postpartum infecundability in fertility inhibition decreased while that of contraception and marriage increased with a greater prominent role for the latter. This is the case of the sub-population under study. However, the role of contraception is a little bit lower than what is suggested in the theoretical model. This is mostly the case of Ivorian Akan who compensate the absence of effective contraception by delay in marriage in order to achieve lower fertility. This is true for the Akan of Ghana as well but with a higher contribution of contraception, which brings them closer to the theoretical model.

4.1.3 Changes in the Akan reproductive model

From sections 3.1.1 and 3.1.2 above we may conclude that the Akan reproductive model has registered some significant changes from the end of the seventies to the middle of the nineties. These changes are perceptible in the trend of TFRs as well as that of the level of intermediate variables. The total fertility rate of the Akan declined from 1980-81 to 1993-94 at a rate of 25% in Côte d'Ivoire and 20% in Ghana (see table 2). These figures are far higher than 10%, which implies that a nonreversible fertility decline process is underway in both groups. Delayed first union (in both countries, but more specifically in Côte d'Ivoire), a prolonged period of infecundability (due to longer breastfeeding in both countries, but more particularly in Ghana, as abstinence remained almost constant) as revealed by the move to the right of some of the survival curves from one period to another (see figures 9 to 11) and increase in contraceptive prevalence (in both countries, with more important increase in Ghana, figure 2) may be the main mechanisms of this decline. However only the inhibiting effect of marriage and contraception really changed overtime. That of marriage increased considerably and that of the contraception moderately in both countries. Hence the increase in their contribution to fertility inhibition already mentioned in the previous section.

Figure 9: Variation in the survival curve of age at first union among the Akan between 1980-81 and 1993-94.

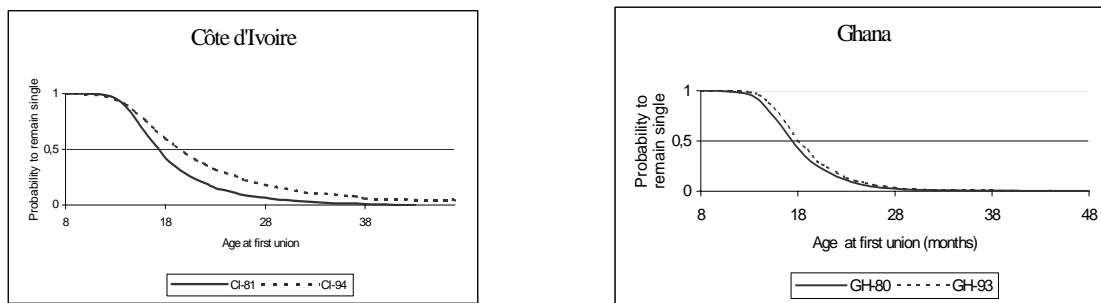


Figure 10: Variation in the duration of postpartum abstinence among the Akan between the two periods

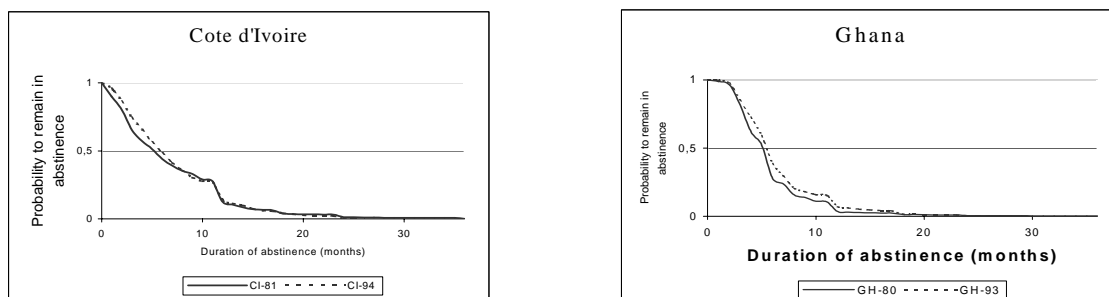
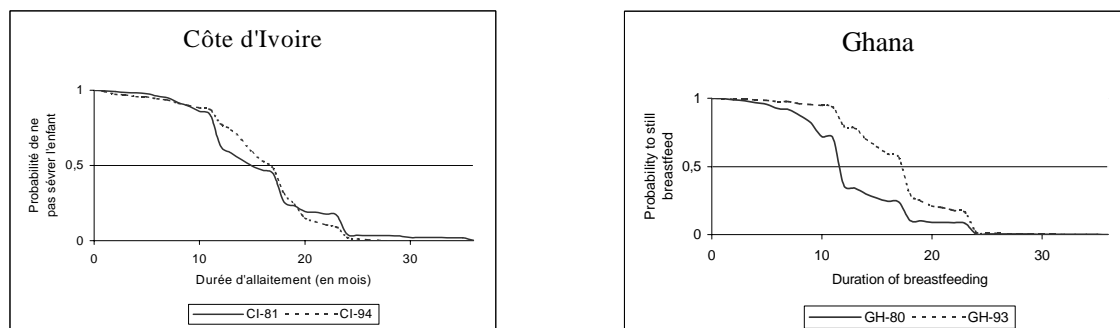


