

## **Fertility in the Democratic Republic of the Congo**

**David Shapiro<sup>1</sup> and B. Oleko Tamashe<sup>2</sup>**

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### **Abstract**

In this paper we examine and discuss estimates of fertility in the Democratic Republic of the Congo (DRC). Currently, the United Nations estimates that the country's total fertility rate is 6.7, and national sources provide an even higher estimate of 7.3. However, our assessment of the data suggests that these figures are too high. In the second part of the paper, we discuss our best estimate of fertility in the country and highlight the factors that are likely to support this estimate. These include mortality, women's education, socioeconomic development, civil war, and economic crisis. Overall, we conclude that the total fertility rate for the country as a whole is probably in the neighborhood of 5.5, and that the DRC has most likely embarked on the fertility transition that is emerging across much of sub-Saharan Africa.

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<sup>1</sup> Professor of Economics, Demography, and Women's Studies, The Pennsylvania State University, 416 Kern Graduate Building, University Park, PA 16802 USA (dshapiro@psu.edu).

<sup>2</sup> Research Associate Professor of International Health and Development, Tulane University School of Public Health and Tropical Medicine, 1440 Canal Street, Suite 2200, New Orleans, LA 70112 USA (btamashe@payson.tulane.edu).

## A. INTRODUCTION

This paper seeks to assess the general level of fertility in the Democratic Republic of the Congo (DRC). This task is rendered difficult by the absence of reliable recent national data. There are only two large-scale national data collection efforts that have been done in the country: one was a massive survey carried out in the mid-1950s by the Belgian Colonial Administration, and the other was a national census carried out in 1984 by the National Institute of Statistics. Further, as we shall see below, there is good reason to believe that the estimates of fertility provided in conjunction with the 1984 census and subsequently are flawed.

In the first substantive section of the paper we review estimates of fertility and mortality in the Congo, covering the second half of the 20<sup>th</sup> century. The most recent estimates provided by the United Nations (2001) are compared to those from the 1950s survey and the 1984 census, from one other large-scale survey carried out in the western part of the country in the mid-1970s, and from a more modest national survey carried out in 1995. Additional evidence is examined, leading us to conclude that the fertility estimates from the 1984 census and from the 1995 survey are too high. The census estimates, in turn, were the basis for upward revisions to the United Nations fertility estimates, done in the mid-1990s. Hence, we conclude that the current U.N. estimates of fertility in the Congo are too high.

In the second section of the paper we discuss different factors likely to influence fertility in the DRC, and assess the status of those factors with a view to estimating what the level of fertility in the DRC might in fact be. Mortality, women's education, socioeconomic development, civil war, and economic crisis are all considered in this context. On balance, the effects of these different factors appear to be to exert downward pressure on fertility. We conclude with some brief speculation concerning the prospects for fertility transition in the Congo.

## B. ESTIMATED FERTILITY AND MORTALITY IN THE DRC

This section provides an overview of estimates of mortality and fertility in the Congo, beginning with the early 1950s. Although the focus of this paper is on fertility, knowledge of mortality levels and trends is very important for understanding changes in fertility behavior (Easterlin, 1996; Easterlin and Crimmins, 1985). The first part of the section thus looks at levels and trends in mortality, as reflected in estimates from different data sources. This is followed by an overview and more detailed discussion of estimated levels and trends in fertility.

Data sources, other than United Nations estimates, consist of the two large-scale national data collection efforts, carried out in 1955-57 and in 1984. In addition, we use data from the EDOZA study, a large-scale demographic household survey carried out in the western part of the country from 1974-77, and we report limited estimates from the Enquête Nationale sur la Situation des Enfants et des Femmes au Zaïre en 1995 (ENSEF).<sup>1</sup>

Estimates of mortality in the Congo are shown in table 1. Due to concerns about possible misreporting of mortality, these estimates are generated via indirect methods. The U.N. figures, as we shall discuss below, are part of broader population estimates and projections that attempt to take into consideration demographic estimates from national data sources.

During the period covered by the table, the national sources and U.N. estimates are fairly close up through the mid-1970s, but diverge afterward. In particular, the national sources tend to show higher mortality in the 1980s and 1990s, with mortality rising, while the U.N. estimates show mortality falling during the 1980s and 1990s. The higher and increasing mortality depicted by the national sources is attributed to the “deterioration in the overall socioeconomic situation” of the country and especially rural areas during the period between 1984 and 1995 (translated from République du Zaïre, 1996, p. 59).

