# DEMOGRAPHIC TRANSITION IN TROPICAL AFRICA: WHAT IS THE LIKELY PATH?

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The theory of demographic transition, though not actually a theory since subsequent historical research evidence in Europe has disproved it, has been, and still is, a great contribution in stimulating research.[1] Research evidence showed a variety of timing and trends in demographic variables in relation to socio-economic development (van de Walle and Knodel, 1967; Coale, 1969). Hence much interest has been on what will happen in the developing countries. Mortality decline is universally accepted and all endeavours are aimed to that effect. It is thus fertility trend that is of interest; whether it will occur before, concurrently or after social and economic advance.

This paper therefore is focused on the likely fertility trends in Africa. Tabbarah has proposed that for the foreseeable future, in the less-developed countries, fertility is likely to rise first as socio-economic development takes place, a trend which he has called demographic development (Tabbarah, 1971). This is because improved health and nutrition, which are concomitant to development, have the effect of increasing fecundity and reducing spontaneous abortions and still births (ibid.). In this paper Tabbarah's hypothesis is tested against the tropical African situation, relating fertility level to socio-economic variables, namely infant mortality, protein consumption, health facilities, per capita income and level of urbanisation. Use is made of cross-sectional data from tropical African countries.

It was intended to use regression analysis to see the effect of each variable on the level of fertility, but no relationship was found because fertility does not seem to vary with the above socio-economic variables put together. Apart from problems of data deficiency which plagues Africa, this finding is seen as plausible in view of the fact that conditions for conscious fertility regulation do not yet exist in Africa. In this exercise, therefore, the fertility and socio-economic variables used are discussed. The data will be presented in the form of statistics, namely the mean and standard deviation to show the degree of variability of fertility and the other variables. Subsequently the reasons are given of why fertility stays constant at a high level by testing Coale's three conditions of fertility decline as they exist in Africa.

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## FERTILITY AND THE ASSOCIATED VARIABLES

(1) The Crude Birth Rate(C B R)is used as an indication of a country's fertility level. With the situation of deficient data, this is probably the most reliable measure as it has been estimated using stable population analysis by the United Nations.[2] Other fertility measures, for example, period rates (total fertility, recorded crude birth rate, etc.) are highly unsatisfactory due to their dependence on a reference period which is normally under/over-estimated by the largely illiterate populations of LDCs. Vital registration is almost non-existent.

(2) Infant mortality has been included as an explanatory variable for the level of fertility; not for the traditional demographic transition theory, that infant mortality causes future fertility decline; but that fertility is likely to remain constant or rise (due to better health and nutrition) as infant mortality falls at least in the early stages of socio-economic development. This is because parents would still have the fear for survival of their children lingering in their minds. In a cross-section, countries with lower infant mortality would be expected to have higher fertility and vice-versa; thus a negative relation between fertility and infant mortality would be expected.

(3) Protein consumption per head is included as a measure for nutritional levels. Better nutrition, apart from lowering mortality, increases fertility by lowering subfecundity, miscarriages and stillbirths. Thus a positive relationship would be expected between fertility and nutrition.

(4) The measures used for health is the number of people per physician, reflecting a country's capacity to combat disease, which here, on the one hand inhibits fecundity and on the other lowers survival. Thus better health is expected to be positively related with fertility. One drawback of the measure, that is, the number of people per physician, is that it is a gross measure and does not show the distribution of doctors over the population, while it is a known fact that health facilities in most LDCs are concentrated in urban areas (Gwendolyn Johnson, 1964). Since the majority of people in Africa live in the rural areas, a better measure should be population per rural health centre or in general the population per health and medical facility available in the rural areas; but these data are not available.

(5) Urbanisation, measured as the proportion of the population living in urban areas, is thought to be a constraint on fertility, for example urban living is relatively expensive: there exists a shortage of housing,

and domestic help is not readily available to take care of the children. Thus a negative relation with fertility is expected. There is a possibility of data incomparability between countries as the minimum size of a centre considered urban may vary from country to country. The United Nations, which is the data source, does not give a hint about this.