Figure 11: Variation in the duration of breastfeeding among the Akan between the two periods



Yet the contribution measures presented above do not tell us about how much they contributed to fertility changes over time; they only indicate how they contribute for a specific period. In order to assess how each proximate determinant contributed to the variation of TFR from one period to another, we applied Bongaart's decomposition formula whose results are presented in table 3 below. It shows for both countries that delay in marriage patterns have been the most important factors of fertility decline. However, its contribution to the change is almost twice as important in Côte d'Ivoire than in Ghana (-131% against -71%). The second factor contributing to the change is contraception but here its relative importance is almost twice as greater in Ghana than in Côte d'Ivoire (-44% against -23%). This confirms the idea that Ivorian Akan women delay marriage to compensate the lack of effective contraception to achieve similar fertility decline as their Ghanaian counterparts. What could then explain these changes in the Akan reproductive model?

Table 3: Decomposition of change in the total fertility rate (1980/81-1993/94)

Factors responsible for fertility change	Contribution to TFR change Between 1980-81 and 1993-94	
	Ghana	Côte d'Ivoire
Proportion of women married (Pm)	-70.9	-131.4
Contraction practice (Pc)	-44.2	-23.4
Duration of postpartum infecundability (Pi)	+14.6	-5.4
Remaining proximate variable (Pr)	-3.0	+83.6
Interaction factor (I)	+3.5	-23.4
Total	100.0	100.0

4.2 The determinants of changes in the Akan reproductive model

In order to answer the above question, we make three types of analysis. We first look at the impact of modernization (or social change) variables on the reproductive model variables for each country and for each period. The second type of analysis is related to the impact of social change on the change in the different dependent variables. In this regard we include the dummy variable "period" within the previous models after a bivariate model linking only "period" and each of the dependent variables. The impact of social change is measured by the relative variation of the coefficient of "period" from a bivariate model to a "saturated" model. In the last type of analysis, we replace the dummy "period" by the dummy "country" in order to assess the impact of population policy. But this time, the effect of this independent variable is measured by the proportion of its net effect compared to the total effect.

4.2.1 Social change and differentiation in the reproductive model

In Côte d'Ivoire in 1981, almost none of the independent or social change variables has a significant effect on the number of children ever born (last column, table 4). This means either that their effects on the different intermediate variables neutralize themselves, or they do not have any effect at all. The activity of the husband/partner is in the later case. Christianity shortens the duration of abstinence and breastfeeding and speeds entry into first union, but overall there is no difference between Christians and non-Christians as regards the number of children ever born. The few women practicing contraception in 1981 seem to belong to the culturally modern group, and to women working in the formal sector, increasing their probability of contraceptive use compared to those working in the agricultural sector, but this does not have any effect on the number of children ever born either. Contraceptive practice compensates for shorter breastfeeding periods among the culturally modern group.

These results indicate that the process of social change which occurred in the Ivorian Akan society did not yield substantive differentiation in their reproductive model up to 1981. At this stage the TFR of 7.2 was characteristic of the traditional fertility regime. In such a regime, there is not much fertility variation according to socio-economic status. Hence the non significant effect of most of modernisation variables on children ever born. The small changes occurred in the intermediate variables such as contraception, abstinence and breastfeeding due to this process of differentiation, in the absence of a population policy, was not enough to affect fertility. The level of socio-economic development reached at this time was insufficient to bring about fertility differentiation.

