The Quite Revolution:

An analysis of the change toward below-replacement-level fertility in Addis Ababa

By

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This thesis is my original work whilst a Research Scholar in the Demography Program, Research School of Social Sciences, The Australian National University.

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ABSTRACT

Rural-urban differentials in fertility behaviour are neither new nor surprising, but a difference of over four children per woman as observed between rural Ethiopia and the country's national capital, Addis Ababa, in 1990 is rare, possibly unique. Reported fertility in Addis Ababa in 1990 was about 2.6 children per woman. By the mid-1990s, it declined further to 1.8 children per woman. This study investigates the dimensions, components and causes of this remarkable reproductive change.

The study specifically asks and seeks to answer the following questions. Is the decline real, or is it merely an illusion created by faulty reporting? If it is real, how has it come about? Did it result from a change in the onset of reproduction or a decline in the proportion of women reaching high parities or both? And in what context has such a fundamental, even revolutionary, change taken place in a country and a continent that are mostly yet to join the global transition to a small family-size norm.

Data for the study were drawn from two national population censuses, undertaken in 1984 and 1994, two fertility surveys, conducted in 1990 and 1995, and a number of supplementary sources, including a qualitative study conducted by the investigator. Results from the study confirm that the trend of declining fertility and the recent fall to below-replacement-level are indeed real. As the analysis shows the decline was largely driven by changes in the marriage pattern, and supplemented by the increased propensity of fertility control observed across all birth orders and age groups. All socio-economic groups in the city have had a decline in cohort fertility and this was brought about both by shifts in population composition (a composition effect) and increased intensity of fertility control within each group (a rate effect). The institutional and cultural factors that are believed to have prompted these changes are discussed in the thesis in some detail.

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Chapter 1

THE RESEARCH BACKGROUND:
Questions, objectives and theoretical considerations

1.1. The research question

Fertility levels in most developing countries were very similar in the 1960s (Casterline, 1991: 71; Cohen, 1993: 52; Chackiel and Schkolnik, 1996: 3). The total fertility rate estimated for sub-Saharan Africa in 1965, 6.6 children per woman, was only slightly higher than the average for low- and middle-income countries. Since then, a major change in levels of fertility has taken place throughout most of the developing world. In Latin America, the decline begun in the first half of the 1960s and by the second half of the 1980s fertility had already decreased to 3.6 children per woman, resulting in a 40 per cent decline (Guzmán, 1996: xxii; Chackiel and Schkolnik, 1996: 3). In East Asia, total fertility fell by more than half, from about 6 children per woman in 1965 to around 2.5 in the early 1980s (Casterline, 1991: 71). In South Asia, the decline was approximately 30 per cent, from 6.3 to 4.4 children per woman (Cohen, 1993: 52). In West Asia and North Africa, the total fertility rate had declined by 39.8 per cent, from 7.16 births per woman in 1960-64 to 4.31 children per woman in the first half of the 1990s (Rashad, 2000: 101).

In contrast, total fertility in Africa south of the Sahara remained more or less on the same level as it was in the 1960s (United Nations, 1991). This has generated considerable pessimism on the prospects for fertility change in the sub-continent. In the spectrum of views, the one that was dominant in the 1970s and even up to the mid-80s regarded the region as presumably the most pronatalist and one where family structure, kinship rules and value system regarding childbearing were not only homogeneous and uniquely distinct from almost all the rest of the world, but also extremely resistant to the influences of education and child survival, which had lowered fertility levels elsewhere (Eberstadt, 1981; Caldwell and Caldwell, 1987; Lesthaeghe, 1989).

Beginning in the late 1980s, in contrast, a growing number of studies begun to document the onset of a nationwide fertility transition in a number of countries in the region, including those once perceived as having little or no prospect of lower fertility in the foreseeable future. Most notable of these have been the declines recorded in Botswana, Kenya, South Africa, Swaziland and Zimbabwe (Cleland, Onuoha and Timaeus, 1991; Rutenberg and Diamond, 1993; Cohen, 1993; Caldwell and Caldwell, 1993; Robinson and Harbison, 1995; Cleland, 1995; Muhwava and Timaeus, 1996; African Population Policy Research Centre, 1998). However, there have been mixed views on the extent of the fertility decline in countries already undergoing the transition and the prospect of a broad-based regional transition (Rutenberg and Diamond, 1993; Caldwell, Orubuloye and Caldwell, 1992; Lockwood, 1995; Lesthaeghe and Jolly, 1995). Some researchers, for instance, have questioned the magnitude of changes reported for some countries, on the grounds of data quality (Blacker, 1994; Blanc and Rutstein, 1994; Thomas and Muvandi, 1994), while others expressed renewed scepticism on the prospect of a decline covering wider areas of the continent, arguing that alongside the driving forces there still remain massive constraints (Caldwell *et al.* 1992; Lesthaeghe and Jolly, 1995).

In a contribution to a special issue of the *Journal of International Development* on 'Demographic Transition in Africa', Lesthaeghe and Jolly (1995: 30) warned that

> one should not by any means deduce from the experience of three countries (Botswana, Kenya and Zimbabwe), that the fertility decline in sub-Saharan Africa has taken a continent wide start. During the 1990s, too many areas will still be likely candidates for a fertility rise than decline. The literature of the 1970s and 1980s, which admittedly did not forecast the turn in Kenya, Zimbabwe or Botswana, is not yet obsolete.

On the other hand, Caldwell *et al.* (1992) used as a threshold point selected socio-demographic indicators, namely the infant mortality rate, female education and family planning effort attained, at the incipience of transition, by those countries which had shown some notable nationwide transition in the region: they speculated that, before the end of the 1990s, the fertility transition in sub-Saharan Africa was unlikely to extend much further than Zambia and Ghana, with some remote possibilities for Senegal, Togo and Cameroon to join the group in the same period or a little later. Subsequent studies, however, showed a fairly long list of countries of the region as

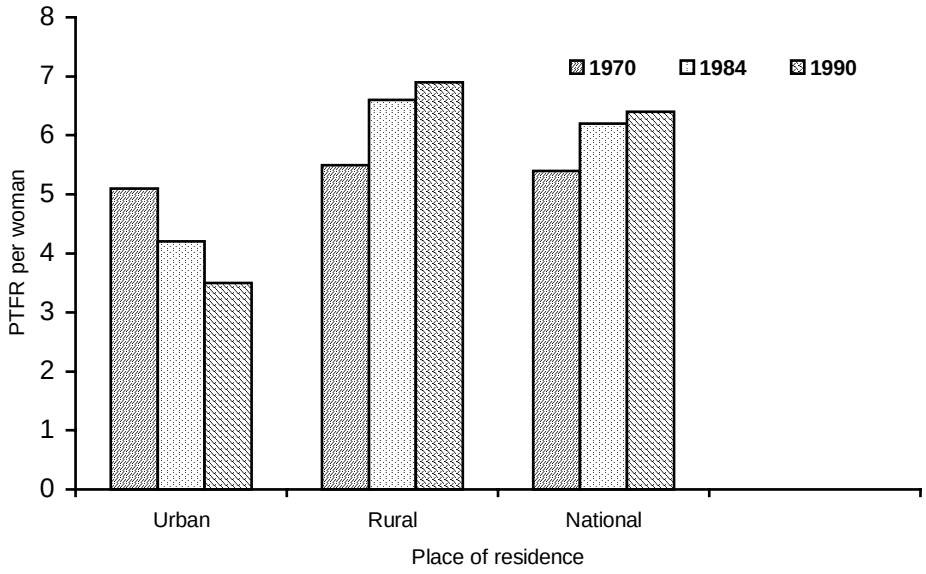
having joined the global transition, in fact, in some, in an earlier time-frame and at a swifter pace than anticipated (Blanc and Poukouta, 1997; Kirk and Pillet, 1998). For instance, Kirk and Pillet (1998) report that by 1995 two-thirds of the 23 countries in the region that had conducted Demographic and Health Surveys (DHS) have already undergone a nationwide fertility decline. Recently, Hinde and Mturi (2000) established a significant fertility decline in Tanzania.

Much of the existing knowledge on reproductive behaviour in the African region, including the literature listed above, largely focuses on large national units, sometimes on continent-wide realities. This approach to some degree has contributed to the failure to foresee the fertility transition, which is now reported in country after country in the region. Caldwell wrote that 'Most population scholars of the region are guilty of having placed too much emphasis on ... similarities across the continent and devoted too little attention to important sub-regional [to which I may add intra- and inter-country] differences' (Caldwell, 1994a: 181). Recognizing the exact nature of transition elsewhere might have help avoid this overly simplistic view. For example, as is clear in the numerous studies that emerged from or followed the famous European Fertility Project and other related studies in that region, the nation-state is not always the best unit of aggregation when it comes to understanding early fertility transition (Wrong, 1980; Watkins, 1991; Chesnais, 1992; Szreter, 1996). This is particularly because fertility transition by nature is far from a unitary and unified national event. In fact, as observed in European studies, the transition to small family size largely followed a developmental sequence, involving multiple transitions within it (Gillis, Tilly and Levine, 1992; Szreter, 1996). Thus the nature of reproductive change, among other issues, points toward the values of a more contextualised analysis of demographic phenomena; and the need for appreciation of the limits of aggregate level and nation-state based approaches, particularly in societies still undergoing fertility transition, as in most countries in contemporary sub-Saharan Africa. This is especially evident in the case of Ethiopia.

The national average, as shown in Figure 1.1, gives the impression of an all-encompassing rise in period fertility in Ethiopia between 1970 and 1984, followed by a fairly stable condition up until 1990. However, this national average conceals an

important regional difference: a consistent decline in fertility in urban areas and an increase in rural areas. This divergence in fertility behaviour between the two areas, as can be expected, has led to a notable rural-urban difference in fertility rates, a difference of over three children per woman in 1990. In fact, in the early 1990s, this was the largest urban-rural fertility difference ever observed in sub-Saharan Africa (Cohen, 1993: 34). For instance, at around the same period the comparable rural-urban difference was 1.8 for Botswana, 2.3 for Kenya and 2.4 for Zimbabwe, countries that are often reported as being in the forefront of the emerging fertility transition. A comparison of the urban fertility rate in Ethiopia with similar data from these countries also shows that the total fertility rate of 3.5 children per woman observed in 1990 in urban Ethiopia was the lowest rate recorded in the region at the time [1].

Figure 1.1 Trends in Period Total Fertility Rate (PTFR) per Woman by Place of Residence, Ethiopia, 1970 - 1990



The picture that emerges from a closer look at data for Ethiopia's capital, Addis Ababa, is even more remarkable. Despite this country having one of the highest fertility rates in the region, remaining in 1990 at 6.6 children per woman, the fertility rate in Addis Ababa had fallen from around four in 1978 to about 2.5 in the late 1980s (CSA, 1997). By the mid-1990s, reported fertility in the city had fallen to 1.8 (CSA, 1997).

[1] Total fertility estimates in urban areas stood at 4 in Botswana in 1988, 4.7 in Kenya in 1988-89, and 3.9 in Zimbabwe in 1988-89 (Cohen, 1993: 34 -35).

Such a level of fertility is remarkably low for an urban area in a developing country such as Ethiopia, which still has moderately high mortality, a low standard of living, and no history of an effective national family planning program (see chapter 3 for more details). In Africa, both south and north of the Sahara, comparably low urban fertility exists perhaps only in South Africa and metropolitan Tunis[2]. However, the prevailing circumstances in Addis Ababa and more broadly in Ethiopia, are hardly comparable with these countries and areas of the region. For instance, to mention but a few contrasts, South Africa is fairly industrialised and economically advanced; it has established historical links with Europe, enjoys a relatively low level of mortality (both in urban and rural areas), maintains a high degree of urbanisation and has a history of strong commitment to family planning (Caldwell, 1994b: 13; Chimere-Dan, 1997: 2; World Bank, 1998). From the perspective of classical demographic transition theory and other contemporary narratives on fertility change, which are discussed in Section 1.3 in this chapter, such conditions are believed to encourage the adoption of a small-family norm.

These are not conditions that have prevailed in Addis Ababa. Estimates of infant mortality for the mid-1970s, for instance, show that 11 per cent of children born in the city did not survive to their first birthday. Though there have been subsequent improvements, mortality among infants remained moderately high, at about 77 per thousand live births, in the early 1990s (OPHCC, 1987: 217; CSA, 1997: 151-153). This figure is not only ten times higher than the level found elsewhere in populations with comparable levels of fertility to Addis Ababa's, but is also above the level proposed by some scholars as a threshold needed for the onset of fertility transition in sub-Saharan Africa (Caldwell *et al.*, 1992: 212). Standards of living in Addis Ababa, though much better than in the rest of the country, also remain low. A significant proportion of the city's population, about 44 per cent in 1994, still live below the 'poverty line' (Tadesse, 1996: 224). Moreover, in Ethiopia there has been neither vigorous state support for family planning nor moral leadership towards family restriction, factors which are accorded key roles in the transition to low fertility in a number of developing countries, including those of the emerging transition in sub-Saharan Africa (Robinson, 1992;

[2] Chimere-Dan (1997: 5; 1998: 3) shows a total fertility of 1.9 for metropolitan areas. However, the 1998 DHS shows a total fertility of 2.3 for urban areas for the period 1995 - 98 (SADHS Project Team, 1999: 72). The total fertility in Tunisia as a whole is 2.8 children per woman (Population Reference Bureau, 2000).

Caldwell, 1993, 1994b; Lockwood, 1995; Robinson and Harbison, 1995; Kirk and Pillet, 1998). In a study designed to assess family planning program efforts in developing countries, Ethiopia's program strength in 1994 had been graded in the category of 'weak effort' (Ross and Mauldin, 1996: 139 - 140). During the same period, the program efforts for Botswana, Kenya and Zimbabwe were ranked as 'moderate' (Ross and Mauldin, 1996: 140).

So the question remains of how a city which at first glance does not appear to be a strong candidate for any significant fertility decline, even by African standards, records such unusually low fertility. This general point leads onto specific questions. Is the decline real or is it an illusion created by faulty reporting? And if it is real, as I shall argue, how does it come about? Does it result from a change in the onset of reproduction or a decline in the proportion of women reaching high parities or both? How consistent are the observed changes with the trends in the proximate determinants of fertility in the city? What are the roles of socio-economic and other background factors in the dynamics of fertility variation and change over time in the study area? And in what context has such a fundamental, even revolutionary, change in reproductive behaviour taken place in a region that has long been regarded as highly pronatalist and extremely resistant to change? The search for answers to these questions is the main theme of this study.

1.2. Research objectives

Consistent with the research questions raised in the previous section, the goal of the present research is to explore the dimensions, components and causes of reproductive change in the national capital of Ethiopia, Addis Ababa. Specifically, the four primary objectives of the study are:

(i) To examine the extent of change in period, cohort and parity-specific fertility behaviour in Addis Ababa using alternative sources of data and techniques of analyses;

(ii) To examine the trends and patterns of the proximate determinants of fertility and analyse their relative contribution to period fertility change in the study area;

(iii) To investigate the importance of socio-economic and other background factors for variations and change in cohort fertility performance, and determine, using the Easterlin framework, the mechanics of their influence; and

(iv) To explain the underlying causes of the ongoing reproductive change in Addis Ababa.

1.3. Determinants of fertility change

1.3.1. The state of knowledge

For many years, discussion of fertility transition has been dominated by a set of inter-related propositions known as the theory of the demographic transition. This theory grew out of a description of demographic change in nineteenth century Europe, and it has always been difficult to distinguish the theory of demographic transition from the population history of European countries (Alter, 1992). Classical statements of the demographic transition theory are found in Landry (1909, 1934 cited in Chesnais, 1992), Thompson (1929), Davis (1945) and Notestein (1945, 1953). However, the contribution of some of these authors such as Thompson and Davis stopped short at a basic outline of the evidence; others, in particular Landry and Notestein proposed explanatory theories (Chesnais, 1992: 3). With respect to the causes of fertility decline, Landry, for instance, has reasoned that the motive for birth restriction is largely 'egotistical': related to the rising cost of children, their ability to cause pain and distress to their parents, and the problems women experience in pregnancy and child care (Landry, 1934 cited in Kirk, 1996: 363).

On the other hand, Notestein, who was credited with having formulated the theory in its most explicit and comprehensive form, and probably the first to introduce the term 'transition', remarked that fertility decline, in historical Europe, came about primarily through rational control and was achieved largely by means of contraceptive practices (Kirk, 1996). He remarked that, even in this respect, contraception should not be perceived as the cause of declining birth rates in any profound sense, since relatively effective methods of contraception were widely known for centuries before they were generally used. Thus, for him, birth rates were reduced largely by means of contraception, but in response to drastic changes in the social and economic setting

that radically altered the motives and aims of people with respect to family size (Notestein, 1945: 37).

Notestein acknowledged the difficulty of identifying precisely the causal factors of these changes, but regarded as most important growing individualism; freedom from older taboos; rising opportunities and popular aspirations; the diminishing role of the family in production and other aspects of life; the rising cost of rearing children and the decline in their economic contribution; the new independence for women from household obligations; and their participation in new economic roles that are less compatible with childbearing (Notestein 1953 cited in Kirk 1996). All these developments together with the effects of urban life made having large families a progressively more difficult and expensive undertaking; hence the social aim of perpetuating the family gave way progressively to that of promoting the health, education and material welfare of the individual child. Therefore, in Notestein's view a decline in fertility requires a shift in social goal from that directed toward the survival of the group to those directed toward the welfare and development of the individual (Notestein, 1945: 40 - 41).

Kingsley Davis (1963) made an early attempt to refine one of the theory's implicit assumptions that demographic change will evolve in the same fashion in every society, by proposing a theory of 'change and response', known as 'multi-phasic response', which allows for different evolutionary patterns. Davis's basic argument is that, faced with a persistently high population growth resulting from past success in controlling death, families tend to exercise 'multiphasic demographic responses' to cope with their new circumstances and avoid a relative loss of status (Davis, 1963: 362). The principal demographic responses which have relevance to subsequent fertility decline include a rise in the proportion of people who remain single; a rise in the age at marriage; increased use of contraception, including sterilisation; abortion; and internal and international migration. However, he contended that the former two responses were not a deliberate effort to reduce fertility, but a response to emerging social and economic opportunities as well as obstacles. Therefore, according to the theory, the desire for self-improvement in the face of economic opportunities or constraints is the central factor that provides the motive for response. Consequently, like the classical

transition theory, this theory remains basically economically oriented. The only major difference is that in the 'multi-phasic hypothesis' societies are assumed to resort to fertility restriction only after all other possible responses are exhausted, such as the migration response, which as Mosher (1980) argues, seems to be preferred to fertility control for several reasons.

In an attempt to address transition theory's inability to forecast the precise threshold levels required for sustained fertility decline, the United Nations (1965) also later proposed what has become known as the 'threshold hypothesis'. The hypothesis holds that fertility will begin to decline in developing countries only if a certain critical minimum combination of social and economic development has been achieved: these are measured by twelve variables ranging from per capita income to mortality level, female literacy, urbanisation, and even energy consumption and cinema attendance.

An increasing number of research studies have pointed out the difficulties of identifying a clear and single threshold level of fertility decline across societies. In this regard, Caldwell wrote that ' ...the United Nations study itself shows that the decline in fertility had begun in some societies at one-third the per-capita income level that had been needed in others and that the finding held with regard to energy consumption at one-ninth the level, urbanisation at one-seventh, and infant mortality at one-fourth', and concluded that 'In fact—although the authors were reluctant to admit it—the real value of the United Nations exercise was to discount completely the possibility of generalizable thresholds across societies' (Caldwell 1991: 210).

Indeed, the main challenges to the threshold hypothesis, and the classical theory in general, emerged from the research findings of the European Fertility Project conducted by the Princeton Office of Population Research in the US (Coale, 1973; Coale and Watkins, 1986). This study established that marital fertility decline in European countries occurred under different circumstances with no common threshold levels for indicators such as infant mortality, literacy, urbanisation and level of economic development. Coale (1973), however, identified three broad prerequisites for marital fertility decline: (1) fertility must be within the calculus of conscious choice; (2)

reduced fertility must be [perceived as] advantageous; and (3) effective techniques of fertility reduction must be available.

Later, several scholars from different disciplines, mainly economists, tried to anchor the general macro-level propositions of the classical demographic transition theory into microscopic aspects of demographic-economic interrelations. There are two major schools and many variants to the economic analyses of fertility. The first, known in the literature as the 'Chicago-Columbia' or the 'new home economics' approach generally views children as analogous to consumer durables, while the second, referred to as the 'Pennsylvania approach' and primarily reflected in the works of Easterlin and his colleagues, made attempts to wed economic theories to more traditional sociological research on fertility.