(6) Per capita income can be said to represent the goods and services available per person. Thus it is an index of development, representing the variables discussed above. In linear regression analysis it would pose a multicolinearity problem (Johnston, 1972).

Regression results are not shown here because they show that the crude birth rate varies little with all the independent variables considered put together: thus the effect of inter-correlation of independent variables is ruled out. In other words the proportion of total variation explained by the given (independent) socio-economic variables is negligible. Originally 35 countries were included and the results were statistically significant; but on removal of 4 countries which showed extremes on the scatter diagrams, all significance disappears. This can intuitively be observed in the table below, showing the mean, standard deviation and coefficient of variation. The crude birth rate varies little although the associated variables vary much more. And much variability in explanatory variables is desired to assert the significance of the relationship through effecting a smaller variance of the regression coefficients (Johnston, op. cit.,). The raw data are shown in the appendix to this paper.

| Variable | Mean | Std. Dev. | Coef. Var. (%) | Sample Size |
|---|---|---|---|---|
| Crude birth rate (per 1,000) | 47 | 3 | 7 | 31 |
| Infant mortality (per 1,000) | 159 | 23 | 15 | 31 |
| Protein consumption (daily gm. per capita) | 57 | 12 | 21 | 31 |
| Health (pop. per physician) | 24,717 | 14,215 | 58 | 31 |
| Per capita income ($ per yr.) | 253 | 142 | 56 | 31 |
| Urbanisation (%) | 18 | 10 | 58 | 31 |

The crude birth rate, the dependent variable, stands at 47 and varies very little. showing a coefficient of variation of only 7 per cent although the explanatory variables vary considerably between countries. The insensitivity of fertility to socio-economic variables found in this exercise could be said

to be due to either one of two factors: poor data or that only little development has occurred in Africa to have any significant effect on fertility. While paucity and poorness of data in Africa is a recognised problem (van de Walle, 1968), fertility is likely to remain at a high level as it is today for the time of the early phase of development due mainly to high infant mortality and the existing pronatalist social values. These factors are dealt with closely in the following section.

## DISCUSSION

Insensitivity of fertility to socio-economic development implies that most African countries are still at the first stage of demographic transition with high fertility and mortality; this is confirmed by the data of high fertility at 47 per 1,000 and high infant mortality of 159 per 1,000, with little variation between countries as shown by their low coefficients of variation of 7 and 15 per cent respectively. High infant mortality and the existing pronatalist values would make for no motive to restrict fertility. The latter statement implies the examination of conditions for fertility decline.

Ansley Coale (Coale, 1973) has proposed three exhaustive conditions which must exist for couples to start fertility regulation. Firstly the notion of fertility regulation must be within the calculus of individual couples; meaning that individual couples must have the freedom to discuss or have aceess to ideas about fertility regulation. Thus in a society where such ideas are regarded as absurd this condition does not exist. Secondly couples must view fertility control as advantageous, say for economic, health and other reasons, otherwise there would be no motivation for control. Thirdly there must exist some means to effect fertility regulation. This is obvious: when one has a need, one must know and have the means to satisfy the need. Now what is the situation in Africa with regard to these three conditions?

High infant and child mortality that exists in Africa would make parents have great concern for the survival of their children so that they would react to it by having as many children as possible in the hope that some will survive (Easterlin, 1972). However this is a disputed issue if consideration is made of the European demographic transition showing a variety of experience of fertility decline before, concurrently or after a fall in mortality (van de Walle and Knodel; Coale, 1969, op. cit.). Actually it seems as if the factor of mortality not being a prerequisite is now accepted; as all the time it is raised, the European findings are referred to. But the variety of experience found for

the European countries makes room for Africa to have mortality decline as a prerequisite.

It is not mere speculation that the mortality decline may be an important factor for fertility decline. Research findings exist showing the concern of parents for child survival, a cause for having as many children as they can: for example in East Africa (Molnos, 1968) and West Africa (Okediji et al, 1976), although the latter authors suggest it is felt only at society rather than individual level (ibid.). The second factor for the current high fertility in Africa are the pronatalist social values. It should be borne in mind that most populations in Africa live in rural areas, for example 18 per cent (average) of the population live in urban areas as shown in the table above, which is an over-estimation since smaller urban places are included in the data used in this paper (Population Reference Bureau, op. cit.); it seems urbanisation level is about 8 to 10 per cent (Mabogunje, 1972). Further, the little modern development that has occurred has largely been confined to urban areas, so that rural areas, where most of the population reside, are little affected by modernisation, one of the main factors of social change to alter pronatalist values. Why pronatalist values exist needs explanation.