Table 4: Impact of social change variables on reproductive model variables, Côte d'Ivoire (WFS-1981)

Social change variables	Bivariate and multivariate regression coefficients (Côte d'Ivoire 1981)									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Religion										
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	0.16a	0.25a	0.35a	0.31a	0.41a	0.26b	(--)	(--)	-0.02	0.06
2. Modernization										
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	0.07	0.05	0.13	0.01	0.21	0.21	(14.21)	16.67a	-0.32a	-0.16
- Modern	-0.26b	0.08	0.35b	0.06	0.80a	0.39b	16.87a	(18.11)	-0.44a	0.11
3. Sector of Activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	0.01	0.10	0.16	-0.01	0.31	0.06	(--)	(--)	-0.31b	-0.02
- Informal	0.15	0.28a	0.07	-0.07	0.03	-0.12	(14.75)	(15.88)	-0.37b	-0.10
- Formal	-0.31b	-0.01	0.48a	0.19	1.11a	0.40	16.38a	15.51a	-0.72a	-0.44
4. Husband activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof. + managers	0.02	-0.16	0.31a	0.24	0.52a	0.25	(--)	(--)	-0.48b	-0.34
- Others	-0.10	-0.25a	0.13	0.11	-0.03	-0.17	(--)	(--)	-0.46a	-0.35

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b = significant at 5 %; a = significant at 1 %.

Table 5: Impact of social change variables on reproductive model variables, Côte d'Ivoire (DHS-1994)

Social change variables	Bivariate and multivariate regression coefficients (Côte d'Ivoire 1994)									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Religion										
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	-0.15a	-0.09	-0.07	-0.02	0.29a	0.30a	0.31	-0.30	-0.64a	-0.47a
2. Modernization										
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	-0.15a	-0.12b	-0.02	0.05	0.14	0.03	1.51a	0.91b	-0.49a	-0.13
- Modern	-0.81a	-0.36a	-0.11	0.08	1.15a	0.84a	2.47a	1.63a	-1.47a	-1.09a
3. Sector of Activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	-0.48a	-0.16b	-0.08	0.04	0.34a	0.11	1.70a	0.92	-0.93a	-0.38b
- Informal	-0.23a	-0.11	-0.07	0.08	0.31a	0.15	2.05a	1.11a	-0.86a	-0.32
- Formal	-0.77a	-0.28b	-0.30	-0.01	0.42b	0.12	2.77a	1.08	-1.48a	-0.66b
4. Husband activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof. + managers	-0.17b	0.06	-0.06	-0.12	0.60a	0.32	2.29a	1.35a	-1.37a	-0.78a
- Others	-0.13b	0.01	-0.22b	-0.27b	0.33a	0.13	1.58a	0.71	-0.80a	-0.41b

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b = significant at 5 %; a = significant at 1 %.

Unlike 1981, 1994's results show significant impact of all the retained modernization variables. We should recall that at this date, fertility transition had already started. This trend in fertility regime allow for a differentiation among categories of population, as all of them are not following the process at the same rhythm. The impact of all the modernization variables is in the expected direction, meaning they reduce fertility as measured by the mean number of children ever born. Christian women have 0,47 children less than others, in spite of a shorter period of breastfeeding not compensated for by contraception. Culturally modern women have 1,1 child less than traditional ones, and this is due to a delay in first union and contraceptive practice which compensate for shortening of breastfeeding duration. Women who work in the formal sector have 0,7 children less than those working in the agricultural sector, because they delay their first union. As regard those women whose husbands work in the modern sector, they have 0,8 children less due to contraceptive practice.

We may therefore tentatively conclude that from one period to another, differentiation in Ivorian Akan reproductive model became more perceptible. This may be due to the depth of the social differentiation process that occurred in the mean time. During this process, modern groups adopted new attitudes towards intermediate variables, more specifically towards marriage and contraception, taking advantage in the later case of the introduction of an innovation, to change their fertility behaviour.