Overall, the U.N. estimates suggest that during the period covered, the estimated crude death rate and infant mortality rate both fell by more than 40 percent, while life expectancy at birth rose by over 30 percent. However, because of the deterioration in the mortality situation that is reflected in the national sources for the period after the onset of first chronic economic crisis in the mid-1970s and then acute economic crisis in the early 1990s, the national sources indicate a much smaller improvement in mortality. That improvement is approximately 10 percent in infant mortality and 15 percent in life expectancy. Further, at the end of the period, the national source pegs infant mortality at almost 60 percent higher than the corresponding U.N. estimate, and has life expectancy at only 88 percent of the value of the U.N. estimate.

Since the period covered by table 1, and especially since 1998, civil war has resulted in a sharp increase in mortality, especially in the eastern part of the country. The International Rescue Committee’s estimate, as of May 2000, of 1.7 million or more excess deaths due to war during a 22-month period implies a crude death rate nationally that is in the mid-30s – twice as high or more than the estimated crude death rate in the 1980s (International Rescue Committee, 2000).<sup>2</sup> The civil war has also extensively disrupted life in much of the eastern DRC, with likely implications for fertility (to be discussed below).

Estimates of fertility in the Congo are shown in table 2. During the period covered by the table, there is an increase in estimated fertility. The total fertility rate increased by more than 10 percent according to the U.N. estimates, and by more than 20 percent if the national estimate for 1995 is used. The estimated general fertility rate rose by more than 10 percent between the mid-1950s and the mid-1980s, while the crude birth rate estimates show a distinctly smaller increase, on the order of 1-7 percent. Further, prior to 1984, the estimated crude birth rates from the national sources are consistently less than the U.N. estimates, while there is closer agreement between the different TFR estimates.

The relatively low fertility that prevailed in the 1950s in part reflected the presence of high levels of sterility and childlessness in certain northern parts of the country. Among women aged 35-44, for example, roughly 40 percent of those in the Tshuapa and Equateur districts in Equateur province and almost 45 percent of those in the Bas-Uélé and Haut-Uélé districts in Orientale province were childless. The corresponding figure for the entire Congo was 22 percent (Romaniuk, 1968, table 6.47, p. 331). The northern part of the Congo, with its low level of fertility and high proportions childless, was part of a broader “infertility belt” stretching from Cameroon to southern Chad, and including the Central African Republic (Rete-Laurentin, 1974). The high levels of sterility among certain of the Congo’s ethnic groups were convincingly linked to relatively high levels of venereal disease by Romaniuk (1961, 1967, ch. 10).

By the mid-1970s, it appears that fertility had risen somewhat, at least as measured by the general fertility rate and the total fertility rate. As noted earlier, there were no national surveys carried out during this period, but results from the large-scale EDOZA study done in the mid-1970s covering the western part of the country (République du Zaïre and others, 1977, 1978a, 1978b) provide a good indication of what was happening in a major part of the country. These figures are reported for 1974-7 in table 2.

In order to assess changes over time, Tabutin (1982, table 1) used Romaniuk's (1967) estimates and determined that in the west of the country, as of the mid-1950s, the crude birth rate had been 46.4, the general fertility rate was 211, and the total fertility rate was 6.2. Hence, in the 1950s fertility measures for the west of the country were slightly higher than the corresponding national figures, with the differences being about 3-5 percent. Comparing these figures for the west from the 1950s with those from the 1970s makes it clear that overall, there was a small increase in fertility (2-3 percent), as measured by the general fertility rate and the total fertility rate. This increase presumably reflected reductions in sterility in the northwestern part of the country associated with public health campaigns against venereal disease (Sala-Diakanda, 1980; Tabutin, 1982).

Comparing estimates from the EDOZA survey with those from the 1950s data, Tabutin (1982) documented a slight increase in fertility in the western part of the country. This trend may be assumed to characterize the trend at the national level, both because the west constituted a significant share of the total national population and because the lowered incidence of sterility should have had an impact in the northeast of the country as well as in the northwest. As noted earlier, the districts of Equateur and Tshuapa in Equateur province in the northwestern part of the country had especially low levels of fertility in the 1950s, and the Bas-Uélé and Haut-Uélé districts of Orientale province in the northeastern part of the country were also distinguished in the 1950s by very low fertility and an inordinately high incidence of sterility. Hence, reductions in sterility would lead to higher fertility in the northeast as well as in the northwest of the country.

Overall, these considerations from the EDOZA study suggest that as of the mid-1970s, the total fertility rate nationally was probably in the neighborhood of 6.0-6.2. Note that this figure is slightly smaller than the U.N. estimate of 6.3.