In Africa, if not in most agrarian societies, the family is mainly organised around a kinship system rather than simply and purely on nuclear family relations. The function of the kinship system is the continuation of the clan or lineage so that attitudes, norms, and all institutions are geared to encouraging couples to have as many children as possible. Consequently, couples with no children tend to be regarded by society as "abnormal and unfortunate". In such societies, having children has been positively regarded for several reasons. First, children provide labour inputs on the land, though the introduction of formal education significantly lessens this. Second, children serve as old age security. Further, the kinship of extended family provides social and psychological (emotional) security, thus this advantage would encourage one to abide by the kinship code to belong to it, one being to want to increase the family size (Davis, 1955; Molnos, 1968). Against these factors there is clearly little room left for developing or discussing ideas on fertility control, since it is not advantageous. These are Coale's two conditions, which are not satisfied. Change in the social structure (Davis, 1967) and reduction of mortality, both implying the need for socio-economic development, seem to be plausible prerequisites for fertility decline, rather than just making means of fertility control available (Bogue, 1969).

Even the availability of means of fertility regulation in Africa is not assured. This can be subdivided into two levels. One is the availability of the means of fertility regulation and the other is the knowledge that the means exist. Traditional means of fertility control are not unknown in rural Africa, but these are isolated cases usually associated with witchcraft. Knowledge and availability of modern means is largely hindered by poor communications and illiteracy so that these are usually limited to urban areas and among the educated elite. Knowledge, attitude and practice of family planning studies in some African countries show evidence to these facts; for example Sierra Leone (Dow, 1971), Ghana (Caldwell, 1966), Kenya (Ejiogu, 1972; Heisel, 1968), and Nigeria (Okediji et al., op. cit.).

The above discussion then shows that conditions are not yet ripe for massive fertility control in tropical Africa. Therefore for the foreseeable future, fertility is likely to stay at a high constant level; and Tabbarah's suggestion of a possible increase in fertility is plausible as development takes place in fertility-enhancing factors of health and nutrition; particularly in a rural residential population where children are economic assets. And most of the population are likely to remain living in rural areas as all developmental efforts are directed to it because of constraints in employment expansion in the urban areas.

## SUMMARY AND CONCLUSION

This paper set out to test Riad Tabbarah's thesis that fertility is likely to rise as countries at low levels of development start to develop due to the enhancing effect of improved health and nutrition which are concomitant to development. Regression of fertility on socio-economic variables, namely infant mortality, protein consumption, health, urbanisation and per capita income reveals insignificant relationships; even if all variables are considered together the amount of variation in fertility explained is small. A look at the mean and standard deviation of fertility shows very little variation in fertility between countries although socio-economic variables vary greatly. The conclusion drawn is that fertility is insensitive to socio-economic development at the early stage.

Although poor data that exist in Africa may explain the results obtained, still, two other factors seem to be particularly responsible for the low degree of variation in fertility between countries with different levels of development. Mean infant mortality for Africa is high, at about 160 per 1,000, and it varies

little between African countries, so that parents try to have as many children as possible in the hope that some will survive. Secondly, pronatalist values predominate due to desires in the rural setting of most of the people for kinship and clan continuity, and in return, the kinship itself providing security. Further, children still provide labour and old age security.

It would seem then that change in social structure and decline in infant and child mortality are prerequisites for the onset of fertility decline in Africa. This implies socio-economic development then as a prerequisite à la demographic transition "theory". Infant mortality decline will eliminate the need of producing a buffer against risk of death. Change in social structure would seem to be hard to come about in view of the rural residence and the socially desired goal of keeping it that way mainly for employment purposes. However, education, which is á concomitant of development, not necessarily formal, will be an important variable, to widen the horizon of people (Freedman, 1963).