In Ghana, the total fertility rate of 6,4 in 1980 is an indication of the departure from the traditional fertility regime (for which TFR is estimated at 7), but the transition did not reach the second phase of the transition process for which the TFR is estimated at 5. The beginning of the transition is evidenced by differentiation in the reproductive model. And here the major factors are cultural modernization and women's status. Culturally modernized women are seen to have had 0,5 children less than the traditional ones and women working in the formal sector had 0,6 children less than those working in the agricultural sector. In both cases delayed first union and increased contraceptive practice are the main mechanisms. We should recall that during this period, there were no such effects in Côte d'Ivoire, and we thought that this was due to the low degree of differentiation in the Ivorian Akan reproductive model. We may therefore deduce that at the end of the seventies, changes in the reproductive model were more important among the Akan Ghana than those of Côte d'Ivoire. The existence of population policy in Ghana and its absence in Côte d'Ivoire is probably one of the factors of this difference; other factors which synergically operate with population policy being cultural modernization and improving women status.

In 1993, the significant effects of cultural modernization and women status had become stronger. The modern group had 1,2 children less than the traditional group and the formal sector women had one child less than the agricultural sector women. The same mechanisms (delayed first union and contraception) have been seen to operate here again. In addition, the other two social change variables have a significant effect on the number of children ever born and in the expected direction, but not on the intermediate variables. So we do not know what mechanisms underlie the impact of religion and social status of husband. Christian women have 0,33 children less than the others, and women whose husbands have a high social status have 0,6 children less. At this period the results are similar (in term of significance) to those of Côte d'Ivoire. This means that social change has attained a degree of maturation permitting relatively major changes in the Akan reproductive model in both countries. How then does it contribute to these changes?

Table 6: Impact of social change variables on reproductive model variables, Ghana (WFS-1980)

Social change variables	Bivariate and multivariate regression coefficients (Ghana 1980)									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Religion										
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	-0.16a	-0.03	0.20a	0.19a	0.32a	0.17	1.08a	0.71	-0.28a	-0.08
2. Modernization										
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	-0.10b	-0.03	-0.03	-0.07	0.09	-0.08	0.94a	0.68b	-0.24a	-0.09
- Modern	-0.64a	-0.23b	-0.04	-0.17	0.70a	0.27	1.91a	1.20a	-0.78a	-0.49a
3. Sector of Activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	-0.89a	-0.18b	-0.09	-0.06	0.08	-0.09	0.41	-0.12	-0.80a	-0.49a
- Informal	-0.56b	0.16	-0.05	0.01	0.84a	0.80b	(--)	(--)	-0.70a	-0.45
- Formal	-0.65a	-0.31a	-0.0ε	0.03	0.74a	0.49a	2.17a	1.33a	-0.95a	-0.60a
4. Husband activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof. + managers	-0.23a	-0.10	0.0ε	-0.0ε	0.43a	0.25	1.68a	0.72b	-0.54a	-0.13
- Others	-0.09	-0.01	-0.0ε	0.07	0.26a	0.12	0.87a	0.31	-0.25a	-0.02

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

Table 7 : Impact of social change variables on reproductive model variables, Ghana (DHS-1993)

Social change Variables	Bivariate and multivariate regression coefficients (Ghana 1993)									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Religion										
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	-0.26a	-0.02	0.14	0.16	0.15	0.11	-0.03	-0.13	-0.64a	-0.33a
2. Modernization										
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	-0.20a	-0.02	-0.11	-0.04	0.26b	0.18	0.31	0.19	-0.55a	-0.24a
- Modern	-1.10a	-0.55a	-0.16	-0.02	0.99a	0.83a	0.90a	0.79b	-1.74a	-1.21a
3. Sector of Activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	--	--	--	--	--	--	--	--	--	--
- Informal	-0.64a	-0.24a	-0.07	0.03	0.47a	0.45b	-0.23	-0.42	-1.03a	-0.34a
- Formal	-0.33a	-0.17a	-0.17	-0.09	0.28a	0.22	0.36b	0.31	-0.94a	-0.43a
	-0.77a	-0.39a	0.0ε	0.09	0.64a	0.46b	0.66a	0.50	-1.73a	-1.00a
4. Husband activ.										
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof.+ managers	-0.25a	0.03	-0.14	-0.15	0.26	-0.01	0.20	-0.13	-1.18a	-0.60a
- Others	-0.18a	-0.01	-0.17b	-0.17	0.14	-0.11	0.16	-0.06	-0.94a	-0.56a