The census data for 1984 suggest that fertility continued to increase after the 1970s, with all three measures of fertility increasing over a period of a decade or less by amounts of at least 5-8 percent. Indeed, given that the figures in the table from the mid-1970s probably overstate fertility in the entire country (since the west already had somewhat higher fertility than the rest of the country even in the 1950s), this implies that the apparent increase in fertility from the mid-1970s to the mid-1980s was even larger than 5-8 percent. According to the ENSEF data from 1995, the total fertility rate continued to rise by almost another 10 percent between the mid-1980s and mid-1990s.

As noted briefly earlier, the period from the mid-1970s until 1990 was one of chronic economic crisis in the Congo, with stagnant or declining real incomes and inflation usually well into double digits and occasionally higher. Even more severe economic problems were experienced during the early 1990s, with civil disorder, a shrinking modern sector of the economy, and accelerated inflation. An increase of fertility of almost 20 percent during such a period seems unlikely to us.

More concretely, we believe that the fertility estimates for 1984 and for 1995 are flawed. As indicated in multiple INS census reports (e.g., Institut National de la Statistique, 1991b, p. 18), they were generated using the FERTCB procedure of MortPak-Lite, a United Nations demographic software package (United Nations, 1988). This procedure, which was also used to generate the fertility estimates from the 1995 ENSEF survey data, uses information from a single survey on the average number of children ever born to women by age group, employing a technique first suggested by Mortara (1949) for populations with constant fertility. This approach presupposes that fertility has remained stable in the recent past, however, and it is clear that applying the procedure when fertility has in fact been falling will yield incorrect estimates.

Consider, for example, what happens when the procedure is used with data from different surveys done in Kenya, where fertility has fallen sharply since at least the latter part of the 1980s. Applying the procedure to data on children ever born from the 1978 Kenya Fertility Survey (part of the World Fertility Surveys) yields an estimated total fertility rate of 8.03 – which is quite close to the survey estimate of 8.11 (African Population Policy Research Center, 1998). However, when applied to the 1989 Kenya DHS data the procedure generates an estimated total fertility rate of 8.06, well above the survey estimate of 6.7. Similarly, when applied to the 1993 Kenya DHS data, FERTCB produces an estimate of the total fertility rate of 7.68, substantially higher than the DHS estimate of 5.4. Note that as fertility transition in Kenya proceeds, the inaccuracy of the FERTCB estimates of fertility grows. *These results indicate that use of FERTCB with data from a single survey when fertility has been falling will yield inaccurate, misleading, and increasingly erroneous estimates of fertility.*

Similarly, application of the single-survey FERTCB procedure to data we collected in the DRC's capital, Kinshasa, in 1990 yields an estimate of the TFR of 8.86. This clearly is an extremely high level of fertility, substantially higher than earlier estimates for 1975 of 7.2-7.5, and unprecedented for a large city. Indeed, we have documented elsewhere (Shapiro, 1996; Shapiro and Tambahe, 2002) strong evidence of a decline in fertility in Kinshasa, to a level less than 5.7 as of 1990. Again, then, it seems clear that applying this FERTCB procedure in cases where fertility has been falling appears to lead to misleading estimates, and these estimates in the cases cited are always too high.

At the national level the census estimates reported a total fertility rate of 6.7 (Institut National de la Statistique, 1991b). This represents an increase of 13 percent as compared to the level that prevailed in the mid-1950s, and an increase of 8-12 percent vis-à-vis the level of roughly 6.0-6.2 that may be presumed to have existed in the mid-1970s. Such an increase might reflect changes in proximate determinants of fertility that have sometimes been observed in conjunction with some initial exposure to modernization or schooling, such as reduced durations of breastfeeding and postpartum abstinence. These changes shorten birth intervals and consequently increase fertility (cf., Romaniuk, 1980; Lesthaeghe, 1989).

Alternatively, it is possible, given the problems we have just seen with the implementation of the procedure used to estimate fertility, that the national census estimates are incorrect, and instead that fertility nationally has either been stable or perhaps declining somewhat, rather than increasing. This is the outcome we believe to be most plausible, as discussed in the following section. Such a scenario would help explain the sorts of anomalies noted in the ENSEF report, which contrasted the estimated increased fertility between 1984 and 1995 with the facts (normally associated with reduced fertility) that the mean age at first marriage as well as the mean age at childbirth had both increased over the same period (République du Zaïre, 1996, p. 56).