In the 'new home economics' approach, Leibenstein in his path-breaking work (1957) and subsequent reformulation (1974, 1975) outlined an economic framework of fertility that attempts to explain the differences in fertility behaviour among low and high-income countries as well as between individuals of different socio-economic background, in terms of variations in the utility and costs of an additional birth. Leibenstein distinguished two types of costs and three kinds of utilities associated with children. On the utility side, he included: (a) *consumption utility*, which he referred to as personal pleasure derived or gained; (b) *production utility*, which refers to the contribution children make to family income; and (c) *security utility*, which refers to the kind of assistance children provide to parents in their old age. On the other hand, on the cost side, he suggested the following two elements (a) direct cost, related to the financial outlay involved in bringing up a child; and (b) indirect cost, which includes opportunity costs that may be foregone by parents in their decision to have children.

In the discussion of his framework, Leibenstein focused on what may be called 'limited rationality', that is, on the decision process at the margin, where a couple could rationally choose whether or not to have an additional child given certain prior fertility experience; he asserted that this rational decision-making process does not become operative until some threshold number of children has been reached, which is to some extent determined by preference and can vary across households and social groups.

Reproductive behaviour before this point is largely unplanned, while beyond this point decisions concerning the marginal child involve the optimising cost-benefit calculations. Furthermore, Leibenstein argued that, with development, the consumption utility derived from the marginal child remains largely unchanged, while the costs increase and economic benefits decline. Thus, the decision rule at the margin favours fewer children. The social and economic changes that accompany development may also, it is said, operate to influence the social position of households within society. This in turn may alter the objective function, namely tests for children and other consumption goods competing with them. This suggests that a household's demand function may be redefined as a consequence.

Becker (1960, 1965, 1981) and several others (Mincer, 1963; Becker and Lewis, 1973; Becker and Barro, 1988) subsequently re-formulated and refined the earlier attempt into a more general model, based on the familiar neo-classical assumption of fixed preferences, maximising behaviour and the existence of equilibrium solutions for a decision situation. According to the Becker-Lewis approach, also known as the demand theory of fertility, or the Chicago-Columbia model, a household derives a positive utility from a bundle of goods and services that parents choose to buy and consume from a set of alternative bundles constrained by a given budget. Thus, the household allocates its budget not only for purchasing traditional consumer goods and services but also for investment in children, itself a product of two choice variables: the number of children and the well-being of each child: the 'quantity' and 'quality' of children, respectively, in the language of Becker and Lewis. The improvement in the quality of a child can be made in a form of expenditure on the current consumption of the child and investment in the child's health and education, which is 'investment in human capital'. Therefore, faced with these three arguments, namely the quantity and quality of children and a bundle of other non-child commodities (that are represented by the utility function in the language of economics), and subject to a household resource constraint, parents would then chose a fertility level that maximises its total utility. The household resource constraint, also known as the budget line, is composed of household income and total available time each spouse has to allocate between market and non-market activities, and depends on the market wage rate, money prices of market goods and costs of raising children. More recent versions of the model have

added 'altruism' as a source of utility to the decision maker and extended the maximising process so as to be 'dynastic': the present decision-maker acts on behalf of future generations by making bequests and investments in addition to current expenditures (Becker and Barro, 1988).

Further advances in the micro-economic theory of fertility have also been made by different scholars at various times, to address some of its original limitations. In 1976 Schultz attempted to incorporate child mortality into the model and discussed the role of preferences or tastes, which were missing in the basic model. Michael and Willis (1976) also examined fertility behaviour using a much broader economic approach, while in 1978 Easterlin made his famous attempt to incorporate effects of 'taste' and 'preference' changes as well as the role of biological factors, which subsequently led to the development of an entirely new perspective in the study of fertility.

This approach which has come to be known as the 'Pennsylvania approach' or the 'synthesis' framework, argues that fertility performance depends on three interrelated factors: 'demand' for children, potential 'supply' of children and 'fertility regulation costs' (Easterlin, 1978; Easterlin and Crimmins, 1982, 1985). The 'demand' for children, which is generally taken to mean desired family size, is believed to be an expression of both the relative costs of childbearing compared with other activities, and parents' subjective preferences within the constraints imposed by their income. In deciding their family size or the number of children they demand, parents compare the costs and benefits of children to the costs and benefits of alternative life styles available to them within the limitations imposed by their expected future income (Alter, 1992). On the other hand, the 'supply' of children depends on the biological and cultural mechanisms that affect a couple's ability to conceive and bear children, and on the mortality of children. The assumption of the model is that these 'supply' conditions are beyond the control of the family, and thus they are constraints in the environment of the family rather than being decision variables. Consequently, if the ability of the family to produce children yields fewer than desired, then fertility behaviour is entirely determined by supply conditions. Conversely, if the demand for children is less than the potential supply, the couple faces the prospect of having a larger family size than desired. The larger this excess, the greater the potential burden of unwanted children,

and consequently the greater a household's motivation to limit its fertility. However, whether fertility control will actually be practised, given an excess supply situation, depends on how the costs of fertility regulation compare with the motivation to limit fertility. These costs are of two types; psychic costs: the displeasure associated with the idea or practice of fertility control; and market costs: the time and money necessary to learn about and use specific techniques. At the same time, the costs in turn depend upon (a) the attitudes in society toward the general notion of fertility control and toward specific techniques, and (b) the degree of access to fertility control, in both the availability of information and the range of specific techniques and their prices. Typically, a family planning program lowers market costs by increasing information and providing services free or at affordable prices. It also lowers subjective costs by lending legitimacy to the notion of practising birth control (Easterlin and Crimmins, 1985). This framework has proved enormously influential and, in fact, guided much of the recent research on fertility determinants, including large projects undertaken by the US National Academy of Sciences (Bulatao and Lee, 1983).

There has also been a significant attempt to restate the conventional demographic transition theory on a similar micro-level foundation, but in a broader cultural and institutional setting rather than an entirely economic perspective. This has been Caldwell's (1976, 1978, 1982) 'wealth flows' theory of fertility change, which maintains that fertility behaviour is rational in all societies and at every stage of development within the context of socially determined economic goals and within the bounds largely set by biological and physiological factors. The theory distinguishes two fundamental modes of production: traditional family–based production with high fertility; and non-familial (or market–based) production with low fertility. Caldwell held that the fundamental issue in demographic transition is the direction and magnitude of intergenerational wealth flows or the net balance of the two flows, one from parent to child and the other from child to parent, over the period from when people become parents until they die. This flow has been from younger to older generations in all traditional societies, and fertility decline began when there was a reversal of the net flow of resources toward children rather than parents. However, he held that such economic change was the result of social change that concentrated

greater family concern, in both emotional attachment and expenditure, on the children (Caldwell, 1978).

Caldwell (1978) accorded a key position in the onset of fertility transition to 'Westernisation' together with its two interrelated vehicles, mass education and the mass media, whose short- and long-term effects were the primary cause of a reversal in the direction of intergenerational wealth flows. The effects of mass education are argued to operate through reducing the child's potential for work, increasing the cost of children beyond the immediate costs of attending school, speeding up cultural change, and in developing countries, particularly Africa, propagating Western middle-class values (United Nations, 1990a:23).

A more specifically cultural perspective than Caldwell's has been the ideational-cultural approach propagated by, among others, Lesthaeghe (1983) and Cleland and Wilson (1987). In the course of criticising the micro-economic approaches of both Becker and Easterlin as well as the macro-level explanations of economic and social development of fertility change, Cleland and Wilson (1987) proposed an alternative explanation, known as ideational theory, that emphasizes cultural factors as primary determinants of the timing of change. Basing their analysis on historical data from Europe and selected developing countries that participated in the WFS program, they argue that the importance of innovation and ideational forces is underscored by (i) the rapidity with which the transition has occurred in these countries; (ii) the apparent heterogeneity of the socio-economic groups in which the transition has taken place; (iii) the homogeneity of 'cultural groups' in which fertility decline has taken place; (iv) the near-absence of reduction in child demand before the fall in marital fertility; and (v) the absence of parity-specific fertility control in pretransitional societies; rather than by structural changes, as proposed by demand oriented theories. Hence, they argued that

> …at the societal level, the timing of transition is strongly influenced by cultural boundaries and is associated rather with indicators of social development, such as literacy, than with economic indicators. The same argument is also believed to hold within a given societal category where the onset of [fertility] change is more closely associated with parents' education and cultural affiliation than with economic factors, such as familial control of economic life or women's employment (Cleland and Wilson, 1987: 27-28).

Another version of the ideational hypothesis is that of Lesthaeghe (1983), which asserts that '*a cost-benefit paradigm* [as is the case in demand theories] *is necessary*' but as 'taste' is assumed to be exogenous as well as constant in such theories, but is subject to change across cultural groups, a 'cost-benefit paradigm is *not sufficient* '. A striking distinction between the approaches of Cleland and Wilson (1987) and of Lesthaeghe (1983), according to van de Kaa (1996: 425) is that

> …while the former see their analysis as a rebuttal of micro-economic theories without precluding the operational role of broad economic factors, the latter sees no particular conflict with that approach. From his perspective, the ideational discussions should be looked at as an important if not crucial addition to the micro-economic approach. In fact, there is likely to be a synergetic relation between economic and cultural factors (van de Kaa, 1996: 425).

Another explanation of fertility change expounded chiefly by McNicol (1980, 1994, 1995, 1996, 1997, 1998) emphasises the role of institutions in fertility transition. Institutions, in this sense, refer to clusters of behavioural rules describing human actions and relationships in recurrent situations which would directly or indirectly influence fertility behaviour. Such rules may be written or unwritten, but are publicly known even if unexpressed; sanctions for violating them may be dictated by external authority or self-imposed (McNicoll, 1997: 201). The influence of government policies on fertility behaviour can, for instance, operate

> by altering prices (and endeavouring to alter preferences) attach[ed] to various behaviours within a given institutional system, or [by] modify[ing] the system itself, [or through altering] power relations within the family such as through 'empowerment' of women or, in a less potentially sensitive way, through communities or local government (McNicoll, 1994: 21-22).

There has also been a parallel development with respect to identifying the proximate determinants through which the effects of background and socio-cultural factors operate to influence fertility. Kingsley Davis and Judith Blake (1956) proposed the first such organising framework which included a list of eleven factors classified into three broad groups: factors affecting exposure to intercourse; factors affecting exposure to conception; and factors affecting gestation and successful parturition. Later, Bongaarts (1978, 1982; Bongaarts and Potter, 1983) grouped the intermediate fertility variables into seven and then, on grounds of degree of influence, identified only four as factors of primary importance. These key factors are marriage, contraceptive

use, induced abortion and lactational infecundability. Subsequent studies on the subject, particularly in sub-Saharan Africa also included sterility as among the most important proximate determinants of fertility (Frank, 1983; Bongaarts, Frank and Lesthaeghe, 1984, 1990). Although the proximate determinants framework proposed by Bongaarts (1978, 1982) and others (Bongaarts and Potter, 1983; Bongaarts *et al.*, 1984, 1990) appears a theoretically neat conceptualisation, in general such classification still leaves unanswered the questions of 'why' and under what conditions these factors change, which requires recourse to the type of theories of fertility decline reviewed in this section.

1.3.2. Synthesis and the approach in this study

The brief review of fertility theories in the previous section clearly suggests that a single unifying theory of reproductive behaviour, accepted by all demographers and applicable in all settings, is yet to be seen. In fact, no single narrative has so far remained unchallenged and, in most instances the effort seems to be, as van de Kaa (1996) put it, one of seeking alternative ways of 'telling the story' rather than amending previously existing theories. The classical demographic transition theory, for instance, has been criticised on several grounds. A number of scholars, on different occasions, questioned different aspects of its proposition, such as its overwhelming emphasis on structural factors and view of the demographic change as a single path process by which every nation is assumed to evolve in the same way (Davis, 1963; Cleland and Wilson, 1987; Knodel and van de Walle, 1986). Others also questioned even its accuracy in terms of fully describing the past let alone its ability to predict the future—both in terms of timing as well as the level and optimum combination of structural factors required to initiate it (Coale and Watkins, 1986).

Other theories have received no less scepticism. The original demand theory of fertility, particularly the 'Chicago-Columbia' approach, for instance has been challenged for its assumption of complete rationality and lack of proper handling of 'test' and 'preference' variations, as well for neglecting the 'supply' aspect of childbearing (Blake, 1968; Pollak and Watkins, 1993; Robinson, 1997). Although some of these issues have been addressed in later modifications, still other aspects of the

micro-economic approach, including its static nature, remain sources of criticism. Caldwell's 'wealth flows' theory has also been questioned on the tenability of the conclusion that compulsory universal schooling triggers the decline in fertility, given the legislative record and enforcement capabilities of most poor countries (Thadani, 1978; Schultz, 1983). Questions have also been raised on the nature of the specific appeal of Westernised values and family system, and how these cultural influences bring about fertility decline.

This state of affairs, manifested in the form of criticisms and alternative interpretations, partly reflects the complexity of the issue, the diversity of cultural, social and economic settings within which fertility change potentially takes place, as well as the disciplinary differences among the great number of scholars who have devoted research efforts to this topic. But it does not necessarily imply some kind of mutual exclusivity between the theories themselves. In fact, following the original Easterlin framework, which was later modified and adopted by the US National Academy of Sciences (Bulatao and Lee, 1983) as a general organising framework for fertility research, it can be shown that the important elements of marital fertility change propagated in these seemingly competing theories can be linked into the three factors identified by Easterlin (*changes in desired family size, the supply of children, and the costs of fertility regulation);* and that the difference between the theories is only in their differing emphasis on the elements of the framework and, of course, to some degree on the causes of change in these elements.

The ideational and diffusion theories as well as the explanations and/or hypotheses emanating from the European Fertility Project, can be viewed as reflections of the argument that fertility change rests on the changing costs of fertility regulation, rather than changes in the supply of and demand for children. This is because in these theories pre-transitional societies lack neither the motivation for nor the means of fertility control, but intervention in the process of childbearing is seen to be not part of their world-view. This places infinitely high 'psychic' cost on users of birth control while at the same time couples who do regard family limitation an acceptable choice will find information about birth control difficult and expensive to acquire. Hence,

fertility change takes place when such regulation costs begin to change due mainly to diffusion of ideas.

On the other hand, the mechanisms of change outlined in the demographic transition theory can be viewed as operating basically through changes in the motivation for fertility control, that is, changes related to the supply of and demand for children. Changes in the supply side are due primarily to declining mortality in childhood, resulting from rising standards of living and improved health conditions; changes in demand are due to factors which stimulate new aspirations incompatible with large-family life styles and create alternatives which compete for parents' resources of money, time and emotions. The cost of fertility regulation, however, seems to be accorded a less consequential role in the theory.

Caldwell's 'wealth flows' theory, although compatible with the idea of cultural diffusion, as related to the spread of Western values and concepts of family relationships that are implicit in the role it assigns to 'Westernisation', can also be seen as a theory which regards changes in the motivation for family limitation, particularly changes in the demand for children emanating from changing net costs and benefits, as the main cause of fertility change. Hence, in Caldwell's 'wealth flows' theory changing attitudes toward fertility control do not appear to be an important factor.

The foregoing discussion demonstrates both the inter-dependence between these seemingly alternative theories of fertility and the immense value of the Easterlin framework in organizing the key elements of fertility change. One other advantage of the Easterlin framework is also its usefulness in the analysis of the effects of socio-economic and modernization factors on individual fertility performance (Easterlin and Crimmins, 1982, 1985; Bulatao and Lee, 1983). In this case, much in the same way as used in explaining changes in fertility behaviour over time, the differentials in fertility performance across social and economic groups are viewed as reflections of differences in the motivation for fertility control and costs of regulation between the groups. As already alluded to the motivation for fertility control is determined by the balance between the demand for and supply of children, which can be respectively approximated by responses on desired fertility and a set of behavioural and biological

variables available in most fertility surveys. For instance, taking education as an example, the Easterlin framework attempts to identify whether differentials in fertility behaviour by educational status result from differences in the demand for children between the groups, differences in the supply of children or variations associated with the cost of fertility regulation or some combination of these? Due to the immense value of such analytical approach in clarifying the underlying mechanisms of influence of background factors on fertility behaviour, in this study I also employ the Easterlin framework as a tool of analysis to investigate the role of socio-economic factors on fertility behaviour in the study area. Details on the framework and the measurement issues involved in its application in the present study are discussed in Chapter 6. The proximate determinants framework and the institutionalists approach to fertility change, discussed in the previous section, also guide the present research. Hence, while the proximate determinants framework is used to examine the components of period fertility change in terms of its demographic elements, the underlying causes for the change in the proximate determinants themselves and fertility behaviour in general are explained in terms of the institutional level forces operating in the area.

1.4. Order of presentation

This research aims at analysing the dynamics of fertility and the proximate and background factors associated with the reproductive revolution in Addis Ababa. In doing so, the study is structured into seven chapters. Chapter 1 has provided a perspective on the research questions, the available theories on fertility decline and the analytical approach of the study. Chapter 2 describes the various data sources, and includes a detailed evaluation of the quality of each data source used in the subsequent analysis. Chapter 3 sketches the social, political, cultural and economic environment in the study area. The review in this chapter mainly focuses on variables and factors that are often regarded as having strong influence on both individual fertility performance and changes in aggregate fertility behaviour over time.

Chapter 4 analyses the levels and trends of fertility in Addis Ababa since the second half of the 1970s. This analysis involves examination of both cohort and period fertility, and the trends and patterns in parity-dependent fertility behaviour in the

study area. Changes in the demand for children over time are also assessed in this chapter, mainly to see if the decline in fertility that emerged from the analysis is indeed consistent with changes in fertility intentions in the area. Chapter 5 examines the demographic components of fertility change and analyses the relative contribution of each element to the decline in period fertility documented in the earlier chapter.

Chapters 6 looks into the socio-economic determinants of cumulated fertility, using bivariate and multivariate approaches. Given the evidence that childbearing in the area largely takes place within union, the multivariate analysis is specifically focussed on marital fertility. The chapter also looks into the specific mechanisms through which socio-economic factors influence individual fertility performance in the study area. This analysis is mainly guided by the Easterlin framework which relates variations in fertility performance to differences in the motivation for fertility control and costs of fertility regulation existing between individuals. The final chapter synthesises the key empirical findings and speculates on the underlying causes of reproductive change in Addis Ababa.

.... §§§ ....

Chapter 2

SOURCES AND QUALITY OF DATA

A study of levels and long term trends in reproductive change requires reliable data spanning a long period of time. Since 1961, four population and housing censuses (1961, 1967, 1984, 1994), two general-purpose demographic, housing and socio-economic inquiries (1976, 1978) and two other specialised fertility surveys (1990, 1995) have been conducted in the city of Addis Ababa. While such a large stock of data is a potentially important source of time-series information for the study of various aspects of reproductive behaviour in the city, some of the data, particularly those collected before 1980, are only available in the form of published reports, are often aggregated, and lack the necessary detail for undertaking analysis that is of interest to the study. On the other hand, the censuses of 1984 and 1994 and the two fertility surveys conducted in 1990 and 1995 provide rich information in machine-readable format and thus form the major sources of data in this study. This chapter examines the nature and quality of these data. It begins with a detailed account of the procedure of data collection and types of information available from all data sources. The quality of the various data is examined in Section 2.2. Bearing in mind the intended analysis in the subsequent chapters, this section focuses only on the four major sources of data and only on two variables, age and fertility. A qualitative study has been undertaken in the study area to supplement these quantitative sources of data. Section 2.3 describes the objectives and method of data collection used in this study. The concluding remarks are in Section 2.4.

2.1. Sources and nature of data

2.1.1. The 1984 Population and Housing Census

The 1984 Population and Housing Census of Addis Ababa, one of the primary sources of quantitative information in this study, is part of the country's first nation-wide population and housing census. Like many other 1980-round censuses carried out in Africa, the 1984 National Population and Housing Census of Ethiopia was conducted with the following four major objectives: (i) to provide basic information on the social,

economic and demographic characteristics of the population and its distribution over space; (ii) to collect data on recent levels of fertility and mortality, the migration pattern and the rate of growth of the population; (iii) to gather information on condition and stock of housing in the country; and (iv) to provide a much-needed framework for future multipurpose sample surveys (Hassen, Ahmed and Mengistu, 1989).

Including data vital to fertility analysis, the 1984 Census provides information on a wide range of areas: as many as 20 items on population characteristics and about the same number on conditions of dwelling units were included in the census. Regarding fertility, the census obtained information on lifetime fertility and births in the 12 months before enumeration. The information on lifetime fertility was obtained from all women of relevant age, irrespective of marital status, by asking the number of children ever-born, classified by survival status and whether living at home or elsewhere (1984 Census Questionnaire). Another important source of information for fertility analysis from the census is the data on children's and women's age along with the relevant information on relationship with other members of the household. Other information collected from individuals includes (Hassen *et. al.*, 1989):

1. *From all members of the household* : Resident status, sex and age at last birthday, relationship with other members of the household, religious affiliation, ethnicity and language usually spoken at home, place of birth and duration of continuous residence as well as disability status.
2. *From persons aged five years and over* : School attendance and highest grade completed;
3. *From persons aged ten years and over* : Marital and activity status, number of days worked, reasons for not working for those not engaged in gainful activities and type of occupation for the working population.