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

4.2.2 Social Change and the changing Akan reproductive model

In Côte d'Ivoire, the effect of "period" is significant on age at first union, contraceptive practice, and children ever born and not significant on the two other reproductive model variables. This may mean that variation of fertility between 1981 and 1994 is due to delayed entry into first union and increased contraceptive practice. This result is consistent with that of the previous analysis of the evolution of the Ivorian Akan reproductive model. Coming back to the regression results, we may observe that the coefficient of period on the number of children ever born varies from -0,42 in the bivariate model to -0,19 in the completed one, hence a decrease of -0,23 which represents 55% of the crude regression coefficient (or the total effect of "period"). This last figure may be considered as the contribution of social change variables to the variation of fertility between 1981 and 1994. The equivalent figures for first union and contraception are 74% and 12% respectively. Social change contributes 74% to change in age at first union and 12% to that in contraceptive practice to yield a 55% of change in fertility behaviour among the Akan of Côte d'Ivoire.

In Ghana the impact of "period" on fertility (children ever born) varies from -0,37 to -0,28 after inclusion of social change variables, hence a decrease of 32% due to them. The effect of this variable is significant on all the intermediate variables, but the variation of their coefficients is important only for age at first union and contraception, which is also consistent with the results of the analyses of the reproductive model. Reduction in the impact on age at first union is 37%. The impact on contraception rather increases *ceteris paribus*.

Table 8 : Impact of "period" and social change on reproductive model in Côte d'Ivoire (WFS/1981-DHS/1994)

Independent Variables	Bivariate and multivariate regression coefficients, Côte d'Ivoire									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. <u>Period</u>	--	--	--	--	--	--	--	--	--	--
- 1981										
- 1994	-0.43a	-0.11a	-0.09	-0.05	-0.14	-0.14	2.83a	2.48a	-0.42a	-0.19b
2. <u>Religion</u>	--	--	--	--	--	--	--	--	--	--
- Others										
- Christians	-0.11a	0.07	0.14a	0.16a	0.33a	0.29a	0.66a	-0.19	-0.43a	-0.21b
3. <u>Modernization</u>	--	--	--	--	--	--	--	--	--	--
- Traditional										
- Middle	-0.10b	-0.01	0.08	0.08	0.19b	0.11	1.11a	0.86b	-0.46a	-0.10
- Modern	-0.63a	-0.15	0.17	0.20	0.99a	0.75a	2.07a	1.55a	-1.12a	-0.49b
4. <u>Sector of Activ.</u>	--	--	--	--	--	--	--	--	--	--
- Agric.										
- Jobless	-0.34a	-0.02	0.07	0.03	0.33a	0.10	1.68a	1.08b	-0.71a	-0.14
- Informal	-0.20a	0.03	-0.0e	-0.03	0.19b	0.02	2.01a	1.33a	-0.73a	-0.22
- Formal	-0.62a	-0.13	0.09	0.10	0.66a	0.29	2.44a	1.47a	-1.19a	-0.52b
5. <u>Husband activ.</u>	--	--	--	--	--	--	--	--	--	--
- Agric.										
- Prof.+ managers	-0.11b	-0.06	0.20b	0.11	0.59a	0.33b	2.22a	1.07a	-1.03a	-0.67a
- Others	-0.12a	-0.11b	0.00	-0.06	0.15	-0.01	1.43a	0.47	-0.66a	-0.43a