Indeed, as recently as 1991 the U.N. estimates for the country showed a total fertility rate of 6.09 for the first half of the 1980s. This estimated rate, comparable to our best estimate as of the mid-1970s, had been stable for the period from 1970 through 1985, after having been just below 6.0 for most of the two decades prior to 1970 (United Nations, 1991, p. 602). Following publication of the census estimates in 1991, however, the U.N. estimates were revised so as to be compatible with the census figures. Hence, more recent U.N. estimates show a total fertility rate of 6.0 for the period from 1950-1965, with a small increase to 6.1 in 1965-70, moving to 6.3 in 1970-75, to 6.5 in 1975-80, up to 6.7 in 1980-85, and then holding steady at 6.7 for the period from 1985 to 1995 (United Nations, 2001).

In sum, then, while we cannot rule out the possibility that the total fertility rate in the Congo is as high as

6.7, we believe that a strong case can be made for fertility being distinctly lower. A TFR of 6.7 would put the DRC at or near the top in terms of estimated fertility in Central Africa, where the average TFR in 1995 (excluding the two smallest countries, Sao Tome and Principe and Equatorial Guinea, which are offshore and have relatively low fertility) was under 5.5 according to the Population Reference Bureau (1995), and just over 6.0 (for 1990-95) according to the United Nations (2001). The following section provides a discussion of some of the reasons underlying our point of view.

### C. WHITHER FERTILITY?

Between the mid-1950s and the mid-1970s, it appears that fertility in the Congo increased somewhat, as a reflection of reductions in sterility and also possibly some changes in proximate determinants due to secular effects of modernization and urbanization. The question here is, what happened to fertility after the mid-1970s? A number of factors are likely to be relevant in considering fertility behavior. These include mortality, women's education, socioeconomic development (or, in the case of the Congo, the lack of such development), civil war, and economic crisis.

As shown in the first part of this paper, it appears that until recently, there has been a long-term downward trend in mortality in the Congo. As Easterlin (1996) and Easterlin and Crimmins (1985) have argued, declining mortality should lead ultimately to lower fertility, as couples determine that fewer numbers of births are required to achieve any given number of desired children surviving to adulthood. Such an effect would clearly be more substantial if the U.N. mortality estimates (showing continued improved mortality during the 1990s) were accurate rather than the national estimates. At the same time, however, knowledge of the state of the country's economy during the 1990s, as well as the effects of civil war for most of the past five years, suggest that the more pessimistic estimates from national sources may well be more plausible. Indeed, estimates from the International Rescue Committee (2000) suggest that as a consequence of the ongoing civil war, recent mortality in the DRC now exceeds the levels reported in table 1. This increased mortality, in turn, if it persisted, might well contribute ultimately to higher fertility. In any case, longer-term trends in mortality seem likely to have contributed somewhat to fertility decline, but more recent mortality experience is unlikely to promote further declines in fertility.

Consider now women's education. We have shown elsewhere (Shapiro, 1996; Shapiro and Tambashe, 1997, 1998; see also chapter 4 of Shapiro and Tambashe, 2002) that in the DRC's capital, Kinshasa, women with secondary education tend to have significantly lower fertility than those with primary or no schooling. The strong tendency for women with secondary education to have distinctly lower fertility has been documented for a number of countries in sub-Saharan Africa (Ainsworth et al., 1996; Jolly and Gribble, 1993; Muhuri et al., 1994). To the extent that this phenomenon is pertinent elsewhere in the Congo besides Kinshasa, the growth over time in the proportion of women with secondary education should exert downward pressure on overall fertility.

To determine the relevance of this factor, we have examined data collected in six smaller cities in the Congo during the period from 1975-77. The data collection was done in conjunction with the EDOZA study, and included the cities of Mbandaka, Bandundu, Kikwit, Kananga, Matadi, and Bukavu.<sup>3</sup> Looking at the determinants of the number of children ever born among women in these six cities, we find that after controlling for age, fertility is highest among women with primary education, and there is a clear pattern of declining fertility as education increases beyond the primary level. In fact, the fertility differentials by education among women in these smaller cities are extremely similar to those among women in Kinshasa (Shapiro, 1996; Shapiro and Tambashe, 1998). Hence, the lower fertility of women with secondary education that was apparent in Kinshasa in the 1970s was also evident among women in the smaller cities.