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FOOTNOTES:

1 For the origin of the theory of demographic transition see Davis, 1945; Notestein, 1945.

2 Evidence of this is provided by the writer as he found the same estimate for Tanzania as the United Nations using stable population analysis.

Appendix: Fertility and Socio-economic Variables in Tropical African Countries.

| COUNTRY | CBR[a] (Crude Birth Rate per 1,000) | INFANT[a] (Infant Mortality per 1,000) | PROT[b] (Protein) daily gms/ capita | HEALTH[b] Population/ physician | INCOME[a] Per capita income ($) | URBS[a] Percent Popul. Urban |
|---|---|---|---|---|---|---|
| 1. Burundi | 41 | 150 | 61 | 48,469 | 0100 | 02 |
| 2. Cameroon | 40 | 137 | 59 | 25,956 | 0270 | 20 |
| 3. C. African Rep. | 43 | 190 | 48 | 27,097 | 0230 | 36 |
| 4. Chad | 44 | 160 | 78 | 43,483 | 0120 | 14 |
| 5. Congo | 45 | 180 | 40 | 06,173 | 0500 | 40 |
| 6. Dahomey | 50 | 185 | 52 | 31,300 | 0140 | 14 |
| 7. Ethiopia | 43 | 181 | 66 | 73,314 | 0100 | 12 |
| 8. Gabon | 32 | 178 | 51 | 05,208 | 2240 | 32 |
| 9. Gambia | 42 | 165 | 62 | 18,947 | 0190 | 14 |
| 10. Ghana | 47 | 156 | 43 | 11,227 | 0460 | 31 |
| 11. Guinea | 47 | 175 | 45 | 22,394 | 0130 | 20 |
| 12. Ivory Coast | 46 | 164 | 59 | 13,839 | 0500 | 20 |
| 13. Kenya | 49 | 119 | 68 | 10,240 | 0220 | 10 |
| 14. Liberia | 50 | 159 | 41 | 12,576 | 0410 | 28 |
| 15. Madagascar | 50 | 102 | 54 | 09,970 | 0200 | 14 |
| 16. Malawi | 48 | 142 | 63 | 37,982 | 0150 | 10 |
| 17. Mali | 50 | 188 | 68 | 38,963 | 0090 | 13 |
| 18. Mauritania | 45 | 187 | 73 | 17,746 | 0310 | 23 |
| 19. Mauritius | 25 | 046 | 50 | 04,438 | 0580 | 44 |
| 20. Mozambique | 43 | 165 | 40 | 16,080 | 0310 | 06 |
| 21. Niger | 52 | 200 | 78 | 43,000 | 0130 | 09 |
| 22. Nigeria | 49 | 180 | 60 | 25,463 | 0310 | 18 |
| 23. Rwanda | 51 | 133 | 57 | 52,763 | 0090 | 03 |
| 24. Senegal | 46 | 159 | 64 | 14,668 | 0370 | 32 |
| 25. Sierra Leone | 45 | 136 | 49 | 17,114 | 0200 | 15 |
| 26. Somalia | 47 | 177 | 57 | 15,544 | 0100 | 28 |
| 27. South Africa | 40 | 117 | 77 | 02,016 | 1320 | 48 |
| 28. Southern Rhodesia | 48 | 122 | 73 | 06,579 | 0540 | 20 |
| 29. Sudan | 48 | 141 | 59 | 12,527 | 0290 | 13 |
| 30. Togo | 51 | 127 | 51 | 21,200 | 0270 | 15 |
| 31. Uganda | 43 | 160 | 56 | 35,443 | 0250 | 07 |
| 32. Un. Rep. Tanzania | 47 | 162 | 43 | 27,572 | 0170 | 07 |
| 33. Upper Volta | 48 | 182 | 70 | 59,595 | 0090 | 04 |
| 34. Zaire | 45 | 160 | 33 | 28,802 | 0150 | 26 |
| 35. Zambia | 50 | 160 | 69 | 13,518 | 0540 | 36 |

Source: (a) Population Reference Bureau. 1977 World Population Data Sheet. Washington, D.C.

(b) United Nations. 1976. Statistical Yearbook 1975. New York.