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

Table 9: Impact of "period" and social change on reproductive model in Ghana

Independent Variables	Bivariate and multivariate regression coefficients, Ghana									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. <u>Period</u>	--	--	--	--	--	--	--	--	--	--
- 1981										
- 1994	-0.19a	-0.12a	-0.20a	-0.19a	-0.72a	-0.69a	0.21	0.37b	-0.37a	-0.28a
2. <u>Religion</u>	--	--	--	--	--	--	--	--	--	--
- Others										
- Christians	-0.21a	-0.02	0.18a	0.19a	0.23a	0.17b	0.47a	0.12	-0.46a	-0.18b
3. <u>Modernization</u>	--	--	--	--	--	--	--	--	--	--
- Traditional										
- Middle	-0.13a	-0.02	-0.03	-0.06	0.17a	0.01	0.48a	0.22	-0.38a	-0.18a
- Modern	-0.70a	-0.33a	0.01	-0.12	0.92a	0.48a	1.20a	0.86a	-0.99a	-0.75a
4. <u>Sector of Activ.</u>	--	--	--	--	--	--	--	--	--	--
- Agric.										
- Jobless	-0.76a	-0.21a	-0.11	-0.04	0.12	0.11	0.27	-0.31	-0.95a	-0.43a
- Informal	-0.37a	-0.13b	-0.25a	-0.12	-0.13	0.15	0.62a	0.38b	-0.97a	-0.52a
- Formal	-0.68a	-0.33a	0.03	0.06	0.72a	0.46a	1.23a	0.96a	-1.30a	-0.74a
5. <u>Husband activ.</u>	--	--	--	--	--	--	--	--	--	--
- Agric.										
- Prof.+ managers	-0.23a	-0.03	-0.01	-0.04	0.42a	0.18	0.85a	0.08	-0.81a	-0.35a
- Others	-0.14a	-0.01	-0.06	-0.01	0.20a	0.08	0.39a	-0.01	-0.57a	-0.29a

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

4.2.3 Population policy and the changing Akan reproductive model

Assuming that the social change variables included in the model take into account all the individual characteristics, the net effect of "country" may be considered as that of all characteristics which distinguish both countries. One of these characteristics is the availability of a population policy or its effectiveness. At the end of the seventies, only Ghana has such a policy. In the middle of the nineties, Côte d'Ivoire started formulating and implementing a population policy, but its strength cannot equal that of the long standing population policy of Ghana. Our analyses show that this matters in fertility differentiation between both countries.

After control for social change variables in the model for the end of the seventies, the effect of "country" on the reproductive model variables is still significant, except on age at first union. All things being equal, an Ivorian Akan woman will have 0,5 children more than her Ghanaian counterpart and will have 87% less chance to practice contraception. She is known to have a longer duration of breastfeeding and abstinence. These results are not surprising. The absence of effect on age at first union may be due to the fact that the policy did not address this issue. The higher contraceptive prevalence in Ghana is a direct result of the existence of population policy in Ghana which made easier the availability of and accessibility to contraceptive methods. The IEC component of the accompanying family planning program developed awareness on the issue, reduced cultural resistance, and developed persuasion for the use of these methods. In the absence of such a program, those Ivorian Akan women who have wanted to limit their fertility have had to proceed through child spacing and this may explain the longer duration of abstinence and breastfeeding in Côte d'Ivoire where the fertility regime may still have been characterized as traditional at the end of the seventies.

In the middle of the nineties the patterns of variation between Ghana and Côte d'Ivoire are a little bit different from the previous period. The effect on age at first union is now significant, although negligible, but that on abstinence is no more and breastfeeding duration is now shorter among the Akan of Côte d'Ivoire. The modernization process has led to a faster

relaxation of traditional birth spacing methods in Côte d'Ivoire than in Ghana. In addition, the probability of practicing contraception has become higher in Ghana than in Côte d'Ivoire compared to the previous period, despite the adoption of a population policy in the latter. The ineffectiveness of this policy and the strength gained by that of Ghana due to its long existence may explain this result. The combination of these changes leads to the maintenance of the fertility gap (0, 5 child) between both groups, as the small delay in first union in Côte d'Ivoire was not enough to compensate for the other changes.

Table 10 : Impact of "country" and social change on the reproductive model of the Akan (WFS-1980/81)

Independent variables	Bivariate and multivariate regression coefficients, 1980/81									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Pays	--	--	--	--	--	--	--	--	--	--
- Ghana	--	--	--	--	--	--	--	--	--	--
- Côte d'Ivoire	-0.07	-0.06	-0.21a	-0.17a	-0.39a	-0.22a	-2.51a	-2.03a	0.49a	0.45a
2. Religion	--	--	--	--	--	--	--	--	--	--
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	0.03	0.14a	0.08b	0.27a	0.43a	0.22a	1.74a	0.78	-0.33a	0.01
3. Modernization	--	--	--	--	--	--	--	--	--	--
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	-0.01	0.01	0.02	-0.03	0.16a	-0.03	1.20a	0.70b	-0.32a	-0.10
- Modern	-0.49a	-0.14	-0.22a	-0.07	0.80a	0.37a	2.35a	1.38a	-0.81a	-0.29
4. Sector of Activ.	--	--	--	--	--	--	--	--	--	--
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	-0.43a	-0.02	-0.10	0.02	0.10	0.01	0.13	0.03	-0.49a	-0.26b
- Informal	-0.08	0.18b	0.08	-0.05	-0.09	0.0e	-1.48	-0.76	-0.26b	-0.29
- Formal	-0.50a	-0.26a	-0.33a	0.05	0.83a	0.49a	2.31a	1.24a	-0.94a	-0.60a
5. Husband activ.	--	--	--	--	--	--	--	--	--	--
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof.+ managers	-0.13a	-0.08	-0.13a	0.10	0.44a	0.26b	1.82a	0.78b	-0.55a	-0.17
- Others	-0.07	-0.09	-0.07	0.09	0.20a	0.05	0.96a	0.29	-0.32a	-0.14