In the 1970s, the impact of these better-educated women on overall fertility was very slight, since they were only a minor component of the population of women of reproductive age. Even as of 1984, it is unlikely that this effect was very large, since only 16 percent of women of reproductive age (15-49) nationally had secondary schooling. However, with nearly 25 percent of 15-24 year olds and 17 percent of 25-29 year olds having reached the secondary level as of 1984, it seems likely that there was some effect.

More importantly, in the years since then, the educational profile of women of reproductive age has changed, with increasing numbers of women having been exposed to secondary schooling. According to the 1995 ENSEF study, for example, more than 25 percent of women aged 15 and over had attended secondary school, and in urban areas, the figure exceeded 60 percent (République du Zaïre, 1996, p. 67). Given this increase in the fraction of women with secondary education, one would expect distinct downward pressure on fertility.

Socioeconomic development in the Congo has been stymied, first by severe political difficulties in the early 1960s, then by an autocratic regime (lasting from 1965-97) whose policies effectively promoted underdevelopment, and by civil war for much of the past five years. Fertility transition in much of the developed and developing world has been broadly associated with socioeconomic development, presumably in part reflecting increased parental investment in the education of a relatively small number of children as such investments bear the promise of potentially substantial returns (Becker, 1991; Easterlin and Crimmins, 1985). On this ground, then, the absence of development in the DRC may be seen as a factor supportive of maintaining traditional high levels of fertility.

At the same time, we believe that the increased urbanization that has taken place is putting downward pressure on fertility. Urban places are clearly the loci from which fertility transition in sub-Saharan Africa is beginning (Shapiro and Tambashe, 2000). They are places where the economic benefits of children to parents are smaller than in rural areas, where living costs are higher, and where opportunities for education of children are also greater. All of these factors tend to promote smaller families. Hence, even in the absence of meaningful development, we believe that the trend toward increasing urbanization of the Congolese population most likely is exerting some downward pressure on fertility.

There have been some suggestions in the literature about the possibility of crisis-led fertility transitions (Lesthaeghe, 1993), as well as evidence of economic crisis contributing to fertility decline (e.g., see Eloundou-Enyegue et al., 2000; Foster, 1993). The DRC has experienced both a longer-term chronic economic crisis (from the mid-1970s until 1990), and then more severe economic dislocations since 1990, exacerbated by civil war for most of the period since 1996. It is likely that these dislocations have had some impact on fertility, both in urban and rural areas.

The acute economic crisis of the early 1990s (cf., Maton et al., 1999) is likely to have led to delays in marriage and in the onset of childbearing, especially in urban places (Foster, 1993). Crisis also appears to weaken solidarity networks, whereby extended-family members often provide economic assistance to one another (Eloundou-Enyegue, 1992). Evidence from Kinshasa shows that much of the assistance from solidarity networks is focused on children's schooling and child fostering (Shapiro et al., 1995). To the extent that this phenomenon prevails elsewhere in the Congo, particularly among urban dwellers, the weakening of these solidarity networks effectively raises the cost of children to parents and, hence, this puts downward pressure on family size. Rural areas have been doubly hit by economic crisis and by ongoing civil war. Outmigration of men to urban places in search of better economic opportunities and evacuation of able-bodied men from villages in war zones are both factors likely to result in lower fertility

in rural areas.

Taking all of these factors together, it appears that there are several reasons why one might expect fertility over the past 25 years or so to have declined. There are not reasons that are evident to support the notion that fertility has increased. The magnitude of the factors contributing to a likely decline in fertility is difficult to assess, but at the very minimum, at least a moderate impact seems likely. Hence, given that fertility in the DRC was probably at a level for the TFR of just above 6 in the mid-1970s, we believe that the total fertility rate in the DRC at present is probably in the neighborhood of 5.5. We must acknowledge, however, that this is speculative on our part. The desirability of having reliable and current information on fertility and mortality in sub-Saharan Africa's third most populous country should be manifestly evident.

What the future holds with respect to fertility remains to be seen. Using DHS data from 40 surveys in 25 countries, we have examined the unfolding fertility transition in sub-Saharan Africa (Shapiro and Tambashe, 2000). Our analyses indicate that fertility transition typically begins in the capital city and spreads first to other urban centers and then to rural areas. We believe that this scenario, undergirded by both increased women's education and by ongoing economic and political disruptions, probably characterizes the DRC as well. We have documented declines in fertility in Kinshasa (Shapiro, 1996; Shapiro and Tambashe, 2002), and the fertility differences by education that were apparent in smaller cities in the 1970s make us confident that other urban places have also experienced fertility transition. Further, the social and economic dislocations caused by the economic crisis of the 1990s and the ongoing civil war appear to have created an environment where rural fertility is also very likely to have begun to fall. By how much fertility has changed, and the pace of fertility transition in the DRC, are both topics that merit further research using more recent national data. At the same time, the persistence of economic crisis and civil war and their likely negative consequences for school enrollment, especially among girls, may slow down the fertility transition which we believe has already been set in motion in the country as a whole.