On the other hand, at the household level the census also collected detailed information on housing characteristics such as ownership status of dwelling unit, number of rooms per dwelling unit, amount of monthly rent paid for rented premises, availability of facilities in dwelling units as well as possession of radio, television and telephone (1984 Census Questionnaire).

The questionnaire and all other relevant materials for the 1984 Census were prepared in *Amharic*, the official and most widely spoken language in Ethiopia, and separate instruments were developed for rural and urban areas. Census data collection was administered through the canvas method and lasted for about 15 days beginning from 9 May 1984, which for all reference purposes, served as the 'Census Day' (OPHCC, 1991: iii). In most areas census interviews were conducted by enumerators who could speak the local dialect, in addition to *Amharic*, while in areas where local qualified enumerators could not be found interpreters were used to facilitate the interview process.

In many ways, the 1984 National Population and Housing Census occupies a unique position in demographic data collection and analysis in the study area as well as in Ethiopia as a whole. At the national level, the 1984 census was the first in the demographic history of the country that enabled a systematic comparison of vital rates between urban and rural areas of the country for identical time periods and methods of data collection (OPHCC, 1991: ii). Specially for the urban parts of Ethiopia including the capital Addis Ababa, the 1984 Census was also the first data set made available to researchers in machine-readable format for primary analysis. Because of its comprehensive enumeration area maps, the 1984 Census was also the first data source which had managed to cover areas often left out in previous surveys. With the exception of a small part of the country excluded for security reasons and technical difficulties, all areas and every person in Ethiopia were effectively covered in the inquiry through a total of about 7786 supervision and 40,765 enumeration areas (OPHCC, 1991: iii). In Addis Ababa alone about 1517 enumeration areas were demarcated (OPHCC, 1987: ii).

At the time of the census, Addis Ababa was administratively divided into five zones, locally known as *Ketena*, and each *Ketena* was further divided into five Higher Urban Dwellers' Associations (HUDAs), locally known as *Keftegna.* An Urban Dwellers' Association (UDA), locally known as *Kebelle*, constitutes the lowest administrative unit within a *Keftegna*. Altogether, at the time, there were five *Ketenas,* 25 *Keftegnas* and 284 *Kebelles* in the city. *Kebelles*, *Keftegnas* and *Ketenas* are all administrative institutions that came into existence after the 1974 Ethiopian revolution (see Section 3.1 for more

details) and a single *Kebelle* covers on average between 1000 and 1400 households, with a mean population of a little under 5000 persons (Clapham, 1988). Covering a defined territory demarcated strictly along physical boundaries, the *Kebelles* have served, and still continue to serve, several administrative purposes in post-revolution city life including administration of data collection. During the 1984 census each *Kebelle* (UDA) was divided into a number of enumeration areas, each consisting of about 150 to 200 households (OPHCC, 1987: ii). Moreover, five or six contiguous enumeration areas were combined to form a supervision area (OPHCC, 1991).

Data from the 1984 Census employed in the present study for primary analysis relate to records obtained from a cluster sample of enumeration areas in Addis Ababa. In drawing up the census sample, all the 1517 enumeration areas in the city were first stratified according to their distribution by *Keftegna* followed by selection of a single enumeration area, on an equal-probability-non-proportional basis, from each stratum (*Keftegna*) (Tesfaghiorghis, 1990: 35). The census sample data used for primary analysis comprised 22,655 individuals, of whom 5807 were women of reproductive age.

2.1.2. The 1990 National Family and Fertility Survey (NFFS)

The 1990 NFFS, also used in the present study as a primary source of information, is the first and so far the only nation-wide fertility survey ever carried out in Ethiopia. The survey was conducted by the Central Statistical Authority during May to August 1990 and covered most parts of the country. It is based on a self-weighting multistage stratified sampling procedure that ensured nationally representative estimates for a number of variables of interest (CSA, 1993: 7-10). Eight major sampling domains, six rural and two urban, were employed in the 1990 survey (CSA, 1993: 7-8). The urban domain contained Addis Ababa, as one domain and 'other urban centres' as another, the latter of which was further divided into three subdomains of different size classes: (a) areas with population over 50,000; (b) areas with population between 10,000 and 50,000, and (c) areas with populations less than 10,000. The estimated population size of areas in 1989, projected from the 1984 Census results, was used to classify areas into the respective size-classes of settlements. In 1989, there were 11 urban areas in the first group, 58 in the second and 213 in the last category (CSA, 1993).

The sample selection used in the 1990 survey also varied from one domain to another. In Addis Ababa, the sample was drawn in two stages. Initially, all the 284 *Kebelles* in the city were stratified by *Keftegna;* this was followed by a first-stage selection of representative *Kebelles* from each stratum. The second stage involved selection of households from within sampled *Kebelles.* Also, in the six rural domains, a fairly similar two-stage sampling design was adopted: selection of rural *Kebelle*s (commonly known as farmers' associations), the equivalent of UDA (*Kebelle*) in urban areas, at the first stage, and households at the second stage. In the category of 'Urban areas other than Addis Ababa', two different sampling strategies were used varying with the size of settlements. In areas with fewer than 50,000 inhabitants, a three-stage sampling design was adopted. The order consisted of selection of the desired number of urban areas out of 213 urban areas in that class in the first stage, followed by selection of *Kebelles* within sampled urban areas and finally selection of households within sampled *Kebelles.* In the remaining urban areas, a two-stage design, identical to the kind implemented in Addis Ababa, was adopted. Following the procedures described, a total of 153 urban and 308 rural *Kebelles* were selected (CSA, 1993).

Developed along a format fairly similar to the two well known international population survey programs, World Fertility Survey (WFS) and Demographic and Health Survey (DHS) although it was not part of them, the 1990 Survey provides detailed information on levels and components of reproduction, health and mortality of children as well as data on selected characteristics of the sample population in Ethiopia (CSA, 1993: 26). Six types of questionnaire were administered in the survey: the Household questionnaire, Questionnaire on socio-economic conditions of households including characteristics of the household head, the Women's questionnaire, the Husband's questionnaire, Community leader's questionnaire, and Community questionnaire (CSA, 1993). All relevant survey documents including the six instruments were prepared in *Amharic*, but a separate code that indicates the language of interview was introduced in all the questionnaires.

The *Household Questionnaire* obtained information on age, sex, marital status and relationship to head of household for all usual members and visitors from all sample households and was also used to identify eligible respondents for the Women's

questionnaire. The *Women's Questionnaire*, on which most of the analysis in this study has depended, was administered to all women of reproductive age in sample households, irrespective of their marital status, and collected information on a wide range of topics of demographic interest organised in seven sections: (a) Respondent's background; (b) Marriage history; (c) Birth history; (d) Health and breastfeeding; (e) Family planning; (f) Fertility preference; and (g) Woman's work history, Husband's background, and Sexual practices of married women. The *Husband's Questionnaire* collected information on age, educational attainment, occupation, marriage history, family planning and fertility preferences from a sample of husbands of women who were already covered in the survey (1990 Family and Fertility Survey Questionnaires).

The NFFS, though originally planned to cover 14,680 women of reproductive age (4300 from the urban domain and 10,380 from the rural domain), only reached 9104 eligible women, of whom 8757 were successfully interviewed (CSA, 1993: 9-13). These figures are about 62 per cent of the initially planned target. This resulted largely from the exclusion for security reasons of sampled areas mostly located in the north and north-western parts of the country (CSA, 1993: 13). However, the overall response rate for those who were actually sampled was quite high, over 90 per cent in all domains.

A total of 1654 households had been initially allocated for Addis Ababa (CSA, 1993: 12). However, only 1394 households were actually sampled for inclusion and 1314 of them were successfully interviewed, yielding a household response rate of 93.6 per cent[1] (CSA, 1993: 12). Of 1663 eligible women identified in these households, 1551 were successfully interviewed. However, appropriate statistical weights were later developed and the weighted data for Addis Ababa, used for further analysis, have yielded a total population of 360,665 women. The weights used in the survey were developed by taking into account both the probability of selection and the non-response rate of the sample units.

[1] The survey report provides no explicit reason for the observed discrepancy between planned and actual number of sampled households in the city.

2.1.3. The 1994 Population and Housing Census

The 1994 Population and Housing Census, Ethiopia's second nationwide complete enumeration, is another set of data available in a machine-readable form and used for primary analysis in this study. The 1994 census was carried out in most parts of the country including Addis Ababa between 11 and 21 October 1994, while for all reference purposes 11 October 1994 was adopted as the census day (CSA, 1997).

Like the previous national census, the 1994 Population and Housing Census was administered by enumerators who made house-to-house visits. Hence, at the national level, the census required the recruitment of 68,650 enumerators, most of whom were young persons who had recently completed year 12 (Hassen and Strong, 1997). About 13,650 supervisors and 3000 technical and support staff (most of whom were college or university graduates) were also employed in the census operation (Hassen and Strong, 1997). Both enumerators and supervisors took a ten-day training course on data collection procedure. As part of the overall preparation, an intensive and continuous census campaign was conducted on public media throughout the country, starting one month before the census date. In October and November 1993 a pilot census was carried out on 30,000 households in about 200 enumeration areas and about 40 supervision areas spread throughout Ethiopia (Hassen and Strong, 1997). On the basis of this pilot census, all questionnaires and documents were further revised. For the purpose of enumeration, 58,702 enumeration areas and 11,420 supervision areas were delineated in the settled rural areas and all urban parts of the country, of which 2383 enumeration areas and 496 supervision areas were in Addis Ababa (OPHCC, 1995; OPHCC, 1998).

The 1994 census collected more-or-less similar items to those in the earlier census. Perhaps the major difference between the two national censuses lies in their method of data collection rather than their content. Both obtained information on a wide variety of socio-economic, housing and demographic characteristics of the population. However, while the 1984 census collected information from all individuals and households on a strictly census basis, the 1994 census used two types of questionnaires (i.e. short and long versions) and restricted more specific inquiries, such

as those on fertility, mortality, migration, school attendance, employment and housing, to a sample of households to be covered by the long questionnaire.

The short version of the 1994 Census questionnaire that contained similar questions for both urban and rural areas recorded only basic information (age, sex, relationship to household head, religion, mother tongue and second language, ethnic background, residence status and marital status) on all usual members and visitors of a household for the entire population. The long version of the questionnaire included several other questions on migration status, disability, education, labour force participation and occupation, children ever born by survival status and sex of child, total number of births in the 12 months preceding the census, and on housing stock and conditions, which were also slightly different for rural and urban areas. For instance, in the rural areas information on housing unit included wall and roof material, water source, toilet facilities, number of rooms, availability of kitchen, source of water and energy, ownership of livestock and radio. The urban long form asked the same questions of each household, but replaced the question on livestock ownership with ownership of television and other modern possessions, and added questions on tenure status and rent paid by those living in rented premises (OPHCC, 1995, 1998).

The type of questionnaire that was administered to each household in the 1994 census was determined through a systematic sampling process. The long questionnaire was conducted on one out of five households while the other four were interviewed using the short questionnaire. The exceptions to this rule were residents of hotels, hostels and other collective quarters, who were all interviewed using the long questionnaire (OPHCC, 1998).

The procedure of collecting the more detailed questions only from sample households instead of addressing them to the entire population, as was the case in the 1984 Census, was preferred in the recent exercise on the premise that this method of data collection improves the quality of information and enables timely release of the census results. The former advantage is particularly anticipated to result from reduced workload to enumerators and closer supervision on the part of supervisors during fieldwork (OPHCC, 1995, 1998). However, appropriate statistical weights were later

developed to allow population wide representation for items collected only on a sample basis (OPHCC, 1995; 1998). The raw data used in this study come from the long version of the census questionnaire and include over half a million women aged 15-49 years.

Unlike the 1984 Census, the 1994 Census was followed by a post-enumeration survey (PES) conducted in 290 randomly selected enumeration areas to evaluate its coverage and content errors (Hassen and Strong, 1997). It was reported that the results of the PES, carried out in November 1994 in Addis Ababa, Harari and Diredawa regions and in December 1994 in the remaining regions of the country except Afar and Somali on a total of 55,273 households, show 'indications that the quality of the data collected in the 1994 Census was good' (Hassen and Strong, 1997: 6-7).

2.1.4. The 1995 Fertility Survey of Addis Ababa (AFS)

The 1995 AFS was a survey specifically carried out in response to questions occasioned by the preliminary result of the 1994 Census, which had produced a total fertility rate of 1.8 children per woman for the city (CSA, 1997: i). Two of the main objectives of the survey were to verify if that was a problem of data collection and to collect insightful information on the components of change and reproductive behaviour of the city's population (CSA, 1997:2).

The survey that was launched on 11 October, exactly a year after the last census, collected data from 2,336 women of reproductive age chosen on the basis of a two-stage stratified sampling design (CSA, 1997: 2). In the process of sample selection, *Keftegnas* (recently renamed *Woreda*) were treated as strata, with the enumeration areas within them and the households within enumeration areas forming respectively the primary and ultimate sampling units (CSA, 1997: 2). Thus, out of considerations of cost and precision, from 2347 enumeration areas identified in the city during the last census, a sample of 54 was regarded as sufficient and chosen to yield results for major survey items at the city level (CSA, 1997: 2-3). The targeted sample size was then distributed across all the strata proportionally to the total enumerated households in each stratum in the 1994 Census, followed by subsequent selection of enumeration areas within a

stratum on a probability-proportional-to-size basis. All households within the 54 sampled enumeration areas were first house-listed, and finally 30 households were systematically selected from each list of households for sampled enumeration areas. The survey interviewed all women aged 15-49 years in the selected households and achieved an overall response rate, at the household level, of 98.4 per cent (CSA, 1997: 3-4).

Two types of questionnaire were used in the 1995 fertility survey of the city: a *Women's Questionnaire* and a *Household Questionnaire*, which collected information on relationship, sex, age and marital status from all usual members and visitors to a household. In addition, the *Household Questionnaire* also, for the first time in Ethiopia, collected specific information on 'Mother's Line Number', which is known to facilitate the process of matching children with their mothers in the 'Own Children' procedure, a method known for generating alternative and independent estimates of fertility levels and trends from a single source for a period up to 15 years before enumeration (Cho, Retherford and Choe, 1986).

The *Women's Questionnaire* collected data on background characteristics of respondent, age at and frequency of marriage, births in the 12 months before enumeration, number of children ever born classified by survival status and whether living at home or elsewhere, spontaneous and induced abortion, stillbirths, whether currently pregnant or not, postpartum practice, family planning, fertility preference, work status and husband's education. Although the survey, like several other specialised fertility surveys, obtained relevant information on the proximate determinants of fertility, no birth-history was collected.

2.1.5. Other sources of data

Other sources of data used in the present study are the 1961 and 1967 Censuses and two general-purpose demographic, housing and socio-economic inquiries conducted in 1976 and 1978. The 1961 Census, conducted jointly by the city municipality and the then Central Statistical Office on 10-11 September, includes data on age and sex of usual members and visitors of all households, marital and educational status of members of

relevant age categories, migration status including place of previous residence, place of birth and duration of continuous residence, and mortality in Addis Ababa. With regard to fertility, the census provides core census-type retrospective information on children ever-born and births in the year before enumeration from all women aged 10 years and over (Municipality of Addis Ababa, 1971).

Other supplementary data are from a census conducted in the city of Addis Ababa in September and October 1967 and a one-in-ten population sample survey carried out following the complete enumeration. The relevant information from these sources is on marital status, nationality, language usually spoken at home, religion, literacy status and school grade completed, economic activity, number of children born and surviving, births and deaths during the last twelve months before the survey date, and migration (CSO, 1972).

The other supplementary data come from the results of a *Manpower and Housing Sample Survey* conducted by the Central Statistical Office in the second half of the 1970s. The 1976 inquiry collected a wide range of information including age and sex of sample population, marital status and duration of marriage, mother tongue, place of birth and duration of continuous residence, literacy status, school attendance, highest grade completed, employment status and type of occupation, earnings per month and source of income, possession of household amenities, housing stock and type of facilities (CSO, 1977a). Population information for the city was also available from the *Housing Census* (*Registration*) carried out by the Ministry of Urban Development and Housing in August 1978, which was followed by a 7.7 per cent *Demographic Sample Survey*, carried out in September 1978. The latter was conducted in close collaboration with the then Central Statistical Authority and the City Municipality and covered 80 enumeration areas out of a total of 1060 in the city. Both in content and tabulation format, the 1978 survey was more rigorous than earlier similar inquiries and provided information on broad topics of demographic interest from 20,357 households selected for the purpose (CSO, 1979).

Several features of the above data sets (both the major and supplementary sources) make them particularly suitable for this study of reproductive change in Addis

Ababa. For instance, the birth history information from the 1990 NFFS, and the data on children ever born and births in the 12 months preceding enumeration collected from all the other sources, make possible the estimation of time series cohort and period fertility rates for the city for a reasonably long period of time. The information on 'Mother's Line Number', obtained in the latest fertility survey, the 1995 AFS, which is known to facilitate the process of matching children with their mothers, is another useful piece of information for making independent estimates of fertility levels and trends using the 'Own Children' procedure (Cho, *et al.*, 1986). The information on dates of birth for the last child and the responses on pregnancy status also obtained in the 1995 AFS both allow the estimation of total fertility rates for the recent period which could then be compared, for consistency checks, with estimates from the conventional measures (Goldman and Westoff, 1980). The available wide range of data on respondents' background can also be used successfully in examining the relationship between fertility and these variables, both across groups and within the same group over time. The data on marriage history and the information on family planning and postpartum practices collected from the two fertility surveys also permit a detailed investigation of the proximate determinants of fertility, which helps map the nature of reproductive change in the city.

However, the validity and reliability of the estimates to be derived from these sources are largely determined by the accuracy and completeness of the reported information. Of particular interest to the study is the reporting of respondent's birth date, age and dates of marriage and the completeness and timing accuracy of the birth data. Yet the retrospective nature of these inquiries, and the fact that surveys and censuses by their nature cover a variety of topics and involve large and varied numbers of respondents and enumerators, create conditions for errors and deficiencies to be introduced in the data. Generally, these errors may arise from misreporting of events by respondents, poor interaction between respondent and interviewer, misconception of the purpose of inquiry, errors in identifying and interviewing eligible women, genuine memory lapse and faults in the design of questionnaires (Timaeus and Balasubramanian, 1984: 8).

On the part of respondents, for example, errors may arise because they do not know the answer or, have forgotten exactly when the event of interest occurred; or even deliberately give incorrect responses. Such errors tend to vary substantially among different population groups, often resulting in distortions of differentials in vital rates among different sub-groups.

Errors can also be introduced through setbacks in survey methodology including, but not limited to, questionnaire design and inadequate training, or in the process of free translation of survey questions as in multilingual societies. Enumerators were often blamed for deliberately introducing errors in survey inquiries either by shifting respondents outside of the desired age range or omitting them altogether from the inquiry in order to avoid extra work (Ramachandran, 1989). In this instance mention could be made of enumerator-induced bias in responses to questions on, for instance, labour-force or marital status, fertility and immunisation, which are designed to be addressed for specific population groups (Bicego and Boerma, 1993). Blacker (1994: 200) asserts that 'long experience with the analysis of these types of data has shown that they are all too often fraught with serious errors and biases' and 'it is a golden rule that all such data should be assumed guilty until they prove themselves innocent'.

With this background and a firm belief that a formal evaluation of the data for possible errors would help in making sound judgements on the demographic process of interest in the study area, the section that follows provides a thorough evaluation and appraisal of various aspects of the major data sources of the study. Primarily on grounds of importance to the study objectives, the evaluation is focused on only two main areas, reporting of respondent's age and quality of birth data.

2.2. Assessment of data quality

2.2.1. Quality of age data

Perhaps no information is more basic to demographic analysis than sex, age and the dates of vital events. While a person's sex is easily identifiable and often reported adequately, in many societies age and date reporting is more problematic. Yet, depending on the fertility schedule and the number of women who have reported their

ages incorrectly, poor age reporting can lead to serious biases on the pattern and level of fertility (Brass, 1976: 147 – 148). The reliability of fertility estimates from birth history data and those derived by 'reverse-survival' and 'own-children' procedures is also heavily dependent on the quality of age data of women and their children. In both cases, if women report more-distant births as closer to the present it can lead to a cohort-time pattern with odd features (Henin, Korten and Werner, 1982: 15).

Table 2.1 presents evidence on the proportion of respondents who provided their ages in terms of year of birth during the two fertility surveys (1990, 1995) and an index of digit preference for the earliest (1984) and latest (1995) data sets to assess changes over time in the quality of age data in Addis Ababa. The table also provides the same information by selected characteristics of respondents to assess if there are any unique patterns of differential age-reporting by background characteristics of respondents.