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

Table 11 : Impact of "country" and social change on the reproductive model of the Akan (DHS-1993/94)

Independent variables	Bivariate and multivariate regression coefficients, 1993/94									
	Age at first union		Abstinence		Breastfeeding		Contraception		Children ever born	
	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects	Gross effects	Net effects
1. Country	--	--	--	--	--	--	--	--	--	--
- Ghana	--	--	--	--	--	--	--	--	--	--
- Côte d'Ivoire	-0.33b	-0.07b	-0.13b	-0.11	0.14b	0.21a	-0.52a	-0.77a	0.43a	0.52a
2. Religion	--	--	--	--	--	--	--	--	--	--
- Others	--	--	--	--	--	--	--	--	--	--
- Christians	-0.06	-0.05	0.03	0.04	0.17b	0.24b	0.41a	-0.09	-0.73a	-0.41a
3. Modernization	--	--	--	--	--	--	--	--	--	--
- Traditional	--	--	--	--	--	--	--	--	--	--
- Middle	-0.18a	-0.06	-0.06	-0.0e	0.22a	0.16	0.53a	0.40a	-0.51a	-1.19b
- Modern	-0.92a	-0.42a	-0.16	-0.0e	1.10a	0.87a	1.33a	1.08a	-1.53a	-1.16a
4. Sector of Activ.	--	--	--	--	--	--	--	--	--	--
- Agric.	--	--	--	--	--	--	--	--	--	--
- Jobless	-0.58a	-0.20a	-0.08	0.04	0.38a	0.22	0.35b	-0.0e	-0.89a	-0.35a
- Informal	-0.28a	-0.14a	-0.11	-0.0e	0.29a	0.15	0.68a	0.42b	-0.87a	-0.38a
- Formal	-0.71a	-0.33a	-0.14	0.05	0.55a	0.29	1.13a	0.48	-1.64a	-0.92a
5. Husband activ.	--	--	--	--	--	--	--	--	--	--
- Agric.	--	--	--	--	--	--	--	--	--	--
- Prof.+ managers	-0.19a	0.04	-0.09	-0.11	0.41a	0.16	0.86a	0.11	-1.27a	-0.66a
- Others	-0.15a	-0.02	-0.16a	-0.19b	0.20b	0.02	0.55a	0.52	-0.93a	-0.48a

Note : Age group is included as control variable in all models; -- = reference category; (--) = small size; b= significant at 5 %; a = significant at 1 %.

IV Discussions and conclusion

The aim of this study was to test the hypothesis that reproductive models (which are cultural by nature) change over time under the influence of social change and population policy. There are two different ways of doing it. The first is to analyze the impact of socio-economic change and population policy by controlling for the cultural context. The cultural context is generally defined by the ethnic group, as each ethnic group is supposed to have its own cultural model of reproduction. The second approach is to analyze the impacts of social change and population policy on the reproductive model in a fixed cultural context. We chose the second approach. The Akan ethnic group gives us the opportunity to use this approach to test the hypothesis, as it represents the same cultural entity submitted to two different processes of social change and divergent population policies.