#### NOTES

<sup>1</sup> The specific sources used are Romaniuk (1967, 1968) for the 1950s survey, Institut National de la Statistique (1991b) for the 1984 census, République du Zaïre and others (1978b) and Tabutin (1982) for the EDOZA study, and République du Zaïre (1996) for the ENSEF study. The ENSEF study was national in scope, and covered more than 4,500 households and in excess of 27,500 individuals.

<sup>2</sup> Estimates from UNAIDS, World Health Organization, Democratic Republic of the Congo, Epidemiological Fact Sheet on HIV/AIDS and sexually transmitted infections, 2000 Update [[http://www.unaids.org/hivaidsinfo/statistics/june00/fact\\_sheets/pdfs/demrepcongo.pdf](http://www.unaids.org/hivaidsinfo/statistics/june00/fact_sheets/pdfs/demrepcongo.pdf), accessed on 15 May 2001] suggest that AIDS plays only a relatively minor role in mortality in the DRC, representing no more than 2 deaths per 1000 population in 1999. However, it is very likely that the situation will change in the coming years. As a result of the civil war, Congolese in the east and north of the country have been under occupation for close to three years, with armed forces from Uganda, Rwanda, Burundi, Angola, and Zimbabwe all present. With the exception of Angola, these soldiers all come from countries with high HIV prevalence. Since military populations often play an important role in the propagation of the AIDS epidemic, it is quite possible that, with some lag, the epidemic may soar sharply, especially among rural populations that have been ravaged by the war and are at the mercy of these armed forces.

<sup>3</sup> Data for these analyses were provided by Emile Berckmans of the Belgian Archives for the Social Sciences at the Catholic University of Louvain, Louvain-la-Neuve, Belgium.

## REFERENCES

- African Population Policy Research Center (1998). *Fertility Decline in Kenya: Levels, Trends and Differentials*. Nairobi, Kenya: African Population Policy Research Center, The Population Council.
- Ainsworth, Martha, Kathleen Beegle, and Andrew Nyamete (1996). The Impact of Women's Schooling on Fertility and Contraceptive Use: A Study of Fourteen Sub-Saharan African Countries. *World Bank Economic Review* (Washington, DC), Vol. 10, No. 1 (January), pp. 85-122.
- Becker, Gary S. (1991). *A Treatise on the Family*, enlarged edition. Cambridge, MA: Harvard University Press.
- Easterlin, Richard A. (1996). *Growth Triumphant: The 21<sup>st</sup> Century in Historical Perspective*. Ann Arbor: University of Michigan Press.
- Easterlin, Richard A. and Eileen M. Crimmins (1985). *The Fertility Revolution: A Supply-Demand Analysis*. Chicago: University of Chicago Press.
- Eloundou-Enyegue, Parfait Martial (1992). *Solidarité dans la crise ou crise des solidarités familiales au Cameroun? Evolutions récentes des échanges entre villes et campagnes*. Les Dossiers Du CEPED No. 22 (December). Paris: Centre Français sur la Population et le Développement.
- Eloundou-Enyegue, Parfait M., C. Shannon Stokes and Gretchen T. Cornwell (2000). Are there crisis-led fertility declines? Evidence from central Cameroon. *Population Research and Policy Review* (Dordrecht, The Netherlands), Vol. 19, No. 1 (February), pp. 47-72.
- Foster, Andrew (1993). The Effects of Economic Fluctuations on Marriage and Fertility in Sub-Saharan Africa. Paper presented at the 1993 Annual Meeting of the Population Association of America, Cincinnati, OH.
- Institut National de la Statistique (1991a). *Zaire/Kinshasa. Recensement scientifique de la Population -- Juillet 1984 -- Caractéristiques démographiques, Volume I*. Kinshasa: Institut National de la Statistique, Ministère du Plan et Aménagement du Territoire, République du Zaïre.
- Institut National de la Statistique (1991b). *Zaire: Un aperçu démographique. Recensement scientifique de la Population, 1984*. Kinshasa: Institut National de la Statistique, Ministère du Plan et Aménagement du Territoire, République du Zaïre.
- International Rescue Committee (2000). Mortality in Eastern DRC: Results from Five Mortality Surveys. Bukavu, DRC: International Rescue Committee. Mimeographed.
- Jolly, Carole L. and James N. Gribble. (1993). "The Proximate Determinants of Fertility." In Karen A. Foote, Kenneth H. Hill, and Linda G. Martin (eds.), *Demographic Change in Sub-Saharan Africa*, pp. 68-116. Washington, DC: National Academy Press.
- Lesthaeghe, Ron J. (1989). Introduction and Production and Reproduction in Sub-Saharan Africa: An