Table 2.1: Proportion reporting year of birth and Myers' index of digit preference by selected background characteristics of respondents, Addis Ababa, 1984 - 1995

Background Characteristics	% reporting year of birth		Myers' digit preference index	
	1990 NFFS	1995 AFS	1984 Census	1995 Survey
Addis Ababa [TOTAL]	31.6	43.4	19.1	10.1
Literacy Status				
Illiterate	4.4	13.4	23.1	15.1
Literate	39.5	52.7	18.7	9.4
Marital Status				
Never married	45.6	55.7	26.4	23.4
Currently married	23.7	33.0	16.4	9.7
Previously married	14.7	23.7	22.8	12.1
Migration Status				
Non-migrant	45.7	58.9	18.8	14.0
Urban-migrant	41.9	61.3	18.1	8.9
Rural-migrant	11.5	21.1	20.1	11.7
Religion				
Christian	32.2	44.5	19.1	8.6
Muslim	21.6	28.9	22.6	15.2

Source: Computed by author from the computer record of the data files.

Overall, as can be observed from Table 2.1, in both surveys fewer than half of the respondents reported their ages by year of birth. There seem to be some socio-economic differentials in completeness of reporting of year of birth among respondents of both surveys, and more women gave their ages by year of birth in 1995 than in 1990.

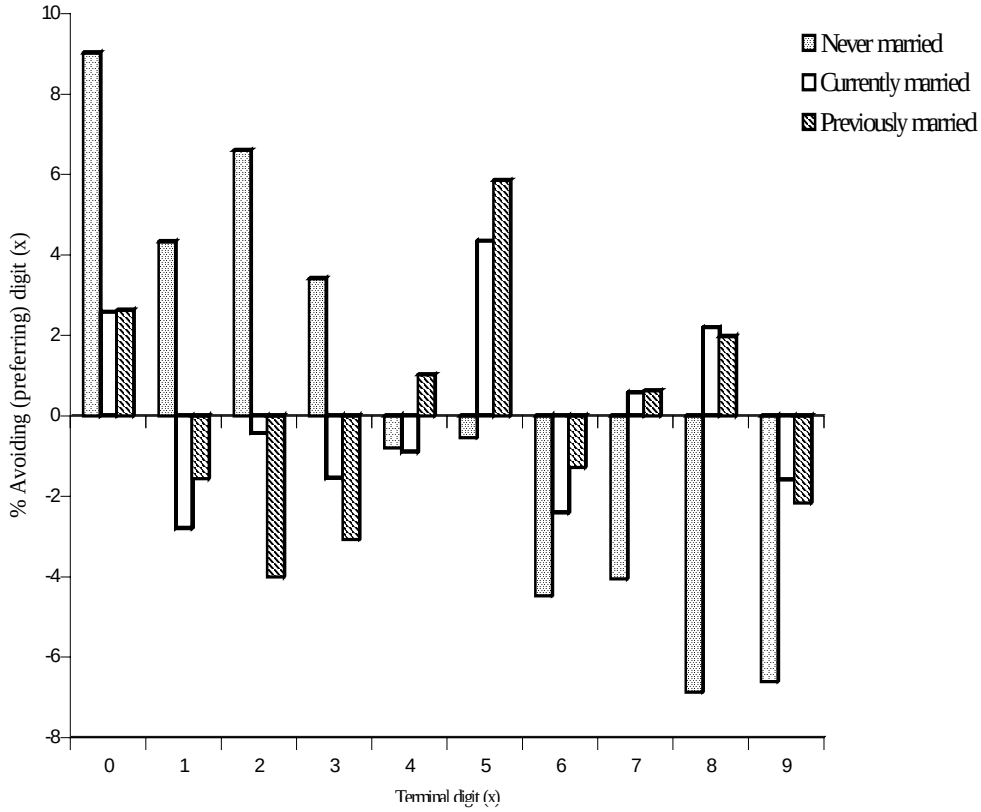
Reporting of year of birth, in both surveys, was more complete among the educated than those with no education, among Christians than Muslims, among those born in the city and other urban centres than rural migrants, and among the never-married than the ever-married population. In general, one would expect the quality of age data to be more reliable when ages are reported in year of birth than in completed years as the latter is highly susceptible to digit preference.

The degree and pattern of digit preference (or avoidance) in age reporting can be summarised using Myers' index (Shryock and Siegel, 1976: 114-118). The procedure involves constructing a blended population as a weighted sum of the number of persons that have reported ages ending in each of the ten terminal digits over a given age range: in the absence of any systematic irregularities in reporting of ages, the sum at each terminal digit should then be approximately equal to 10 per cent of the total blended population. A sum in excess of 10 per cent for any given digit indicates preference for ages ending in that digit and a negative deviation for a given digit would mean avoidance or under-selection of the particular digit in question. The summary index of digit preference is thus obtained by adding the absolute deviations for all digits and dividing the sum by two. The theoretical value of the index varies between 0 and 90 and the lower its value the less the degree of digit preference. Use of the index is believed to simplify comparison of the quality of age data from different sources and among different subgroups of the population (Timaeus and Balasubramanian, 1984: 14).

Values of Myers' index derived from the female population aged 20-49 years enumerated in the 1984 and 1995 data sets are presented in Table 2.1. Also presented are values of the index for selected sub-groups of the female population over the same age-range. The overall index for Addis Ababa shows that over 80 per cent of the women aged 20-49 years in 1984 and about 90 per cent in 1995 reported their ages with correct terminal digits. The moderate degree of digit preference for the later compared with the earlier period is consistent with the observation made earlier of a modest increase in the proportion of women who reported their ages in calendar years in the recent years. This most likely partly reflects genuine evidence of improvement in the quality of age reporting in the city between 1984 and 1995. Part of the difference, on the other hand, may have resulted from differences in data collection procedures between

the two data sets, such as interviews by proxy which are common in census undertakings, as opposed to response by the women themselves to the individual questionnaire in fertility surveys. It may also be linked to other aspects of the two data sets such as the degree of close supervision, the quality of interviewers and the intensity of training in the survey as opposed to the large-scale nature of the 1984 census.

Figure 2.1.a. Digit preference (avoidance) pattern by marital status, Addis Ababa, 1995, AFS

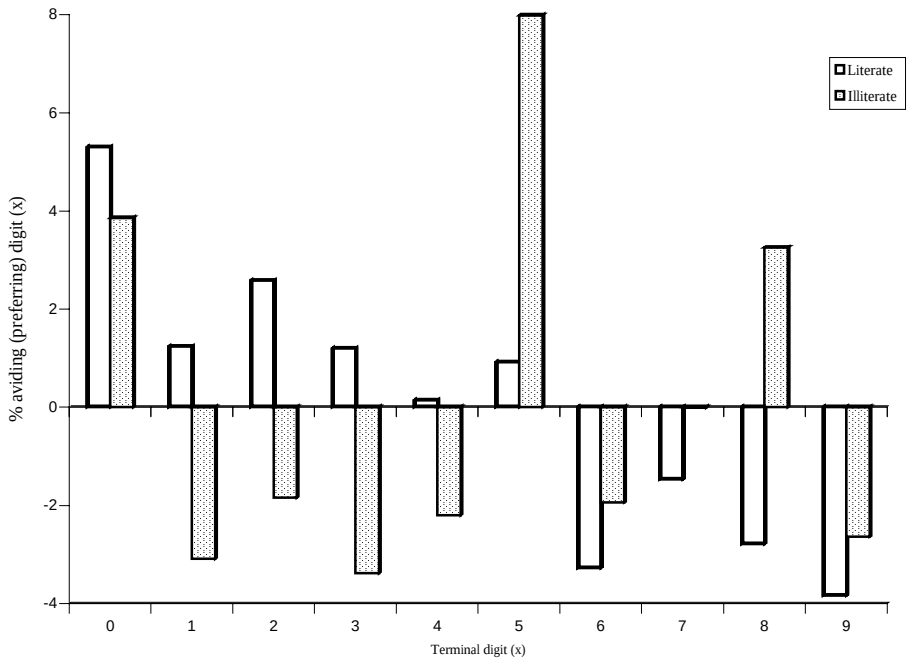


Remark: The bars show the extent of preference or avoidance for the terminal digits displayed in the x-axis over and above the theoretically expected value. Normally, if there is no digit prefrence or avoidance in the data all terminal digits will have a value of zero or closer to it.

Table 2.1 also shows some differentials in the quality of age reporting by background characteristics of respondents. As with the pattern of reporting year-of-birth information observed earlier, the quality of age reporting in both surveys was found also to be better among the educated than those with no education, among Christians than Muslims, and among the urban-born than rural migrants. However, in most instances, compared to the differences reflected in the reporting of year-of-birth data, the overall difference in age heaping observed between the subgroups was rather

small. Moreover, in some cases, such as those relating to marital status and the non-migrant category there were unexpected opposite relationships. For instance, the never- married category, which had a higher proportion of women who claimed to know their year of birth than women in other marital categories, in both data sets showed a degree of digit preference much higher than that of currently and previously married women. As shown in Figure 2.1.a, the two groups, the ever-married and never-married, also exhibit different patterns of preference for each terminal digit. Women in the never-married group generally tend to report their ages ending with digits 0, 1, 2, and 3 and avoid, with increasing intensity, any digit higher than 5. A similar pattern of age shifting was also observed for literate women, as shown in Figure 2.1.b. These patterns are typical of a phenomenon described by Florez and Goldman (1980: 9) as a 'rejuvenation' process, that is, a tendency among women to report themselves younger than their true ages.

Figure 2.1.b Digit preference (avoidance) pattern by literacy status, Addis Ababa, 1995, AFS



Note: See the remark shown on Figure 2.1.a for further clarification

Over all, errors in age reporting in the source data do not seem to be serious and their potential effects on subsequent analysis can be minimised further through use of data for groups of ages. However, the existence of different patterns of age reporting and the associated effects of the 'rejuvenation' process among selected groups may mean that for some age-based analyses, such as the age patterns of fertility and the singulate mean age at marriage, there may be a tendency for results to appear much 'younger' than they ought to be. This needs to be borne in mind.

2.2.2. Completeness and quality of birth data

In countries like Ethiopia, where comprehensive systems of vital registration are non-existent, evidence on levels and trends of vital rates can only be gleaned from population censuses and sample surveys. The two most important sets of information for fertility analysis from these sources are individual birth histories, often collected in specialised demographic surveys, and data on children ever born and births in a specified period of time preceding enumeration, which are obtained from women of reproductive age or older in most population censuses. However, the retrospective nature of these inquiries means that such information can be easily prone to omission and displacement problems.

Errors in fertility information from surveys and censuses are likely to arise from problems of completeness and inaccuracy of timing or reference period error. Period fertility data, often derived from information on births in the year prior to enumeration may be distorted by misperception of the length of the reference period, so that the reported births correspond to an ill-defined period whose average length may be either shorter or longer than a year (United Nations, 1983: 31) . However almost all the data sets used in the present study, both major and supplementary sources, with the exception of the 1984 Census and 1990 NFFS were conducted immediately following the Ethiopian New Year, a period which can easily be recognised for reference purposes. Moreover, since the New Year (which falls on the 11 of September) in Ethiopia also marks the end of the main rainy season it makes it easy for identification, both for enumerators and respondents. On the other hand, among Orthodox Christians, who make up about 85 per cent of Addis Ababa's population and for whom

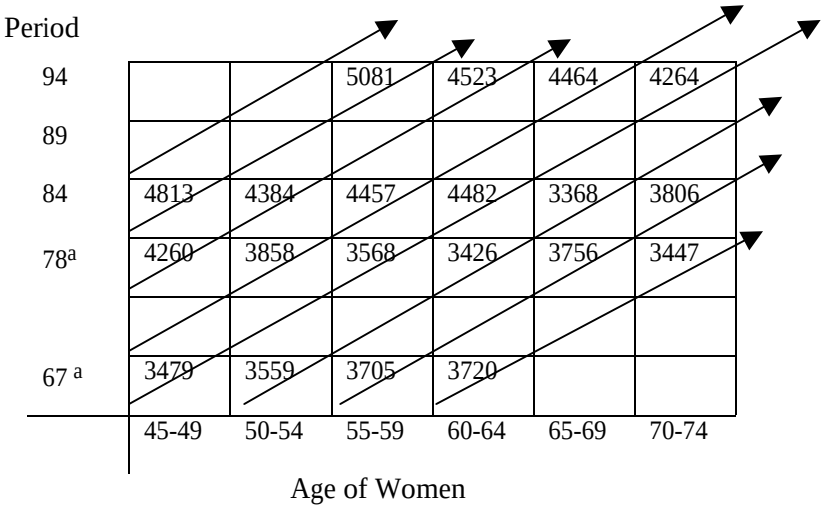
most dates in every month have some religious significance, it is not uncommon to observe adherents relating events of importance to their life, including births, to such religious events. In fact, as observed in both the 1990 and 1995 surveys, more respondents in the study have supplied complete information, both for themselves and their children, on month of birth than year of birth, a phenomenon rarely observed for other data sources in the region. For these reasons and because of the favourable educational composition of the city's population (where currently over 35 per cent have secondary education and fewer than 20 per cent have no education(see section 3.4)), the possibilities of reference-period error in the current fertility data can be assumed to be either negligible or minimal. An attempt follows, however, to evaluate the completeness of the stock element of the fertility data (i.e. children ever-born data) for all the major data sources, while the birth history data of the 1990 NFFS are also examined for any errors of displacement.

Life-time fertility data can be distorted by different kinds of errors affecting the number of children reported by women. The most common error is omission. Most errors of omission are non-random and show significant variation with age of women, sex and survival status of children. In these cases, the proportion of omitted children, in most instances, is expected to increase with age of mother, resulting in average parities that fail to increase with age or show a decline, even when there is no reason to suppose that fertility has been rising (United Nations, 1983). To assess the extent of such age-related non-random error in the data sets used for analysis I have matched values of completed family size, derived from parity progression ratios of women in the respective age groups in Table 2.2.

The x-axis represents age, the y-axis represents time period, matching the different sources of data, while values for each cohort are represented diagonally. Therefore, the table shows data for seven cohorts at four points of time, 1994, 1984, 1978 and 1967. As can be seen from these values, with the exception of a few instances, Table 2.2 shows no evidence of cohort decline in completed family size which is generally taken to suggest increasing omission of children with age of mother. Indeed, contrary to the expectation of a constant completed family size for any age beyond 50, the data show some signs of increase with age, possibly due to the inexact nature of the

reconstituted cohorts. It may also be a reflection of sampling variability, especially for the 1967 and 1978 surveys, while effects of differential migration and mortality also remain possible explanations. However, there is a slight decline in cohort fertility for women aged 60-64 in 1984, as these women move to the next higher ten-year age group (i.e. 70-74). This may be a result of age misstatement and parity related differentials in mortality experience as well as memory lapse among these women.

Table 2.2. Completed family size per 1000 women by cohort, period and age, constructed from the 1994 and 1984 censuses and 1978 and 1967 demographic surveys, Addis Ababa



Note : [a] The data sets do not form ***exact*** cohort experience with that of the 1984 and 1994 sources and between themselves.
Source: Computed by author from the respective data sources

A simple and quick test for examining selectivity by sex or survival status in omission error in a data set is to examine the sex ratio of all children and proportions of dead children by age of women. In a situation of systematic omission of dead children by age of mothers, the proportion of dead children, which is expected to increase with age of mother, fails to show any marked increase as mother's age advances. Moreover, where there is sex-selective omission, the sex ratio, computed as a ratio of reported male births to reported female births, will not only show an irregular pattern with age of mother but also deviate significantly from the expected range of between 102 and 107 males per 100 female children (Ramachandran, 1989). Table 2.3 shows the sex ratio of children ever born and the proportion of children dead by sex of children and age of mother for the 1994 and 1984 Censuses and the 1990 NFFS.

Table 2.3. Sex ratio of children ever born and proportion of children dead by current age of women, Addis Ababa, 1984 - 1994

Age of women	Sex Ratio			Proportion of dead children					
				Male			Female		
	1984 Census	1990 NFFS	1994 Census	1984 Census	1990 NFFS	1994 Census	1984 Census	1990 Census	1994 Census
15 – 29	1.03	1.01	1.04	.0916	.0856	.0980	.0866	.0516	.0786
30 – 34	1.06	1.18	1.01	.1453	.0999	.1234	.1150	.0918	.0995
35 – 49	1.09	1.04	1.02	.2222	.1956	.1664	.1725	.1445	.1297

Source: Computed by author from the computer record of the respective data files.

Examination of the sex ratio of children ever born by age of women for each set of data shows that the results of the two censuses lie fairly within the expected range and show little variation by age of women. Considering the sensitivity of the sex ratio measure for sample data, the result of the 1990 NFFS for most age groups is also within acceptable margins. With in this generalisation, it may be noted that the sex ratio recorded in age group 30-34 years in 1990 is high by most standards. However, the reasons behind such pattern remain unclear.

The proportion of dead children shown for each set of data by sex of child demonstrates the expected pattern of a rapid increase with age of mother. The higher proportion of male to female child death evident in all the data sets and for all ages of women is also consistent with the expected sex differential in the risk of mortality, that is a much higher mortality among males than females.

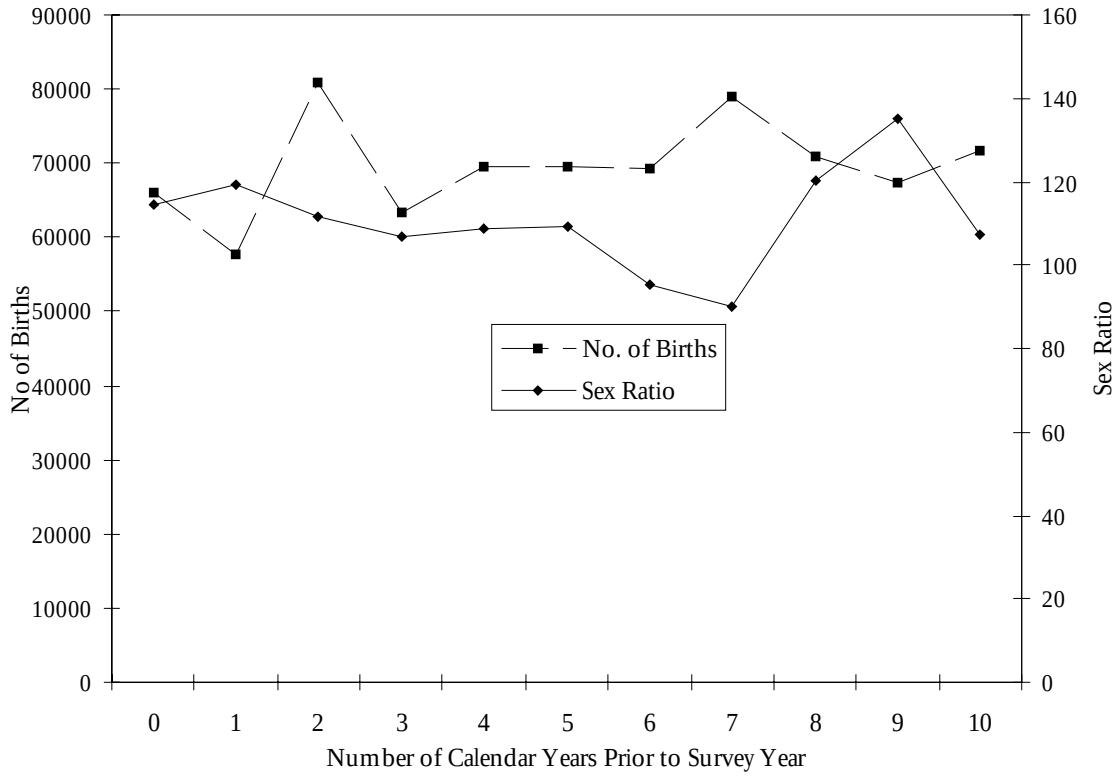
Displacement of births is one of the major problems of maternity history data of the kind collected in the 1990 NFFS. A common problem with birth history data that combine questions on immunisation and health of children is that children born in the last five years have their dates of birth shifted backwards by enumerators so they can avoid asking the block of questions relating to children born after this cut-off date (Arnold 1990 cited in Muhwava and Timaeus, 1996). Such an error has implications for examining fertility trends.

> In many surveys where birth histories have been used, the dating of the births has been subject to a characteristic bias such that the most recent births are displaced backward in time, reducing the number of births reported for the last five years and

inflating the numbers between five and ten years before the survey, thus simulating a decline in fertility (Blacker, 1994: 202).

Although it is difficult to measure the extent of displacement in a given data set owing to the difficulty involved in distinguishing actual trends from errors of displacement, serious problems of displacement such as the type described can be detected by examining distribution of births by calendar periods as well as with the help of sex ratios calculated by year of birth. Figure 2.2 shows annual births during the ten-year period before the 1990 NFFS and the sex ratios calculated for the corresponding years.