The choice of the objective supposes an underlined assumption, that changes have occurred in the Akan reproductive model or that there is a differential fertility transition process between the two Akan groups. The results of our analyses support this assumption. The Ghana Akan displayed an earlier fertility transition process than those of Côte d'Ivoire. Indeed by the end of the seventies, this process seemed to have already begun in Ghana, but not in Côte d'Ivoire, although changes in reproductive model were evident in both groups. By the middle of the nineties, the gap between both groups has been considerably reduced, meaning changes occurred more rapidly in Côte d'Ivoire during the interval. However Ghana Akan were still ahead. The availability of population policy in Ghana and its absence in Côte d'Ivoire is probably the major reason for this difference, although other factors, such as the economic conjuncture, may be mentioned. Yet, the changes that occurred in the Ghanaian Akan reproductive model are much less than expected. After 23 years of implementation of a family planning program, one would have expected a greater impact of contraception on the reproductive model. In countries such as Botswana and Zimbabwe where this program has been successful, the impact of contraception is much more important (Letamo, 1996; Sibanda, 1999). The Ghana case seems similar to that of Kenya where Sibanda (1999: 96) noted a modest contribution of contraception in fertility reduction. The meagre impact of contraception in Ghana is an indication of the ineffectiveness of its population policy as was the case of Kenya for a long time. However unlike Zimbabwe, Botswana and Kenya where there was no erosion of postpartum practices over time, the inhibiting effect of postpartum infecundability was decreased substantially in Ghana. As the role of contraception did not increase very much, marriage is the most important proximate determinant of fertility decline. And this is also the case of the Ivorian Akan among which the role of postpartum infecundability has been considerably eroded and that of marriage considerably increased given the absence of an effective family planning program. This role of delayed marriage made the Akan reproductive model very specific. It has been used to compensate for ineffective family planning program in a context of erosion of postpartum practices. This specificity of the Akan reproductive regime may make it very easy to expand family programs among them. Precarious unions, a common feature of Akan traditional social organization probably makes this solution easier, but the role of social change in delaying first union might also be important. Another point on the specificity of the Akan reproductive regime which deserves note is the speed in the erosion of postpartum practices. In fact, as was noted in the background section, long birth spacing was not a major feature of the Akan matrilineal societies as obtains in the case in most patrilineal systems. Quoting Vimard (1993) we observed that a short postpartum abstinence period was another very feature of the Akan reproductive system in order to achieve high fertility for the perpetuation of the matrilineal

lineage. Therefore postpartum infecundability may probably have been the most important fertility inhibiting factor, but not at the same level as that prevailing in the patrilineal societies. Hence the rapid erosion of its role under the pressure of social change.

At the end of the seventies, there was no variation in the reproductive model of the Ivorian Akan due to social change variables. At the same period, the Ghanaian Akan reproductive model was affected by cultural modernization (a combination of education and urbanization) and improving women status. In the middle of the nineties, all social change variables have had an impact on the reproductive model. At this period the results were found to be similar in both countries (in terms of significance and direction at least for the dependent variable, children ever born). We explain the results of the first period on the Ivorian Akan by the fact that in the absence of a population policy, the social differentiation among them was not deep enough to create a major differentiation in the reproductive model. The availability of such a policy in Ghana allowed for variation in the reproductive model due to changes in fertility attitudes and behaviours of culturally and socially modernized groups (well educated urban women or those working in the formal sector). The significant effect of all social change variables in the middle of the nineties means that social change had attained a degree of maturation permitting more important changes in the Akan reproductive model in both countries than that of the previous period. These later results confirm those of previous studies on the impact of modernization on fertility and its proximate determinants (more specifically marriage and contraception). The consequence is that from one period to another, important changes occurred in Akan reproductive model in both countries. These changes were mainly due to social change in Côte d'Ivoire, while in Ghana social change and population policy interact to foster them. This outcome also has been already established by previous studies which revealed the synergetic effect of the strength of development and family planning programs on fertility decline (Bongaarts et al., 1990).

Our analyses reveal that the Akan reproductive model has already started changing in both countries; that of Ghana being a little bit ahead. However, both may be classified as having entered second phase of Bongaart's theoretical model for fertility transition in the middle of the nineties. For these changes to be possible social change deeper than that observed in Côte d'Ivoire at the end on the seventies is required, unless a population policy exists as was the case for Ghana. We therefore recommend the combination social development programs and family planning ones in order to obtain more rapid favorable changes in reproductive models. Another idea to be retained is related to the patterns of changes in the Akan reproductive model. These patterns seem very favorable for (or require) the extension of family planning programs among the populations concerned.

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