- Overview of Organizing Principles. In *Reproduction and Social Organization in Sub-Saharan Africa*, R. J. Lesthaeghe, ed. Berkeley: University of California Press, pp. 1-59.
- Lesthaeghe, Ron J. (1993). Are There Crisis-led Fertility Transitions? Paper presented at the 1993 Annual Meeting of the Population Association of America, Cincinnati, OH.
- Maton, Jef, Koen Schoors, and Annelies Van Bauwel. (1999). Congo 1965-1997. Gent University, Belgium (November). Mimeographed.
- Mortara, G. (1949). Fertility and reproduction rates. In *Methods of Using Census Statistics for the Calculation of Life Tables and Other Demographic Measures*, United Nations. New York: United Nations, pp. 40-60.
- Muhuri, P.K., Blanc, A.K. and Rutstein, S.O. (1994). *Socioeconomic Differentials in Fertility*. Demographic and Health Surveys Comparative Studies No. 13. Calverton, MD: Macro International Inc.
- Population Reference Bureau. (1995). 1995 World Population Data Sheet. Washington, DC: Population Reference Bureau, Inc.
- République du Zaïre, Ministère du Plan et Reconstruction Nationale (1996). *Enquête Nationale sur la Situation des Enfants et des Femmes au Zaïre en 1995: Rapport Final*. Kinshasa: Ministère du Plan et Reconstruction Nationale, République du Zaïre.
- République du Zaïre, Societa d'Ingegneria e Consulenza Attivita Industriali, and Département de Démographie/Université Catholique de Louvain (1977). *Etude démographique de l'Ouest du Zaïre, Tome 1: Méthodologie*. Louvain-la-Neuve, Belgium: Université Catholique de Louvain.
- République du Zaïre, Societa d'Ingegneria e Consulenza Attivita Industriali, and Département de Démographie/Université Catholique de Louvain (1978a). *Etude démographique de l'Ouest du Zaïre, Tome 3: Mouvement de la population: Nuptialité, fécondité, mortalité, migrations*. Louvain-la-Neuve, Belgium: Université Catholique de Louvain.
- République du Zaïre, Societa d'Ingegneria e Consulenza Attivita Industriali, Département de Démographie/Université Catholique de Louvain, and Centre de Recherches Sociologiques/Université Catholique de Louvain (1978b). *Synthèse des études démographiques de l'Ouest du Zaïre, 1974-1977*. Louvain-la-Neuve, Belgium: Université Catholique de Louvain.
- Retel-Laurentin, Anne (1974). *Infécondité en Afrique noire: Maladies et conséquences sociales*. Paris: Masson et Cie.
- Romaniuk, Anatole (1961). *L'aspect démographique de la stérilité des femmes congolaises*. Léopoldville: Studia Universitatis "Lovanium," Institut de Recherches Economiques et Sociales, Editions de l'Université.
- Romaniuk, Anatole (1967). *La Fécondité des populations congolaises*. Paris: Mouton.