Figure 2.2. Number of births and sex ratio by number of calendar years of birth prior to survey, Addis Ababa, 1990 NFFS



The distribution of births presented in Figure 2.2 shows no evidence of concentration around age 5, nor does it follow any systematic pattern of deficit (or concentration) with even or odd numbered years before 1990. An index of birth displacement (Bicego and Boerma, 1993:33), computed as the ratio of births in the calendar year to half the sum of births in the adjacent calendar years multiplied by 100

for the fourth, fifth and sixth years before the survey to check for heaping on those particular years, gave values of 104, 100 and 93, respectively. As with age ratios, the values of the birth-year ratio in the absence of birth-year displacement should be 100 (Bicego and Boerma, 1993:33). The data show a slight concentration of births reported at two and seven years before the survey, but given the lack of any pattern in the distribution for other birth years the observed concentrations may well be true reflections of fertility trends in the area. Apart from distributions of births by calendar year and birth year ratios, an examination of the sex ratios at birth for different time periods can also reveal sex-selective omission or displacement of either females or males. The trends in sex ratios shown in Figure 2.2, though somehow erratic, do not follow any clear time trend that would have suggested period-correlated omission of a particular sex .

In light of the evidence in this section, it is believed that the fertility data (birth history, life-time and current fertility) do not exhibit any serious systematic errors. The issue is raised again in Chapter 4 where the various data sets are put together to derive fertility trends for the study area and results compared with other independent sources.

2.3. The qualitative study: objectives and method of data collection

The qualitative study, which forms part of the supplementary information for the research, was conceived with two broad objectives: to gain access to information not available from the quantitative sources and to make data verification for some key variables available from the quantitative data. For instance, participants in the survey were asked if they feel the ongoing reproductive transition, such as the pattern of late marriage and of the decline in the fertility of marriage in the area. Such questions were asked not with the objective of collecting information on levels of demographic rates, but given that demographic events are social processes, if the low level of fertility and the high age at marriage documented for the city in the subsequent chapters were indeed true, they should also be recognised by the society. The results from the study gave an affirmative answer. The survey also obtained supplementary information on two other broad issues: union formation and dissolution and reproductive goal and

decision making. Issues related to institutional changes and social networking were also addressed in the qualitative inquiry.

The study was conducted through in-depth interviews and focus-group discussions, taking into account, in the selection process, relevant characteristics of participants, which included age, sex, migration status, education, work status, religion and ethnicity. All the focus-group discussions as well as the in-depth interviews with male participants were undertaken by myself, while a female research assistant who held a Bachelor degree with a minor in demography from Addis Ababa University, moderated the in-depth interviews with female participants. In addition to formal briefing on the purposes of the study and the art of moderation before the actual in-depth interviews began, the research assistant was asked to conduct some mock interviews, following which the tape-recorded discussions of these interviews were played and areas of possible improvement indicated accordingly. This exercise continued throughout the survey period, which lasted from February to May 1998. Before beginning the actual study, I also conducted a series of mock individual in-depth interviews and a focus group discussion on my own, with participants of diverse backgrounds, to test the discussion and interview guides for clarity and comprehensiveness. About 70 in-depth interviews and two focus group discussions were conducted. In every case, the discussions were tape-recorded and later transcribed. Because of the close knowledge I have of Addis Ababa, for I was born and brought up in the area, I used this information mostly in a general form and to supplement my own personal experience as opposed to reporting the outcomes of the discussions word by word as, for instance, commonly done in primarily qualitative based studies.

2.4. Concluding remarks

This chapter has reviewed the sources and nature of the major and supplementary data used in this study. The 1994 and 1984 Censuses and the 1990 and 1995 Fertility Surveys comprise the four major sources of data. Other sources of information available include the 1978, 1967 and 1961 surveys. All of these data, including the four major sources, were collected by the Central Statistical Authority of the Government of Ethiopia.

Additional information for the study was also gathered through a qualitative survey conducted in the study area.

Since the validity and reliability of the results to be derived from these sources largely rest on the accuracy and completeness of the reported information, in addition to reviewing the nature and procedure of data collection, the chapter has also made a through assessment of the quality of these data. Bearing in mind the intended analyses, the evaluation has focused mainly on birth and age reporting and on the four major sources of data. For this purpose a number of demographic procedures have been used, including measures of digit- preference and procedures that help to detect birth displacement, and sex-selective omission of children.

These assessments revealed that the fertility data, both those obtained from the birth history and those collected through 'Brass-type' questions, do not show any evidence of sex-selective omission of children, and in the case of birth history data any systematic displacement of births. The widely held view that the information reported by older women tends to suffer from memory lapse, a view which has largely emanated from the observation of a decline in parity for older women as age increases, was not observed in these data. In this regard, the analysis on reconstructed completed family size for women aged between 45-49 and 70-74 in the periods between 1967 and 1994 showed no evidence of a decline in cohort average parity as age increases.

The evaluation of age data, on the other hand, showed that while there is an improvement in the quality of age reporting over the years, differentials in the quality of age data still remain in Addis Ababa. However, given the small proportion of women who did not report their age on correct terminal digits, barely 10 per cent for the latest data, and the fact that most subsequent analyses are made on data for groups of ages, the effect can be expected to be minimal.

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Chapter 3

SETTING THE CONTEXT OF CHANGE:
The institutional background and characteristics of the study population on the eve of the fertility transition

The demographic profile of any society is a product as well as a determinant of the socio-economic and other related forces operating at various levels of the population. As a background to the subsequent discussion on the dimension and causes of reproductive change in Addis Ababa, this chapter reviews the socio-economic and demographic characteristics of the study population, and the broad social and economic arrangements of the larger political unit within which the study society has had to actualise its reproductive potential. The review will mainly focus on variables and factors that are often hypothesised as having significant influence on demographic processes, particularly fertility behaviour. These include trends in literacy and educational attainment, mortality conditions and access to health facilities, female labour force participation and their occupational profile, family planning and population policy, and on the economic condition of the study population. However, before examining these factors in detail, it is essential to grasp their historical and political setting. This is the subject of the next section.

3.1 Physical, political and historical setting

Addis Ababa, the focus of the present research, is the capital of Ethiopia, one of the 48 nations that make up the region commonly referred to as sub-Saharan Africa. Geographically, Ethiopia is located in the northeastern edge of the African land mass, often known as the Horn of Africa; it is bounded in the west and southwest by the Sudan, in the south by the Republic of Kenya, in the East by Somalia and the Republic of Djibouti, and in the north and northeast by its former northernmost province, now the state of Eritrea. The major physiographic features of Ethiopia include lowlands along the areas bordering all of its five neighbours, a vast block of mountains and high plateaux in the central and northern parts of the country, and a major rift-valley system

that bisects its mountain ranges (Halliday and Molyneux, 1981: 54; Kloos, 1993: 29; CIHI, 1996: 1).

Although Ethiopia lies between 3^0 and 18^0 north of the equator, owing to its diverse physical features it has a wide range of ecological zones and climatic conditions. Mean annual temperatures range from 10^0 to 16^0 Celsius in areas between 2400 and 3500 meters above sea level and often known as the cool-climate zone, 16^0 to 29^0 Celsius in the temperate zone where the altitude ranges between 1500 and 2400 metres; and 23^0 to 33^0 Celsius in the lowlands where the elevation is below 1500 metres (Kloos, 1993: 31). The alpine zone, where the elevation in places exceeds 3500 metres, has a mean annual temperature well below 10^0 Celsius and is the most sparsely populated part of the country. These ecological factors have greatly shaped the spatial distribution of Ethiopia's population.

In 1984, about 11 per cent of Ethiopia's population lived in the lowlands, 75 per cent in the temperate zone and 14 per cent in the cool-climate zone (Library of Congress, 1991). The highland part of the country or places above 1500m elevation constitute nearly half of the land area (Gebre Egziabher, 1995: 21; CIHI, 1996: 1). Addis Ababa, the focus of the present study, is 2364 metres above sea level (CSA, 1996a: 7). Most people living in the highlands are Christians and derive their livelihood from sedentary agriculture; in the lowlands, pastoralism and shifting cultivation are the dominant economic activities of the mainly Muslim nomadic population.

Unlike all other countries in the African continent and many other nations in the world, Ethiopia does not draw its origin, as a nation, from a background of colonial political experience (Halliday and Molyneux, 1981: 58; Keller, 1988: 44; Henze, 1993:42). Clapham (1988) emphasised this point when he wrote that in Ethiopia, the concepts of 'a nation, as a community of people possessing common values and the state, as an organised hierarchy exercising effective control over a territory and people are not merely, as is often the case elsewhere in Africa, alien ideas imported and imposed by an external colonialism but are traditions that have indigenous points of reference' (Clapham, 1988: 20). That national history, notwithstanding periods of grave weakness and the brief period of occupation, 1936-1941, by the Italian army during World War II, extends back over three thousand years (Sergew Hable-Sellassie, 1972;

59; Schwab, 1985: 4; Harbeson, 1988: 23; Keller, 1988: 15; Henze, 1993: 9; Tiruneh, 1993: 2).

During this long history of independent statehood, great empires such as Axum (from the second century BC to the seventh century AD), and important emperors such as Menelik II (1885-1913), emerged and exerted significant influence, some of which is still relevant in the political and cultural life of present-day Ethiopia. The Axumite Kingdom, for instance, was responsible for the development of the Ethiopic (also known as *Amharic* or *Geez*) alphabet system, an indigenous form of writing, which is still, almost exclusively, used in schools, government offices and all forms of written media in the country. King Menelik II was responsible for establishing the first non-religious school in the country in 1906. He was also responsible for founding the city of Addis Ababa in 1887 as the nation's capital. Christianity spread to Ethiopia during the time of Axum and around AD 327 it became the state religion of the Ancient Kingdom (Gäbrä Maryam, 1922: 104) The Ethiopian Orthodox Church continued to enjoy this status until it lost it in the political and social changes that engulfed the country following the 1974 revolution. In 1994, the church had as many as 26.9 million followers out of the country's 53.1 million inhabitants at the time.

Before the 1974 revolution, emperors and the nobility ruled through what many have considered a feudal system (Harbeson, 1988: 26). Hence, the Ethiopian polity was structured with the monarchy, the Ethiopian Coptic Church, and the nobility forming its political and spiritual ruling core (Markakis and Ayele, 1978; Chege, 1979; Keller, 1985, 1988; Harbeson, 1988). As in Tsarist Russia, the monarch in Ethiopia was the head of the Church but the approval of the latter was also a prerequisite for relatively secure imperial survival (Sergew Hable-Sellassie, 1972; Keller, 1988: 49). The Church played this function through defining, articulating, and interpreting the cultural myths of society and the heritage of its rulers, as well as through its activities of education and transmission of the cultural values of the ruling core to peripheral areas and newly conquered territories (Levine, 1974: 75; Keller, 1988: 50). The involvement of the Church was also crucial in the crowning ceremonies of emperors. The nobility, the other key players in the traditional Ethiopian socio-political structure, on the other hand, exercised an array of military and judicial functions as well as economic power over their subjects and received their offices and authority in return for military, tax-

collecting, and judicial services to the emperor (Harbeson, 1988: 26). This political system was brought to an end by the 1974 Ethiopian revolution, which transformed the political, economic and social landscape of the country. The breakdown of the old system and the social reforms adopted thereafter were so fundamental that several political scientists have regarded the changes as being comparable to the classic social revolutions of the modern era: the French Revolution of the late eighteenth century, the Russian Revolution, and the revolutionary experiences of certain Third-World states, China, Cuba, Kampuchea, North Korea and Vietnam (Ottaway, 1976: 470; Halliday and Molyneux, 1981: 14; Clapham, 1988: 16, 242; Keller, 1988: 264;).

In December 1974, the government that assumed power after the dethronement of the emperor declared socialism as its guiding principle. In January 1975 it nationalised all banks, insurance companies and other financial institutions in Ethiopia, and the following month, on 3 February 1975, all major commercial and industrial establishments (Markakis and Ayele, 1978: 128; Henze, 1993: 21; Halliday and Molyneux, 1981: 99). These measures were central to the future of the country's economy as they subsequently established a complete state monopoly over the goods and financial sectors and ensured a similar dominance over employment. As these regulations also had implications for the flow of both domestic and foreign private investment, they also heralded an era in which the state was to become the sole player in the country's economy and the determinant of a person's opportunities in life.

In March of the same year, the government issued its rural land reform proclamation which abolished the age-old peasant-landlord based system of social and economic relations in the countryside (Schwab, 1985: 26; Brietzke 1976: 637; Clapham, 1988: 47; Library of Congress, 1991; Tiruneh, 1993: 100). Under the legislation, all rural land came under state control and individual households were granted usufruct rights to the piece of land which they were allotted on the basis of their family size. At the same time, the reform proclamation prohibited the transfer of land through any means and outlawed hiring of labour outside that of the family (Halliday and Molyneux, 1981: 131). In a traditionally labour intensive agricultural sector, like that of Ethiopia, all these measures, particularly the linking of access to land with family size and the

restrictions on the use of non-family labour, have clear demographic implications (Kinfu, 1999, 2000).

One other important facet of the land reform legislation was the effort to organise the rural society into peasant associations (PAs). These associations, in which every rural household was to be a member, were initially responsible for the distribution of land to rural households and enforcement of other land-reform-related policy measures within a small neighbourhood community. The mandate of these institutions, however, was soon extended to areas such as the maintenance of law and order within their locality, the planning and implementation of certain local-development activities and the execution of other national policies. In effect they took on the role that the local nobility had played in the feudal administrative structure abolished by the revolution. By 1976, within a year of their establishment, 15,989 PAs had been set up throughout the nation, encompassing 4,550,918 peasant households (Clapham, 1988: 158). By 1984, the national total had expanded to 6.2 million households within 24,236 associations, over 90 per cent of the 6.6 million households enumerated in the 1984 Census (Keller, 1988: 260; OPHCC, 1991). State control over these institutions and the rural communities was intensified when the government promoted the formation of the All-Ethiopia Peasants' Association (AEPA), a national association having district officers responsible for overseeing the many and diverse activities of local peasant associations, including redrawing association boundaries, organising adult literacy classes, conducting political education courses, and conscripting young men for national military service (Tiruneh, 1993).

In a measure described by Harbeson (1988: 137) as 'one of the most far-reaching reforms of its kind in the African continent', the government further expanded its dominance over the economy and the society when, in July 1975, it announced the nationalisation of urban land and 'extra' houses. The proclamation permitted each family to retain a single dwelling unit for its own occupation and transferred all privately rented premises, adjudged to be 'extra' houses by the new decree, to state ownership. Simultaneously, with the purpose of making accommodation 'affordable to the broad masses', the state made massive rent reductions on the houses which it confiscated from private *rentiers* (Keller, 1988: 218). The reductions, made according to

a graduated scale, ranged from 50 per cent for less expensive dwelling units to 15 per cent for houses renting for up to 300 Birr a month, then, the equivalent of US $ 150 (Markakis and Ayele, 1978: 141; Halliday and Molyneux, 1981: 100; Clapham, 1988: 142).

The central purpose of the government's urban land and 'extra' housing policy was the provision of adequate and affordable housing for urban dwellers (Tiruneh, 1993: 115) but the results it delivered were far more complex. The reduction in rents following the reform led to an immediate rise in the disposable income of renters; as many as 70 per cent of the population of Addis Ababa and other major urban areas at the time lived in rented houses and thus may have benefited from this measure (CSO, 1977b: 46; Harbeson, 1988: 137). There were reports of a modest growth in construction of residential houses in the aftermath of the reform policy (Tiruneh, 1993: 115; Keller, 1988: 218); these were the result of changes in the legislation regarding access to urban land, which following the reform became free to individuals building their own homes; and of improved access to bank loans which was linked to the credit reforms of the newly nationalised banks.

However, as time passed, due largely to growing administrative bottlenecks surrounding the distribution of land and similar restrictions on house building in general, the housing sector in urban areas began to face serious setbacks (Tiruneh, 1993: 115). The deterioration in this sector was rooted partly in the policies of the government. As noted above, it restricted private investment capital in the country, except in a few limited sectors of the economy. It partly also reflected the increasing inability of the government to adequately play the new role it had acquired through the series of decrees. The government was, for instance, unable to meet the increasing demand for construction materials and the credit needs of would-be house builders. Both deficiencies were subsequently reflected in the increasing gap between the demand for housing and the actual number of houses constructed over the years. Clapham (1988: 145) points out that in this respect 'the experience of Ethiopia is similar to that of revolutionary socialist states the world over.'

With regard to quantity, the Ministry of Urban Development in 1980 estimated that 91,700 new dwelling units were required in urban areas each year, of which 9700

were needed to replace obsolete and uninhabitable housing, 24,000 to ease existing over-crowding, and 58,000 to accommodate the growth in urban population (Clapham, 1988: 143). Because of problems of data, it is hard to know the exact number of houses built subsequently. For Addis Ababa, based on its share of Ethiopia's urban population, at least a third of that projected total would have been required; however, the estimated number of houses actually built did not come anywhere near this total. This estimate, which was based on a census question on the age of the housing unit in which people lived, suggests that, disregarding year to year fluctuations, the annual average rate of construction in the city was 3326 houses over 1975-79, 3546 over 1980-84, 3389 houses over 1985-89 and 4733 over 1990-94 (figures are from primary analysis of the 1994 census for the city by the author). Yet, according to the Ministry's projected demand for housing, each year the city should have had a construction rate of not less than 15,000 houses, just to cope with the population growth. Similarly, the total estimated number of houses built in the city between 1985 and 1990, which was 37,675, was also very far from the 84,000 houses that the city's master plan project office had projected for the 1986-91 period (Bariagaber, 1994: 164). Clapham (1988: 143) indicates that out of the 23,019 Addis Ababa households that joined housing co-operatives (self-help housing construction associations) over the seven years from 1976-77 to 1983-84, only 5888 actually managed to pass through all the administrative and other obstacles, and were able to construct a house (Clapham, 1988: 143). Given the fact that access to urban land and credit had largely favored those applying through co-operatives rather than individual applicants, the low construction rate achieved by those even favoured by the state showed the difficulties that existed in the housing construction sector.

A still more important by-product of the urban reform was the establishment of neighbourhood associations, the equivalent of the Peasant Associations in rural areas, that were initially made responsible for the administration of nationalised houses, but progressively turned into instruments of state control in urban Ethiopia (Tiruneh, 1993). These associations, covering a defined territory of their own that often followed physical lines of demarcation, were used, for instance, to organise adult literacy classes, mobilise residents for vaccination or form work gangs for local public works within their boundary of influence as well as organize youth and women's associations in the

area. Their consent and support were needed to move one's residence out of the neighbourhood area, or the *Kebelle*, as known locally; and at any point when a citizen needed services from the government, a support letter from the *Kebelle* normally had to be presented. The *Kebelles* were also essential in the conscription of young men to fill the increasing military demands of the state, which found itself engaged in war right from the time the revolutionary government assumed power in 1974. The *Kebelles* had considerable discretion over whom to recruit, and were responsible for delivering a given quota of recruits on a due date. The widespread insecurity felt among young men and the emotional strain on parents and the general public at the time of recruitment were clear to any one who witnessed this indiscriminate conscription during the eight years of its implementation from May 1983 to 1991.

The *Kebelles* normally exercised their power over residents in two ways: through sheer coercion, and through their powers over housing and the distribution of highly subsidised household consumption goods (Keller, 1988; Clapham, 1988; Tiruneh, 1993). Each household was issued with a ration card that determined the amount of a basket of commodities that it could buy from the shops, which the *Kebelles*, as part of their function, organized. Initially, these shops offered quite a wide range of commodities for sale, and monthly allocations of these items to each household took explicit consideration of household size. The difference between prices in the open market and in these shops for the same item was substantial. The food distribution system was thus a vital means for households to mitigate the effects of fixed income caused by a salary freeze, and of increased prices in the open market; for *Kebelles* it was an effective instrument of control over the urban population (Clapham, 1988: 147). However, subsequent structural rigidities in the system were manifested in the progressive inability of the shops to circulate the needed amount and variety of items, and the consequent decreasing emphasis on household size in the allocation of whatever was available for sale; these led to a reduced reliance on these shops. Households were increasingly forced to meet their needs in the open market, which itself was operating under imperfect market conditions: a well-known recipe for unwarranted extremely high prices.

Revolutions characteristically induce a high level of conflict and insecurity, both domestically and internationally (Clapham, 1988: 11). Thus it is not surprising that the greater part of Ethiopia' s history since 1974 has been characterised by internal strife and civil conflict. These conditions, exacerbated by the recurrence of severe drought and famine since the mid-1980s, brought periodic hardship to residents of urban areas as well as catastrophe to thousands of rural households (Harbeson, 1988: 8). From the early years after the revolution until 1991, when the long civil war in the country ended with the overthrow of the regime, Ethiopia was engulfed in conflict. The rural areas, particularly those in the north, suffered from frequent crop failure and inadequate food production. The tragic famine of 1984 in Northern Ethiopia was a combined result of these phenomena and the lack of political will in responding to them. Urban areas also faced the consequence of these events, largely through economic setbacks. The case of the housing sector was discussed above, but there were other urban problems such as the deterioration of employment opportunities and living standards of the population, which I examine below. But before proceeding to these issues, I will present a brief picture of demographic trends in the study area and the country at large.

3.2. Population size and change

Compared to those in many other African countries, nationwide demographic and health data in Ethiopia are both relatively limited and of recent origin. Until the second half of the 1960s information on any aspect of the population of Ethiopia was acquired from guesses made by travellers and estimates by individual researchers on the basis of administrative records, in particular voters' registration lists (Ahmed, 1994). As already mentioned in Chapter 2, the country's first national population census was conducted in 1984 and so far there has been only one demographic survey, the 1990 National Family and Fertility Survey, which is capable of providing detailed nationwide information on levels and determinants of natural increase. Study of many aspects of the population of Ethiopia compared with other nations of the world is limited by Ethiopia's non-participation in those internationally standardised survey programs that have now become common in much of the developing world.

According to the first national census the population of Ethiopia was 42,616,876 on 9 May 1984 (OPHCC, 1991: 5). This total had climbed to 53,477,265 in the census of 11 October 1994, implying an average intercensal growth rate of 2.2 per cent per year (OPHCC, 1998: 15). Subsequent estimates made independently by the United Nations Development Program (1999: 200) and the Government of Ethiopia (OPHCC, 1998) put the country's population at 58.2 million in 1997 and 61.7 million in July 1999 (OPHCC, 1998: 331).

The overwhelming majority of Ethiopians live in rural areas. In 1994, barely 13.8 per cent of the country's total population, or about 7.5 million people, were living in areas designated as urban (OPHCC, 1998: 62). The proportion shown for Ethiopia was about half of that of Kenya, a third of that of Nigeria and 57 per cent lower than the average for sub-Saharan Africa as a whole at roughly the same period (World Bank, 1996: 333). The estimates for earlier periods in Ethiopia depict still lower rates of urbanisation: 11.4 per cent in 1984, 9.5 in 1975 and 5.4 per cent in the late 1930s (Abate, 1991: 49; OPHCC, 1991: 4; UNDP, 1999: 200).

Table 3.1: Distribution of urban centres by size class: Ethiopia, 1971- 1994 (population in thousands)

Size	1971[a]			1984[a]			1994 [b]		
	No ..	Pop.	%	No.	Pop.	%	No.	Pop.	%
Over 500,000	1	851.6	34.2	1	1413	32.6	1	2084.6	30.4
100,000- 499,999	1	232.6	9.3	1	275	6.4	3	404.9	5.9
50,000 - 99,999	1	63.7	2.6	10	669	15.4	9	708.6	10.3
20,000 - 49,999	10	352.7	14.2	13	409	9.4	37	1045.1	15.2
10,000 - 19,999	24	337.9	13.6	39	542	12.5	62	838.7	12.2
5000 - 9999	44	289.0	11.6	78	519	12.0	123	853.6	12.4
2000 – 4999	101	361.9	14.5	155	502	11.6	295	927.2	13.5
All sizes	182	2489.4	100	297	4330	100	530	6862.7	100

Sources: [a] Berhane Tareke, 1994: 53, Table 2; [b] Compiled by author from OPHCC (1998: 30-45, Table 2.3). The output for 1994 calculated by the author and the 1984 figures presented above exclude the population figures for towns with fewer than 2000 persons; 395 areas in 1994, and 44 in 1984, were in this category, with respective populations of 459,514 and 466,679 .

Ethiopia's pattern of urbanisation was further characterised by concentration of the urban population in a few large centres. As shown in Table 3.1, well over half the urban centres at any given time had a population not exceeding 5000, and only four cities in 1994 and two cities in 1984 and 1971 had a population of over 100,000. During

this period, from 45 to 50 per cent of the urban population lived in fewer than 15 centres. About 34 per cent of the urban population in 1971, 33 per cent in 1984 and 30.4 per cent in 1994 were living in one city, Addis Ababa, which is so far the only urban centre in the country with a population of over half a million people.

Table 3.2: Population size, growth and rate of in-migration, Addis Ababa, 1961 - 1994

Census /Survey Year	Population size ('000)	Inter-count rate of growth	Annual [e] in-migration rate	Per cent migrants
1961	448, 512 [c]	7.2		
1967	683 530 [a]	4.9	4.6 - 4.7 [c]	55.7 [c]
1978	1, 167, 315 [a]	3.2	2.6 [d]	53.0 [d]
1984	1, 423, 111 [a]	3.7	2.8 [a]	47.4 [a]
1994	2, 084, 588 [b]		2.8 [b]	47.0 [b]

Source: [a] OPHCC, 1987: 9, 219-220; [b] OPHCC, 1995: 11, 150, 155; [c] CSO, 1972: 24, 27; [d] CSO, 1979: 18, 19; [e] Obtained from data on duration of residence in the past five years.

Table 3.3: Selected characteristics of the migrant population of Addis Ababa, 1978- 1994

Selected characteristics	1978 [a]		1984 [b]		1994 [b]	
	Migrants	Total	Migrants	Total	Migrants	Total
Age						
0-14	12.6	42.5	14.4	42.2	10.9	31.5
15-29	40.3	27.3	30.4	26.4	38.8	39.0
30-49	33.9	22.2	36.5	21.2	34.9	20.9
50+	12.9	7.9	18.7	10.2	15.5	8.5
Marital Status (10 years or over)						
Never married	29.3	43.5	33.6	50.9	41.8	60.1
Married	50.8	40.1	48.1	35.6	42.6	29.2
Widowed	14.2	11.3	12.6	9.1	6.6	4.5
Divorced	5.7	4.6	5.8	4.3	8.4	5.7
Educational level (10 years or over)						
Illiterate	58.7	45.6	25.8	18.8	25.6	16.8
Non-formal	9.1	7.3	5.7	4.1	6.5	4.2
Primary (1-6 years)	16.2	24.2	44.0	45.5	29.1	30.3
Junior secondary (7 - 8 years)	5.1	8.1	7.3	10.5	11.1	14.8
Senior-secondary (9-12 years)	7.8	10.8	12.7	16.9	20.2	26.9
Over 12 years of education	3.2	2.8	4.4	4.1	7.5	6.9

Source : [a] CSO, 1979: 21-23; [b] Calculated by author from the raw data of the censuses.

As mentioned above, Addis Ababa, as an urban centre, was founded by emperor Menelik II, in 1887, when he moved Ethiopia's capital from Ankober, some 250 kilometres north of the city. In the first census of the city, conducted in 1961, the population of Addis Ababa was counted at nearly 450 thousand. Growing at a rate of

7.2 per cent per annum between 1961 and 1967, about 5 per cent between 1967 and 1978, 3.2 per cent between 1978 and 1984, and 3.7 per cent between 1984 and 1994, the population reached about 684,000 in 1967, 1. 2 million in 1978, 1.4 million in 1984 and 2.1 million in 1994 (see Table 3.2).

About 56 per cent of the 1967 population, 53 per cent of the 1978 and 47 per cent of the 1994 population of Addis Ababa were born outside of the city. Females constituted almost half of the migrant population enumerated in 1967, about 53 per cent in 1978, 52 per in 1984 and some 52 per cent of the 1994 migrant population. About 64 per cent of the migrant population in 1978 and 58 per cent in 1994 were reported to have migrated from rural areas.

Since migrants compose so significant a fraction of the population of the city, it is worth making clear the characteristics of the migrants. As can be seen in Table 3.3, compared to the total population of Addis Ababa, migrants are generally more likely to be currently in a union, they are more concentrated in the adult age groups, and they have proportionately a higher rate of illiteracy. About 74 per cent of the migrants enumerated in 1978, 67 per cent of those enumerated in 1984 and 74 per cent in 1994 were aged between 15 and 49 years. However, during these periods, only between 50 and 60 per cent of the total population belonged to those age groups. In all the data sets, migrants also show a higher proportion of persons in the widowed and divorced categories and have an above-average representation in the over 12 years of education category. They are also more likely to have non-formal education and are less represented in the primary, junior secondary and senior secondary school groups than the population as a whole. However, it might be worth noting that the differentials in the level of education between migrants and non-migrants are rather small compared with differentials in the level of illiteracy.

3.3 The People: Religion, language, ethnic affiliation and social structure

The Ethiopian state at all times has comprised people of different ethnic groups, speaking different languages, and practising different religions (Levine, 1965, 1974; Schwab, 1985: 7; Clapham, 1988: 23; Harbeson, 1988: 25). This has largely resulted from

the political history of the country as well as from Ethiopia's geographical position at the crossroads of Africa and West Asia. This position not only facilitated cultural exchanges but also, at times, promoted massive migratory movements which contributed to the linguistic and ethnic diversity of the country and the early introduction of the major religions of the world into Ethiopia (Tiruneh, 1993: 1). Judaism was the first to be introduced, some time before the birth of Christ. Christianity, introduced early in the fourth century, and Islam, which was recorded to have arrived during the lifetime of the prophet Mohamed around the seventh century, are now the most widely professed religions. The Christians are predominantly Ethiopian Orthodox; Catholicism and Protestantism, which are relatively dominant in the rest of sub-Saharan Africa and most associated, in the literature, with bringing the local population in contact with Western cultural values, are recent introductions and have few followers either in the country or the city.

In the literature, religious membership and ethnic affiliation have been accorded some importance in the study of group fertility behaviour (Hanna, 1971: 271-240; United Nations, 1973: 110; Freedman, 1987: 783). Family values, timing and types of unions and their dissolution, the moral acceptability and prevalence of premarital and extramarital sexual relations, the use of birth control devices and restriction on their type are all, in many ways, linked to one's belief system and ethnic background. Language and common cultural heritage, through facilitating communication and interpersonal networks, are also reported to have an important bearing on the diffusion of norms related to family size and birth control practices (Cleland, 1985; Cleland and Wilson, 1987).

According to the latest census, conducted in 1994, three-fifths of Ethiopians, i.e. about 33 million, belong to the Christian religion; of these 82.1 per cent adhere to the Ethiopian Orthodox Church (Coptic), 16.5 per cent to Protestant churches and the rest, 1.4 per cent, to the Catholic Church (OPHCC, 1998: 132). One-third of the population are Muslims and another 6 per cent are followers of Indigenous or 'Other' religions, including Judaism. Addis Ababa's population is predominantly Ethiopian Orthodox. About 81 per cent of the total population and almost 95 per cent of the Christian population in the city in 1994 belonged to the Ethiopian Orthodox Church.

Protestants constituted 3.9 and Catholics 0.8 per cent of the 1994 population of the city, while the Muslim population and those belonging to Indigenous and 'Other' religions accounted for the remaining 12.6 and 0.6 per cent, respectively (OPHCC, 1995: 55). 'For most Ethiopians membership in their parental religious group is automatic but attendance at religious services and membership in religious fraternal associations are voluntary' (Levine, 1965: 259). Clapham also (1988: 25) cautions that 'the religious differences should not be elevated into a rigid line of demarcation'; in fact one of the effects 'of the early Christian and Muslim missionary activity was to crisscross Ethiopia with lines of supra-tribal alliance' (Levine, 1974: 44).

Ethiopia has over 80 ethnic groups (OPHCC, 1998: 66-80). However, in 1994, only 29 of these had a population of 100,000 or more and only seven exceeded a million members. About 85 per cent of the country's 53.1 million persons enumerated in the 1994 census belonged to these seven major ethnic groups: in alphabetical order, Amhara, Gurage, Oromo, Somalie, Sidama, Tigrawai and Wolaita. The Oromo and Amhara, with populations of 17.1 and 16 million respectively in 1994, made up about two thirds of the country's population. The Tigrawai, Somalie, Gurage, Sidama and Welaita accounted for 6.2, 5.9, 4.3, 3.5 and 2.4 per cent, respectively. The largest ethnic group in Addis Ababa is the Amhara, accounting for about 49 per cent of the total population of the city in 1994 (OPHCC, 1995: 34-35). The other major ethnic groups, in order of size, were the Oromo, the Gurage and the Tigrawai. In 1994, these groups constituted 18.5, 17.7 and 7.7 per cent of the city's total population, respectively. The Amhara and the Tigrawai are largely Orthodox Christians, the Somali are exclusively Muslim and the rest are split among the different religious groups discussed above.

Both nationally and in Addis Ababa, Amharic, the language of the Amhara, is, at present, the most widely spoken language (OPHCC, 1995: 44-52; 1998: 119-128), and has been the official language of the state for over 300 years (Levine, 1974: 46). According to the 1994 Census, about 93 per cent of the city's population and 42 per cent of all Ethiopians speak Amharic as either their mother tongue or second language.

Among the Amhara and, by extension, most other social groups in the country, which for historical reasons have largely been assimilated to the cultural values of the Amhara[1], 'social relationships are organised to an overwhelming degree on the basis of hierarchical patterns and individualistic association' (Levine, 1974: 123). The system likewise maintains a high degree of respect for individual privacy, despite its hierarchical character.

> This is shown, first, in the expectation that each nuclear family should inhabit its separate dwellings. The individual home is regarded with great respect; no one, not even a relative, presumes to enter another's home without being properly acknowledged and escorted inside. When possible, private quarters are isolated from those where guests are entertained (Levine, 1965: 264).

The production and distribution of goods are carried out on an essentially individualistic basis and in its formal structure, the kinship system stresses the independence of the nuclear family (Levine, 1965: 258). This is relatively free of obligations to extended relationships, and each nuclear family takes care of its own provisions (Levine, 1965: 247). Within the nuclear family itself, individual marriage partners also have important areas of independence from each other (Levine, 1965: 259).

> The land which each partner brings into a marriage or later acquires through bequests remains his own until death. If they should separate, each takes his or her own land, and the goods acquired by the household during their marriage are divided equally between them. There is also the provision of a quantity of property that either or both of the spouses may designate, prior to getting married, as strictly private property and indivisible in case of divorce. In the event that a nuclear family enters one of the indigenous savings associations or *equb*, husband and wife join as separate members (Levine, 1974: 258).

Kinship has a relatively limited role in the social structure of this system (Levine, 1974: 120). The major economic, political, and cultural functions in the society are not carried out by groups organised on the basis of kin relationships, nor is kinship a determining factor in recruitment to the roles which do serve these functions. Recruitment to political or religious spheres of life is entirely made on the basis of demonstrated ability, rather than by virtue of membership in ascriptive solidarities such as descent groups, generational classes, and local communities(Levine, 1974: 173).

[1] They were politically the most dominant ethnic group during most parts of Ethiopia's past and recent history.

> Political appointments are made on the basis of a man's military abilities, demonstrated or presumed loyalty, local power base, or tactical utility. Ecclesiastical appointments are made on the basis of training in centers removed from family settings. Even the head of a household is likely to prefer a competent and devoted servant to a lazy or disobedient son (Levine, 1974:121).

Among this society, interests are structured chiefly on an individual basis (Levine, 1974:146).

> There are no fixed corporate groups with which the individual normally identifies. The individual feels little sense of loyalty to such units as household, descent group, parish, or seigniory. People have a very pragmatic, unsentimental, and unritualised orientation to such collectives. Insofar as their individual purposes are served by complying with the norms of such groups, they will comply. In any event, the allegiance, ephemeral or long lasting, is owed not to a corporate group but on an unmistakably personal basis (Levine, 1974: 125).

Individual as well as social action is 'motivated first and foremost by the pursuit of *tîqem*—self interest' (Levine, 1965: 242). Horizontal relationships thus tend to take the form of 'utilitarian exchange or competition' (Levine, 1974:146).

> Since most other members of the society are one's actual or potential competitors, interpersonal relations are handled with extreme discretion. The main device in this regard is to keep others at a distance. This separation is accomplished, first of all, by the residential pattern. Homesteads are usually built at a respectable distance from one another. (Levine, 1974: 125).

Although in this society residence tends to be virilocal, descent is ambilineal, rights are inherited bilaterally, by sons and daughters equally, and through both parents (Levine, 1974: 116) and there are no obligations with respect to corporate lineages (Levine, 1965: 257).

Spontaneous co-operation in this society is relatively rare and often takes place only at times of grave crisis (Levine, 1965: 247-248). The extent of reciprocal obligations among kin outside the nuclear family is a function primarily of the amount of spontaneous affection that exists among the individuals concerned and how close to each other they happen to live (Levine, 1965: 258).

> [this] characteristic individualism has impressed more than one observer in the past. Perhaps not by accident, those who have been most responsive to these characteristics have been of French nationality. Arnauld d'Adbbadie, writing

> more than a century and half ago, depicted the Abyssinian [a name Ethiopians were known in earlier periods] as an irrepressible foe of uniformity and despotism. More recently the noted linguist, Marcel Cohen, in one of his rare but highly perceptive sociological essays, described the Abyssinian as *membre d'une société individualiste* (Levine, 1965: 238).

3.4. Education and literacy

A good deal of the literature on reproductive change emphasises the importance of literacy and education in the change from high to low fertility regimes (Cochrane, 1979, 1983; United Nations, 1987; Cleland and Rodríguez, 1988; Jeffrey and Basu, 1996). Generally, higher levels of literacy or educational attainment are hypothesised to (i) decrease the biological supply of children, because of the shorter time a woman is exposed to the risk of childbearing, through delayed marriage; (ii) lower the cost of fertility regulation, through increased knowledge of family planning and changed attitudes to their use; (iii) increase the efficiency of reproduction, as manifested in reduced infant and child mortality; and (iv) alter the perceived benefits and costs of children, with households deriving increased utility from 'child quality' and less from child quantity, this change being associated with increased costs of children, both time and expenditure on their education and health. All of these effects, working either individually or in concert, would eventually lead to lower fertility rates. Hence, in this section as a background to a subsequent discussion on the role education may have played in bringing about fertility differentials and the change in fertility performance over time in the study area, the educational profile of the study population and the nation as a whole is assessed in detail.

The beginnings of literacy in Ethiopia may be traced to the time when the Ethiopic (also known as Geez or Amharic) alphabet was first developed around the first century before Christ during the Axumite era. However, as mentioned in section 3.1, education in the modern sense has a history of less than a century in Ethiopia (Tekle-Haimanot, 1992: 3). The first modern school in the country was that founded in Addis Ababa around 1906, but for a variety of reasons access to education for most Ethiopians remained very limited until a much later date. As late as the early 1960s, the illiteracy rate in the country was as high as 95 per cent and by 1970 only 8 per cent of the country's population were reported as able to read and write (CSO, 1984: 14; Schwab, 1985: 87; Keller, 1988: 219; Tekle-Haimanot, 1992: 51).

The statistics on school attendance also reflect the limited coverage of education in the country at that time. In 1960, nationally, the gross enrolment ratio at primary level was 5.9 per cent; it increased only marginally to reach 8.9 per cent in 1965 (Tekle-Haimanot, 1992: 39). Although this ratio had increased further to some 13.4 per cent by 1970, seen against an African average of 56 per cent for the same period the shortfall in the coverage of education in Ethiopia was quite evident.

This picture, however began to show some improvement after 1974 following the adoption of new strategies of education by the revolutionary regime, focusing on improved learning opportunities for women and for people in rural areas and isolated communities (Library of Congress, 1991; Harbeson, 1988: 21). The new strategy, which was part of the social and economic reform agenda of the revolution, declared education, from the lowest grade up to university, to be free to all Ethiopians, and efforts were consequently made to increase its accessibility, through increasing the physical infrastructure and introducing a shift system that, particularly in the capital city, in the early periods reached three in a day (i.e. three different lots of pupils attending school at different times of the day). As a result, especially in the early years of the revolution, total enrolment at primary level, grades 1-6, expanded at a faster pace: from 859,831 in 1973-74 to 1,377,703 in 1978-79, and 2,511,051 in 1982-83 (Wubneh, 1990: 17-20; Ministry of Education, 1995: 136) — an annual average growth rate of about 13 per cent. The increase in enrolment rates at junior (grades 7-8) and senior secondary (grades 9-12) school levels has likewise been quite rapid: about 10 per cent per year for junior secondary schools and 14 per cent for senior secondary schools.

The rapid expansion of school enrolment was accompanied by increased participation of girls in the school system (Lockwood, 1995: 11). Between 1973-74 and 1980-81, school enrolment for girls grew at an annual rate of 15 per cent in primary, 13 per cent in junior secondary and 20 per cent in senior secondary schools. This advantage in favour of girls gradually transformed the gender composition of students throughout all levels of the school system in Ethiopia. For instance, in the senior secondary schools, the proportion of females rose from 24 per cent in 1973-74 to 39 per cent in 1986-87 and to 45 per cent in 1992-93 (Ministry of Education, 1995: 136).

Side by side with the expansion of formal education, a massive adult literacy initiative was also mounted by the state to address the problem of general literacy in the country. This early initiative coincided with the launching of what was officially known as the 'Development through Co-operation' campaign early in 1975, in which more than 60,000 high school students and teachers were mobilised by the revolutionary regime to participate in all-encompassing development activities (including adult literacy) throughout the country for a continuous period of two years. The literacy aspect of this campaign was later, in 1979, developed into a campaign of its own with co-ordinating committees established at national, regional and *Kebelle* levels. The campaign was designed around the concepts of functional literacy training, with the teaching aids focusing not only on teaching reading but also on providing basic information that would help participants improve the quality of their lives (Keller, 1988: 220). For example, subjects such as hygiene, better farming techniques, better ways of food preservation, and basic tips on maternal and child nutrition were commonly the focus of reading materials.