- Romaniuk, Anatole (1968). The Demography of the Democratic Republic of the Congo. In *The Demography of Tropical Africa*, William Brass and others. Princeton, NJ: Princeton University Press, pp. 241-341.
- Romaniuk, Anatole (1980). Increase in Natural Fertility During the Early Stages of Modernization: Evidence from an African Case Study, Zaire. *Population Studies* (London, England), Vol. 34, No. 2, pp. 295-310.
- Sala-Diakanda, Mpembele (1980). *Approche ethnique des phénomènes démographiques: Le cas du Zaïre*. Département de Démographie, Université Catholique de Louvain. Louvain-la-Neuve, Belgium: Cabay Libraire-Editeur S.A.
- Shapiro, David (1996). Fertility Decline in Kinshasa. *Population Studies* (London, England), Vol. 50, No. 1 (March), pp. 89-103.
- Shapiro, David, Gacheke Simons and B. Oleko Tambashe (1995). Extended-Family Solidarity: Interhousehold Resource Transfers for Children's Schooling and Child Fostering in Kinshasa. Paper presented at the Annual Meeting of the Population Association of America, San Francisco, CA. University Park, PA: Department of Economics Working Paper, Pennsylvania State University.
- Shapiro, David and B. Oleko Tambashe (1997). Education, Employment, and Fertility in Kinshasa and Prospects for Changes in Reproductive Behavior. *Population Research and Policy Review* (Dordrecht, The Netherlands), Vol. 16, No. 3 (June), pp. 259-287.
- Shapiro, David and B. Oleko Tambashe (1998). Ethnicity, Education, and Fertility Transition in Kinshasa, Congo. Paper presented at the International Union for the Scientific Study of Population Seminar on Reproductive Change in Sub-Saharan Africa, Nairobi, Kenya. University Park, PA: Department of Economics Working Paper, Pennsylvania State University.
- Shapiro, David and B. Oleko Tambashe (2000). Fertility Transition in Urban and Rural Areas of Sub-Saharan Africa. Revised version of paper presented at the Chaire Quetelet Symposium in Demography, Catholic University of Louvain, Louvain-la-Neuve, Belgium. University Park, PA: Department of Economics Working Paper, Pennsylvania State University.
- Shapiro, David with B. Oleko Tambashe (2002). *Women's Education, Employment, and Fertility: Kinshasa in Transition*. Chicago: University of Chicago Press, forthcoming.
- Tabutin, D. (1982). Evolution régionale de la fécondité dans l'ouest du Zaïre, *Population* (Paris, France), Vol. 37, No. 1, pp. 29-50.
- United Nations (1988). *Mortpak-Lite: The United Nations Software Package for Mortality Measurement*. Population Studies No. 104. New York: Department of International Economic and Social Affairs.
- United Nations (1991). *World Population Prospects 1990*. New York: Population Division, United Nations.

United Nations (2001). *World Population Prospects: The 2000 Revision*. New York: Population Division, United Nations.

**Table 1. Mortality Estimates for the Democratic Republic of Congo, 1950 -1995**

<i>Year</i>	<i>Crude death rate</i>	<i>Infant mortality rate</i>	<i>Life expectancy</i>
1955-7	26	165	39.5
1950-5	25.6	166	39.1
1974-7*	17.0	NA	46.4
1970-5	18.9	127	46.1
1984	16.8	137	47
1980-5	16.4	109	49.6
1995	NA	148	45.4
1990-5	14.7	93	51.7

NA= not available.

\* Data in this row refer to results from the 1974-77 surveys of the west of the country, and pertain to the three provinces of Bas-Congo, Bandundu, and Kasai Occidental, a portion of Equateur province, and Kinshasa.

Sources:

- 1954-7: Romaniuk, 1968, pp. 335-6.
- 1950-5: United Nations, 2001.
- 1974-7: République du Zaïre, 1978b, table 7.2.2, p. 149.
- 1970-5: United Nations, 2001.
- 1984: Institut National de la Statistique, 1991b, pp. 20-21.
- 1980-5: United Nations, 2001.
- 1995: République du Zaïre, 1996, table 4.17, p. 58.
- 1995:
- 1990-5: United Nations, 2001.

**Table 2. Fertility Estimates for the Democratic Republic of Congo, 1950 -1995**

<i>Year</i>	<i>Crude birth rate</i>	<i>General fertility rate</i>	<i>Total fertility rate</i>
1955-7	45.2	203	5.91
1950-5	47.6	NA	6.0
1974-7*	44.6	218	6.3
1970-5	47.7	NA	6.3
1984	48.1	229	6.7
1980-5	48.3	NA	6.7
1995	NA	NA	7.3
1990-5	48.2	NA	6.7

\* Data in this row refer to results from the 1974-77 surveys of the west of the country. In the 1950s, fertility in the west was slightly higher (by 3-5 percent) than the corresponding national estimates, so these figures most likely slightly overstate fertility nationally in the mid-1970s. See discussion in text for details.

Sources:

1955-7: Romaniuk, 1968, table 6.48, p. 333.

1950-5: United Nations, 2001.

1974-7: Tabutin, 1982, table 1.

1970-5: United Nations, 2001.

1984: Institut National de la Statistique, 1991b, pp. 21 (crude birth rate) and 18 (total fertility rate); general fertility rate is estimated based on crude birth rate and the population of women aged 15-44 given in Institut National de la Statistique, 1991a, table 1.

1980-5: United Nations, 2001.

1995: République du Zaïre, 1996, table 4.15, p. 55.

1990-5: United Nations, 2001.