The literacy campaign was carried out in two rounds per year, each coinciding with slack periods in farming and the school year (Clapham, 1988: 152). This arrangement was meant to ensure full participation both of the rural people, who were the major intended beneficiaries of the program, and of the students and school leavers who, through compulsory services, did the teaching and management. Each of the total of 22 rounds launched nationally between July 1979 and February 1990 was concluded with qualifying examinations conducted throughout the country. According to official statistics, by the end of round 22, in the early 1990s, the total cumulative enrolment had passed 22 million and the majority of those who enrolled were females (Ministry of Education, 1994: 5).

The state pursued wide-ranging measures to consolidate the gains achieved through the literacy program. These measures included follow-up courses within the literacy program for those who had already passed the beginners' course, so that they could then easily enrol in the formal school system[2]; the establishment of reading rooms within the local administration premises; and regular columns, specially tailored to the

newly literate group, in the state-owned national newspapers. These actions of the state were often reinforced by coercive measures applied to defaulters. Such measures, resembling the way non-compliance with other government initiatives was dealt with, ranged from imprisoning defaulters to denying them access to services like the highly subsidised *Kebelle* shops. By introducing a literacy status indicator poster that was to appear on each dwelling unit, particularly in urban areas, the state was able to create an environment of social stigmatisation of illiteracy and broaden its monitoring of defaulters.

But despite the progress made through the national literacy program and the expansion in formal schooling, a substantial proportion of Ethiopia's adult population, and a large proportion of its women, still have no education. According to the United Nations Development Report of 1999, in 1997 over 70 per cent of women and 58 per cent of men in Ethiopia had no education (UNDP, 1999: 141). These rates are indeed far higher than the average for developing countries as a whole and for the sub-Saharan African region: in 1997 the developing countries average was 37 per cent for females and 20 per cent for males; the average was 50 for females and 34 for males in sub-Saharan Africa.

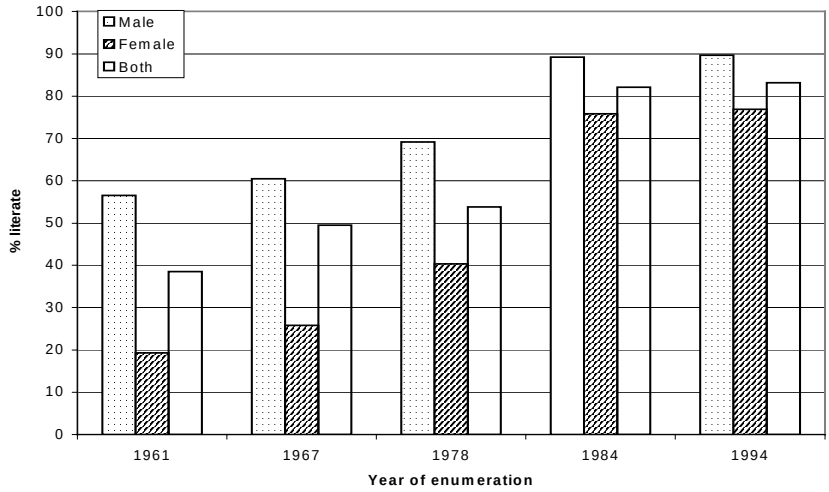
There also remains a wide difference in educational attainment between rural and urban areas. The 1994 Census shows an adult literacy rate of barely 15 per cent in rural areas but well over two-thirds in urban areas (OPHCC, 1998: 172). Moreover, in urban areas, up to 60 per cent of the literate population had six or more years of schooling, about one-third had at least nine years and nearly one in five had 12 years or more (OPHCC, 1998: 176). The corresponding proportions for rural areas were 24.5, 7.1 and 2.6 per cent. The same applied to school enrolment for which the ratios for rural and urban areas were 15.7 as against 95.3 per cent at the primary level; 9.2 against 88 per cent in junior secondary; and 3 against 53.7 per cent at senior secondary levels.

Rural areas are generally characterised by lower participation of girls in the school system. According to the 1994 Census, female students in these areas formed 34

[2] Many of them in urban areas actually did so, contributing to the rapid increase in the proportion of the population with formal schooling.

per cent of primary enrolments, 30 per cent of junior secondary enrolments and 27 per cent of senior secondary enrolments. In contrast, in urban areas, 48 per cent of the secondary school students and about half of the students in primary and junior secondary schools were girls (OPHCC, 1998: 172). Within this national context, I now turn to review the educational profile of the study population, Addis Ababa.

Figure 3.1: Proportion of literate persons in Addis Ababa, 1961-1994



As shown in Figure 3.1 there has been a consistent and overall increase in the educational attainment of Addis Ababa's population in the past three or so decades. For both sexes combined, the literacy rate in the city increased from less than 40 per cent in 1961 to about 54 per cent in 1978, and to well over 80 per cent by the early 1980s. Similarly, the proportion of women aged 10 years and over with no education dropped from some 80 per cent in 1961 to about 60 per cent in 1978 and less than 25 per cent in 1984. Over the same period, the proportion of literate males increased from about 57 per cent in 1961 to 69 per cent in 1978 and almost to 91 per cent in 1994. Accompanying the dramatic change in the rate of literacy in the city was a narrowing of the gap in educational attainment between the two sexes. In the 1960s the rates for females were as much as 35-37 per cent below the rates for males but this difference dropped to 13.4 per cent in 1984 and to 12.8 per cent in 1994. This trend reflects both the rapid expansion of school enrolment among girls as well as the greater involvement of women in the adult literacy program discussed earlier. Although enrolment may not always

imply attendance nor does it measure the efficiency of learning, the use of this measure in the present study was dictated by its wide use in the literature.

Table 3.4: Literacy status of the adult population of Addis Ababa, 1967-1994

Age group	1967 [a] proportion literate		1978 [b] proportion literate		1984 [c] proportion literate		1994 [d] proportion literate	
	Male	Female	Male	Female	Male	Female	Male	Female
15-19	67.4	46.6	80.1	66.4	96.3	92.6	94.7	88.5
20-24	63.6	21.8	77.2	45.5	95.8	89.4	95.6	89.1
25-29	59.8	15.5	68.2	28.3	93.9	82.4	94.4	84.9
30-34	61.4	10.2	66.4	20.5	92.6	77.9	93.5	77.6
35-39	60.0	8.7	63.2	15.4	89.6	70.3	90.9	69.9
40-44	54.0	6.2	59.9	7.7	86.1	60.1	86.5	61.1
45-49	51.0	7.8	57.0	8.4	80.6	53.1	84.1	55.2
50-54	43.7	3.8	48.5	5.4	74.9	36.7	77.6	40.9
55-59	42.7	5.3	49.3	3.3	69.9	27.4	73.8	33.0
60-64	35.8	3.3	44.1	3.0	61.5	16.8	64.9	21.8
65+	30.3	2.7	35.0	2.7	47.9	9.6	50.0	11.7

Sources: [a] CSO, 1972: 60; [b] CSO, 1979: 32-33; [c] OPHCC, 1987: 97; [d] Calculated by author from the raw data for the 1994 census.

As shown in Table 3.4, in any age group men and women in Addis Ababa are now much more likely to have some education than in the past. In the reproductive age group, the proportion of women in the city with some literacy increased from below 32 per cent in 1967 to almost 75 per cent in 1984 and to 85 per cent in 1994. In the most important reproductive age groups, that is between 15 and 30 years, the literacy rate has increased from less than 25 per cent in 1967 to over 85 per cent in 1994. The values for selected individual age groups also show that the proportion of women with no education dropped from well over half in 1967 to less than 12 per cent in 1994 for the age group 15-19; from about four out of five to about one in ten for age group 25-29 and from nine out of ten to fewer than one in four for the age group 30-34 years. However, it is worthwhile to note that a cohort-based comparison of the proportions presented in the table, particularly for 1984 and 1994, do not reveal a good deal of consistency for a number of cohorts. For the majority of the cohorts, the rates for 1994 are lower than that reported in 1984. This may be a result of both increased in-migration of less literate persons into the city in recent years, mainly due to the lessening of administrative control on inter-regional mobility and inaccurate reporting of one's literacy status in the previous census for fear of administrative actions by the then

revolutionary government. In addition, it is also possible that overtime some people, particularly those who became literate through the literacy program, had lost their capacity to read and write, hence contributing to a decline in cohort literacy rate between the two census periods. However, given that the analysis in the subsequent chapters was undertaken by combining people with informal education with those of no education, the effect of such factors on the result of the study is believed to be minimal.

Table 3.5: Distribution of women by age and level of education attained, Addis Ababa, 1984 - 1994

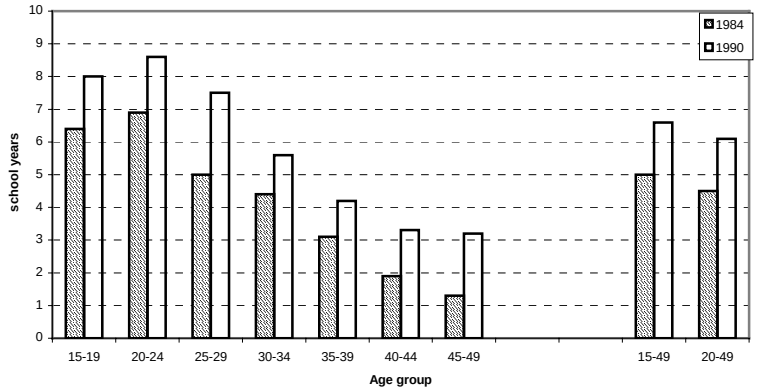
Census/ Survey Year	Age group of women							**15-49**	**20-49**
	15-19	20-24	25-29	30-34	35-39	40-44	45-49		
Panel A: Percentage of women with at least 4 years of education									
1984	73.9	69.1	48.0	41.7	29.1	18.5	11.0	54.9	46.2
1990	85.2	83.6	68.7	46.5	33.1	26.6	17.8	62.4	53.9
1994	85.4	88.2	82.5	72.4	58.4	50.0	43.2	78.7	75.7
Panel B: Percentage of women with 7 or more years of education									
1984	57.4	57.3	37.1	31.3	19.8	10.7	6.3	42.7	35.9
1990	76.1	72.7	54.9	33.1	20.3	14.4	11.9	51.3	42.1
1994	79.4	77.8	69.7	57.7	41.3	33.1	26.8	64.6	62.4
Panel C: Percentage of women with 9 or more years of education									
1984	34.4	45.5	26.3	23.4	12.7	6.8	5.5	29.2	26.9
1990	52.6	58.9	43.8	25.2	13.9	8.0	3.7	37.9	32.4
1994	57.8	61.4	56.4	45.7	30.5	23.0	17.5	45.5	49.0
Panel D: Percentage of women with 12 or more years of education									
1984	11.2	28.1	17.7	17.7	9.3	4.4	3.2	15.8	17.9
1990	19.9	41.0	34.0	19.4	12.3	4.5	3.7	23.0	24.1
1994	11.1	41.1	42.5	36.3	24.1	18.1	13.4	28.0	35.6

Source: Computed by author from the raw data of the survey and censuses

As shown in Table 3.5, many more women in the city have been attaining higher levels of education in recent years. In 1994, about four out of five of the women in reproductive ages had at least four years of education, about two-thirds had seven or more years, over 45 per cent had nine or more years of education and well over one in four had 12 or more years of education. Compared to the situation in 1984, the changes

represented about a 77 per cent increase for the 'Over 12 years of education' category, a 56 per cent rise for the '9 or more years' category, about a 51 per cent increase for the 'seven or more years' group and a 43 per cent gain in the 'at least four years' category. This suggests that the change was much faster for higher than lower educational groups.

Figure 3.2: Mean number of years of education by age group of women, Addis Ababa, 1984 - 1990



As a further evidence on the depth of educational attainment in the city, the overall increase in years of schooling, calculated on the basis of all women, is presented in Figure 3.2. The average number of years of education in the city has increased from five years in 1984 to 6.6 years in 1990. The average number of years of education is over 8.5 years for women aged 20-24 years and about 7.5 years for those aged 25-29. In both data sets, except for the youngest age group, there is a general tendency for mean years of education to be higher the younger the age group is, a fact that reflects the increase in educational opportunity over time.

3.5. Female labour force participation and occupational distribution

Table 3.6 shows the age-specific labour-force participation rates of women aged 20-49 years, obtained from responses to a question on whether they were engaged in economically gainful activity during the week before enumeration in successive censuses and the 1978 demographic survey. As shown in the table, since 1978 the labour

force participation rate in Addis Ababa for each age group has increased substantially. For instance, in 1978 only one-third of the women aged 30-34 were either employed in an economically gainful activity or actively seeking one. By 1984 this proportion had increased to almost 40 per cent and by 1994 to 60 per cent.

Table 3.6: Labour force participation rates for women, Addis Ababa, 1978-1994

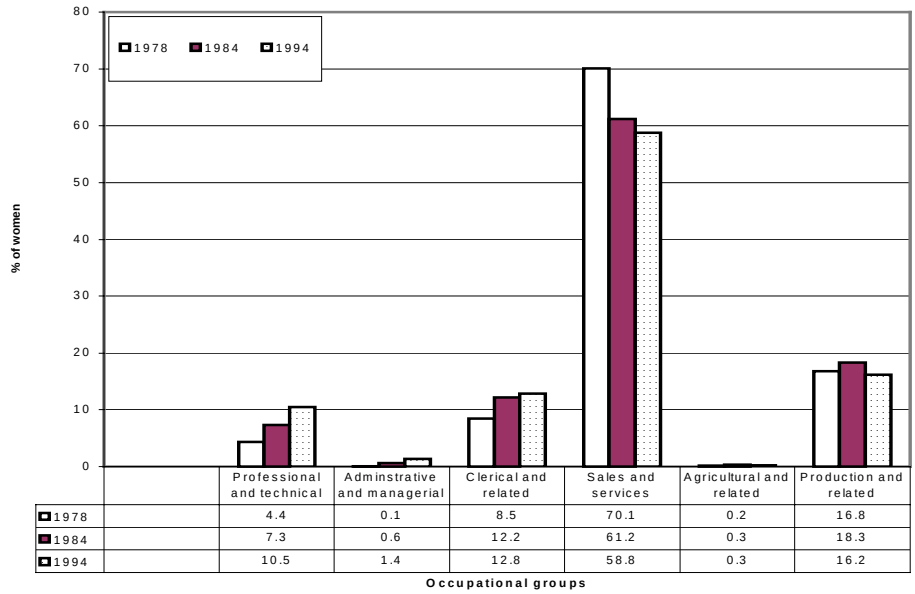
Age of women	Labour force participation rate *		
	1978 [a]	1984 [b]	1994 [c]
20-24	44.5	55.9	67.7
25-29	37.0	47.1	65.5
30-34	33.2	40.1	57.1
35-39	29.8	33.8	47.3
40-44	30.3	32.6	41.3
45-49	28.9	29.9	34.8

Sources and notes: [a] CSO, 1979: 42; [b] OPHCC, 1987: 109; [c] OPHCC, 1995: 112.; *Labour force participation rate is calculated as a ratio of economically active population in a given age group to the total population recorded in the same age group. Women were regarded as economically active if they were either employed in economically gainful activity or actively seeking for one during the reference period under investigation, which in all the data sets used in the analysis, was set at one week prior to enumeration.

This increase probably reflects the combined effect of rising employment opportunities and changes in labour market behaviour that is, related to aspirations for involvement. It was learnt from the qualitative interviews that in the past only two kinds of women involved themselves in work outside of the home: those with very high levels of education, and those who had no alternative sources of income, if single, or whose household income could not meet the family's needs, if married. This seems to have changed significantly over the years. Employment is now viewed not just as an avenue to make up shortfalls in household income, but as a normal way of life expected after years of schooling, and is valued for its own sake. These views are no doubt closely linked to the combined effects of the changing educational composition of women, and the associated changes in attitudes about gender roles in the society, which is partly explained by the propagation of the idea of gender equity which was also a preoccupation of the revolutionary government. In the in-depth interviews several also stressed the importance of economic independence in their life and hence the necessity of acquiring a job, which could also be a contributing factor for the observed increase in participation rate. A change in attitude towards jobs which individuals in the past were not ready to take was also noted, which would partly explain the high activity rate for recent years.

Table 3.6 shows the higher rates of participation by younger than older cohorts for each data set, which again may be interpreted as an indication of both greater chances of employment by these women, probably due to their higher educational qualifications, and changes in their attitude towards employment for the reasons just stated.

Figure 3.3: Occupational distribution of economically active women, Addis Ababa, 1978 - 1994



	Professional and technical	Adminstrative and managerial	Clerical and related	Sales and services	Agricultural and related	Production and related
1978	4.4	0.1	8.5	70.1	0.2	16.8
1984	7.3	0.6	12.2	61.2	0.3	18.3
1994	10.5	1.4	12.8	58.8	0.3	16.2

The occupational distribution of the economically active female population of Addis Ababa presented in Figure 3.3 shows that although the majority of the women are in the sales and services category, traditionally a female-dominated activity, an increasing number of women have joined the professional-technical and the administrative-managerial categories. The proportion of women in these groups increased from 4.4 per cent for the former and 0.1 per cent for the latter in 1978 to 10.5 and 1.4 per cent in 1994. There has also been a consistent increase in the proportion of women engaged in clerical jobs. These changes are consistent with the changing educational profile of the study population observed in the previous section.

3.6. Mortality and health services

The relationship between mortality and fertility behaviour has remained at the centre of most theories of fertility decline. Kingsley Davis (1963), in his classic 'multi-phasic' theory of fertility change, argued that large mortality declines constitute a necessary and sufficient stimulus for fertility decline. The demographic transition theory, and the explanations that followed concerning how a largely traditional and demographically disadvantaged society with high mortality and fertility regimes would eventually evolve into a demographically advanced stage of low fertility and mortality rates, also rested on the premise that both mortality and fertility rates operate in close connection. There is also a large amount of evidence showing that countries with relatively low fertility have generally low infant and overall mortality rates, while countries with exceptionally high risks of mortality tend to have high fertility. The same is true at the individual level. Women who have lost one or more of their children are generally more likely to give birth to another child than the group that has not had this experience. Child death inflates parental family size desires and, in consequence, often stands as a barrier to family limitation and use of birth control devices (Chowdhury, Khan and Chen, 1978: 210; Bulatao, 1984: 18). Hence, in this section, as a background to a subsequent discussion of the possible role mortality change may have played in the fertility decline observed in Addis Ababa, trends in overall mortality and the health infrastructure in general are examined. Moreover, to have a clear picture of the relevance of cross-sectional mortality differentials to the existing group-level fertility differences in the city, an investigation is made of the variations in child-loss experience by selected characteristics of women. As has been done for education, I begin the overview by looking at the national context and proceed to discuss the trends and cross-sectional differentials in the study area, Addis Ababa.

At present, nearly one in ten of newly born babies in Ethiopia dies before reaching age one and about 17 per cent do not survive to their fifth birth day (OPHCC, 1998: 278; UNDP, 1999: 171). These rates are both high in relation to the average for developing nations. Nevertheless, they signify an important, albeit gradual, improvement from the situation that existed earlier. At a national level, the infant mortality rate in Ethiopia dropped from 170-177 deaths per thousand live births in 1971-

74 to 134-139 deaths per thousand in 1975-79 and to 130-135 deaths per thousand in 1980-84 (CSA, 1993: 286). The slow progress in mortality observed in the latter period may be attributed to the possible increase in death rates associated with the 1983-84 drought and consequent shortage of food in the country.

Largely as a reflection of the high mortality rates in infancy, life expectancy in Ethiopia is also quite low. The estimate of just 46 years for 1992 is four years below the median for sub-Saharan Africa and 18 years below the median among all developing countries (CIHI, 1996: 6). Though results from the 1994 Census indicate a somewhat higher level, about 51 years for the nation, with corresponding estimates of 49.9 years for rural and 54.3 years for urban areas, life expectancy in Ethiopia remains among the lowest in the world (OPHCC, 1998: 278). In 1997, on average 14.6 per cent of those born in all developing nations would be expected to die before age 40; for Ethiopia the equivalent figure is 42 per cent (UNDP, 1999: 148).

The high levels of infant and child mortality as well as the consequent lower expectations of life at birth in Ethiopia result from low standards of living and poor access to health services. According to estimates by UNDP (1999: 148) barely 55 per cent of the population of Ethiopia have access to adequate health services, compared to a median of over 60 per cent among sub-Saharan African nations as a group. According to the 1999 UN Human Development Report, Ethiopia has among the world's highest population-per- physician and population-per-nurse ratios, which respectively stood at 4 and 8 per 100,000 in 1993, as against 16 and 75 for sub-Saharan Africa and 76 and 85 for the developing nations as a whole (UNDP, 1999: 175).

However, this national picture conceals an uneven distribution and wide disparities in health facilities. It is reported that 60 per cent of Ethiopia's physicians, 46 per cent of the nurses and 34 per cent of the health assistants work in a part of the country containing only three per cent of its total population, Addis Ababa (CIHI, 1996: 33; OPHCC, 1998: 54-56). This gives Addis Ababa a ratio of one physician per 1000 inhabitants, a proportion which is fairly comparable with the average for middle-income countries, about 108 per 100,000 inhabitants (UNDP, 1999: 172).

At present, a total of 20 hospitals operate in Addis Ababa, of which four are privately owned, two are run by non-governmental organisations and 14 are public hospitals administered by the federal government or the city administration (Addis Ababa Regional Administration, 1998: 10). Additional health infrastructure available in Addis Ababa includes 19 health centers and eight clinics operated by the city administration and 229 clinics managed by private practitioners. Recent estimates show that the Ministry of Health each year spends as much as 24 per cent of its recurrent budget to run the hospitals and health centres operating in Addis Ababa under government ownership. In these institutions health services are provided free and patients are usually required to pay only a small amount of money per visit, no more than US $ 0.50 cents, mostly for handling administrative costs. In the health centres and clinics these payments are much lower still (about 1 Ethiopian Birr, equivalent to US $ 0.15) and patients also receive free medication.

Table 3.7: Trends in infant mortality and crude death rates, Addis Ababa, 1967-1995

Year	Infant mortality per thousand births	Crude death rate per 1000 population (adjusted)
1967 [a]	165-175	19-20
1978 [a]	117	15.4
1984 [b]	92.5	7.5 [a]
1994 [c]	77.3	U
1995 [d]	77.7	U

Sources: [a] OPHCC, 1987: 217; [b] Kinfu, 1990: 57; [c] OPHCC, 1995: 170; [d] CSA, 1997: 151. All rates are adjusted estimates using Brass-type indirect mortality estimation procedure.

Table 3.7 presents trends in infant mortality and the crude death rate in Addis Ababa. Infant mortality in the city dropped from over 160 per thousand births in the second half of the 1960s to well below 80 per thousand in the early 1990s. This represents a decline of over half in a period of about three decades. Yet, these figures, including that observed in the recent year, appear to be high even by the standards found in sub-Saharan Africa, let alone those of countries with a similar fertility level as that of Addis Ababa's. For example, comparable estimates for other cities in the region show a rate of 43 per thousand in Harare (Zimbabwe), in 1988-89, 49 per thousand in Maputo (Mozambique), in 1997, and 58.4 per thousand in Accra (Ghana), in 1993, all of which are significantly lower than that of the level found in Addis Ababa despite the

much higher fertility found in these cities (CSO [Zimbabwe] and MI, 1995; Gaspar *et al.*, 1998; GSS and MI, 1994).

Figures shown in Table 3.8 indicate the existence of differences in the chances of survival among social groups in Addis Ababa. Examination of these figures by highest grade completed shows that, of those women who had become mothers, 42 per cent of those with no education experienced the death of one or more of their children, 22 per cent reported one dead child and the remaining 20 per cent, two or more dead children. By contrast among women with secondary education or higher, fewer than two per cent experienced two or more child deaths, and barely six per cent experienced one child death. As shown by the x^2 test, the differences in child loss experience between the different educational groups were statistically significant at less than 1 per cent level.

Table 3.8: Child loss experience of women by selected characteristics at time of enumeration, Addis Ababa, 1994

		% with indicated number of dead children		
		None	1	2 +
Highest grade completed	χ^2 = 25524.2		P = .000	
None		57.8	21.9	20.3
Non formal		59.2	21.8	18.3
1-6 years		73.2	17.3	9.7
7-8 years		82.1	13.2	4.7
9-12 years		89.0	8.7	2.3
Over 12 years		93.1	5.5	1.4
Religion	χ^2 = 1122.7		P = .000	
Ethiopian Orthodox Christian		73.0	16.1	10.8
Protestant		80.9	12.9	6.2
Catholic		88.1	7.9	3.9
Muslim		67.3	18.5	14.2
Others		81.8	13.8	4.4
Ethnic background	χ^2 = 3519.9		P = .000	
Amhara		76.2	14.8	9.0
Oromo		67.5	18.3	14.2
Tigrawai		78.2	14.0	7.9
Gurage		66.1	19.4	14.6
Others		68.8	17.4	13.8

Source: Computed by author from the 1994 census data for Addis Ababa

Ethnic background and religion also constitute smaller but still important sources of differentiation in child mortality. Women professing Islam followed by Orthodox Christians have a significantly higher child loss experience than Protestant

and Catholic women. Tigrawi and Amhara women also display significantly lower child loss experience than women from other ethnic groups. These differences may partly reflect the differences in educational attainment between the groups.

3.7. Family planning and population policy

Family planning, as the term used in the literature, is a loose concept often applied to anything from multi-component programs aimed at fertility reduction to mere provision of birth control devices, with or without the support of governments and in the former case with or without a clear demographic objective. Yet, despite the lack of specificity, the concept of family planning and its role in fertility transition remain in the forefront of both intellectual debate and bilateral and multilateral assistance to nations in the Third World (Egerö, 1994: 19). The views on the role of family planning programs in fertility decline generally range from what may be called in economic jargon the family planning version of Say's law, which simply means supply creates its own demand and with it a decline in fertility, to an argument that modern family planning programs become a useful support only when already established norms of sexual and reproductive patterns can no longer satisfy the needs of individuals for fertility regulation (Egerö, 1994: 20; Lockwood, 1995: 12). In the second view, fertility change can take place with or without access to modern contraception and results only from the changing cultural, economic and institutional conditions that make people want fewer children. The aim in this section is not to enter the debate on whether the fertility decline observed in Addis Ababa is 'family planning driven' or 'program assisted' or not. Nor do I attempt here to examine the contribution of contraception in the proximate determinant sense as described in Bongaarts (1978, 1982; Bongaarts and Potter, 1983; Bongaarts *et al.*, 1984, 1990). Both issues are more closely examined in the subsequent chapters. In this section, I restrict myself to merely chronicling the evolution of the family planning program and population policy in Ethiopia as a background that will help in answering issues that may be raised in relation to the above hypotheses.

Although as in most societies around the world, non-artificial methods of birth control in Ethiopia have long been known, the history of the modern family planning movement in the country dates back only to the establishment of a non-governmental

volunteer association known as the Family Guidance Association of Ethiopia (FGAE) in 1966. The establishment of the association was also crucial in the setting up, by the same institution, of the first-ever family planning clinic in the country in the following year (Kassa, 1986). In the early stages, before the formal registration of the association, various of its functions, and in particular its clinical services, were carried out in an informal manner. One reason for this was the expected opposition by religious leaders, particularly those of the Ethiopian Orthodox Church, who until the 1974 revolution were well positioned to influence the political affairs of the state, as well as the views of government officials.

However, these impediments began to fade with time, as reflected first with the registration of the Association as a legal entity, in 1975, and subsequently with the adoption by the state itself, in 1982, of an integrated family planning program within the Maternal and Child Health (MCH) activities of the Health Ministry (Tesfaye, 1991: 4). The effects of these changes began to reflect on the expansion of the number of health institutions (health centers, clinics and hospitals) that offered family planning services, which increased from around 22 in 1970 to about 150 in 1977, 553 in 1986 and about 1612 in 1991 (Wubneh, 1990: 13-16; Tesfaye, 1991: 24; Library of Congress, 1991; FGAE, 1996: 16). In terms of the proportion of total health institutions that had integrated provision of family planning in their services, the observed change represented an increase from about 14 per cent of the total in 1982, to 29 per cent in 1987 and 52 per cent in 1990.

Shown in Table 3.9 is a composite family planning effort score of regions and countries, including Ethiopia, at four points in time, as a percentage of the maximum possible score. The score, obtained out of 30 individual items of family planning effort indicators, reflects the performance of each country in relation to four broad components: policy and stage-setting activities; service and service-related activities, record-keeping and evaluation; and availability and accessibility of contraceptive supplies and services. Theoretically the score for individual countries is expected to lie between 0 and 120, with cut-off values of 'over 80', as a percentage of the maximum, depicting ‘strong’ program effort, 55-79 reflecting ‘moderate’ effort, 25-54 showing a ‘weak’ effort and a value below 25 indicating either ‘very weak’ effort or ‘none’.

Table 3.9: Family planning program effort score as per cent of maximum, Ethiopia and selected countries and regions of the world, 1970 - 1994

	Program effort score as % of maximum			
	1970	1982	1989	1994
Ethiopia	0	6	32	39
Botswana	_	27	75	66
Kenya	20	28	58	56
Zimbabwe	10	27	56	68
Sub-Saharan Africa	5	15	37	44
Developing regions	20	29	43	48

Source: Ross and Mauldin, 1996: 146.

The trends in these scores, presented for Ethiopia, show a good deal of consistency with the changes in the policy environment and framework of service provision noted above. The increase in the value of the score from 0 in 1970 to 6 in 1982 and then to 32 in 1989 reflects the changes associated with the shift in policy toward incorporation of family planning services within the maternal and child health activities of the Ministry of Health in 1982, as well as the increase in the number of health institutions that actually began offering the service. The further increase of the score to 39 points for 1994 may also be related to the country's adoption of its first National Population Policy in July, 1993, and the subsequent setting-up of national and regional offices of population that were supposed to follow up the implementation of the specific objectives of the National Population Policy. However, despite this gradual increase in the values of these scores, the program effort score for the country even for the latest period still falls in the category of 'weak program' and throughout the period remained well behind the two regional averages and the values for the individual countries under comparison. Note that the three countries considered in the table are countries that are often reported as being in the forefront of the emerging fertility transition in sub-Saharan Africa (Lockwood, 1995; Kirk and Pillet, 1998).

Haile (1991: 62) argues that legal barriers to the promotion of contraception in public, as well as similar restrictive civil laws pertaining to abortion and sterilisation, made the family planning program in Ethiopia far from aggressive. He quotes Article 802 of the country's penal code that prohibits 'solicitation of contraceptive sales by mailing of advertisements or samples' and Articles 537 and 538 of the same document

that makes both 'compulsory and voluntary sterilisation unlawful acts in the country'. Moreover, except under very limited medical circumstances regarding the health of the mother, abortion is also an illegal act under Ethiopian law. Haile (1991: 70) further argues that 'although not consciously and systematically designed, some of the country's civil laws [on family and welfare] have a pro-natalist tendency'. This was clearly acknowledged in the National Population Policy document adopted in 1993. The document (Transitional Government of Ethiopia, 1993: 7) states that:

> Family laws, currently in force restrict the right of women to regulate their fertility and discourage the widespread use of modern birth control methods. Thus, technically, all institutions providing family planning in the country, including government health institutions are doing so illegally.

However, despite this acknowledgment, even after seven years of the adoption of the policy, surprisingly no changes have so far been made in these areas. Perhaps partly as a reflection of this condition, public advertisement of any form of modern birth control devices, with the exception of condoms for reasons relating to prevention of HIV, is still absent in Ethiopia, including the capital. This is supported by the evidence from the 1990 NFFS which shows the prominence of interpersonal communication as the dominant source of family planning information. In Addis Ababa, the majority of women (close to half of the sample population) learnt about family planning methods from a friend or relative (results are from primary analysis of the 1990 NFFS by the author). These events, therefore, suggest that successive governments in Ethiopia have been far from aggressive in promoting family planning. In fact, neither state officials nor religious leaders have ever discussed (either to promote or to discourage) family planning matters in public.

3.8. Economy, well-being and unemployment

Economic stagnation or reversal was one of the distinguishing characteristics of most sub-Saharan African economies during the greater part of the past two decades (National Research Council, 1993: 3). For the region as a whole, real gross national product (GNP) per capita declined between 1980 and 1987 at an annual rate of 2.8 per

cent, and for the region's low-income countries (those with per capita GNP less than US$ 500 in 1987), it fell at an annual rate of 3.6 per cent.

Links between such economic indices and demographic rates in a population are intuitively plausible. In the case of reproduction, as argued in most demand theories of fertility discussed in Chapter 1, economic development at the macro level and income gains at the personal level are, in the long run, closely associated with the achievement of low fertility. Increased income and economic development change personal tastes and consumption aspirations; they lead to a shift from labour-intensive to labour-saving and knowledge-intensive systems of production; they enhance survival rates in infancy and thus increase the supply of children; and they offer greater opportunities for women to participate in the economy beyond household chores. All of these reduce the utility of children and raise the relative cost of their upbringing.

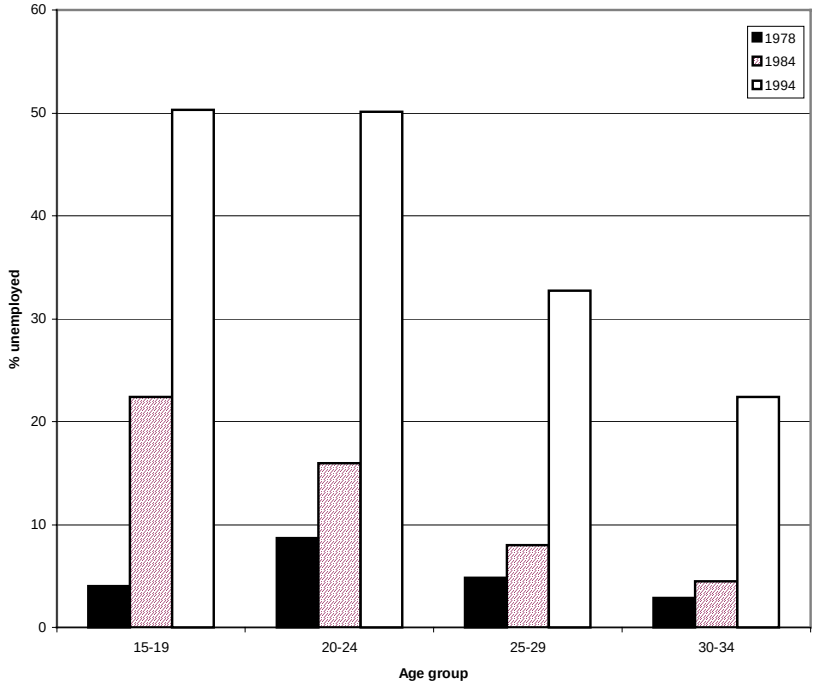
However, deprivation or poverty may also act as a spur to family size limitation, which has come to be known as 'crisis-led transition'. This argument which takes its root in the work of a Belgian economist, Hector Denis (cited in Lesthaeghe and Jolly, 1995: 38), in his study of the Liège industrial belt of Belgium in the early nineteenth century, has also been applied to Indonesia and South India (Cleland *et al*., 1994: 62). For instance, in the case of Liège the fertility decline, which emerged in the face of a sudden and sharp fall in real wages, was regarded as a defensive response by individuals to protect their achieved standards of living and consumption aspirations. Boserup (1985 cited in Lesthaeghe and Jolly, 1995) also refers to this defensive mechanism with reference to sub-Saharan Africa. This section compiles the relevant evidence on the economic condition of Ethiopia in general, and the changes in living conditions in Addis Ababa in particular. However, as in the previous sections, the effort at this stage is merely to present the facts of the situation, thus no attempt is made to argue in favour or against these assertions, which are discussed in Chapter 7.

Perhaps one of the most significant changes in the economic condition of urban areas in Ethiopia is the sharp increase in rates of unemployment. As shown in Figure 3.4, the unemployment rate among men in the marriageable ages has increased from 8.7 per cent for the age group 20-24 in 1978 to 16 per cent in 1984 and 50 per cent in 1994.

The data also clearly show that in 1994 as many as one in three men in the age group 25-29 and close to one in five of those aged 30-34 years was unemployed. Although this problem should be seen in the light of the fact that Ethiopia, like almost all Third World states, has suffered from an increasing level of urban unemployment, it may also have to do with the investment policies and technology choice of the revolutionary government. As noted earlier, the role of private investment was severely limited by the economic policy of the state, while the state never developed the capacity to fill the shortfall either, both of which contributed to the increasing problem of urban unemployment in the country. The sparse investment that was made by the state also focused on heavy and relatively technology-intensive industries that could contribute very little to employment creation. This was one contributing factor to the increase in open unemployment.

Table 3.10 shows trends in annual household income (in real terms) for selected urban areas of Ethiopia obtained from two separate household surveys. In spite of the difficulties posed by cross-survey comparison of income data with varying sampling

Figure 3.4: Unemployment rate among males aged 15-34 years, Addis Ababa, 1978-1994



methodology and data collection procedures, the figures clearly show that the real income of households in most urban centres declined in the period between 1978 and 1994. The declines were over 30 per cent in the two urban centres in the northern parts of the country, a traditionally drought-prone area; the only area where a modest increase was observed was Awassa, an urban centre in the south where Ethiopia's major export item, coffee, is produced. In Addis Ababa, households on average experienced a decline of some 5 per cent: they were no better off in the 1990s than in the late 1970s.

Table 3.10: Average annual household income (in real terms), Urban Ethiopia, 1978 - 1994

Urban centre	Annual Household Income (in real terms) [a]		% change 1978-94
	1978	1994	
Addis Ababa	934	888	-4.9
Awassa	618	752	+21.7
Bahir Dar	601	576	-4.2
Dessie	599	405	-32.3
Dire Dawa	853	738	-13.5
Jimma	639	606	-5.2
Mekelle	807	553	-31.5

Sources and note: [a] All values are computed by author using for 1978, for all urban centres except Addis Ababa, the data on income from CSO, 1980: 318-326; for Addis Ababa 1978, the data from CSO, 1977b: 14 and for 1994, using the data from Bigsten and Makonnen, 1996: 203-214. The information used for converting the reported nominal income for 1978 and 1994 into their real equivalent was the general retail price index for Addis Ababa for the respective years and was obtained from CSA, 1996b: 6.

Interestingly, alongside these economic trends, the proportion of households in Addis Ababa owning some selected household items has increased consistently. For instance, the proportion of households with a television set increased from about 8 per cent in 1976 to 18 in 1984 and to 22 in 1990 (CSO, 1977b: 16; OPHCC, 1987: 315; CSA, 1993: 72). By 1994, well over one in five households were reported as having a television set (OPHCC, 1995: 207). Moreover, these increases have occurred despite heavy import duties imposed on such items that were regarded by the then socialist government as 'luxury' items, adding substantially to their cost.

3.9. Concluding remarks

The overall picture that emerges from a review of the demographic, political, economic and social life in Addis Ababa is multifaceted. Significant changes have been recorded in areas such as schooling, health and labour force participation and status of women. Some of the principal changes with respect to education include a significant rise in the proportion of men and women who are literate, a progressive decline in sex differentials in educational opportunities and an attainment of universal education at primary level.

There has also been a parallel increase in labour force participation of women. For instance, in 1978 only one third of women aged 30-34 were either employed in economically gainful activity or actively seeking one. By 1984, this proportion increased to almost 40 per cent and by 1994 to 60 per cent. This increase reflects the combined effect of rising employment opportunities for females and the changes in their employment seeking behaviour, both of which are in turn linked to the increase in educational and overall status of women in the society. Both the increase in labour force participation of women and the changes in their educational and overall status were part of the all round institutional change in the society, the source and cause of which can be traced to the 1974 social revolution in Ethiopia.

The revolution, among other things, brought with it changes in the existing social order and administrative arrangement of the society. Following the revolution, the urban and rural parts of Ethiopia were organised into neighbourhood associations. These revolutionary institutions and the gender- and age-based associations created within them have been important features of social life in Addis Ababa.

The study area and the country at large also appear to be somehow distinctive in their social and familial traits which might have implications for the study of reproductive pattern in the area. The dominant family type is one of a nuclear structure that places less emphasis on the extended family network. As was seen in the review, this cultural arrangement was not necessarily a product of urbanisation nor of 'Westernisation' as propagated by some scholars, particularly in the case of sub-

Saharan Africa (Caldwell, 1980), but of an aspect of the cultural tradition of the Amhara, a culturally and demographically dominant group in Ethiopia. These cultural traits and the non-colonial political history of the country contrasts with that of the situation in other sub-Saharan African countries or even perhaps most other developing societies.

An equally notable characteristic of the study area was the low level of economic well-being of the population. During the period under investigation, not only have income levels in Addis Ababa fallen in real terms but also, as recently as 1994 as many as 44 per cent of the city's population were living 'below poverty line' (Tadesse, 1996: 224). The city also has a severe housing problem and a high rate of unemployment. In the area of health, although there has been notable improvement in the past three decades, with the infant mortality rate declining from well over 150 per thousand in 1967 to below 80 in 1995, the rate recorded in recent years, 77 per thousand, remains high even by sub-Saharan African standards let alone those of countries with a similar fertility level as Addis Ababa's. Similarly, despite the increasing expansion of family planning services in Ethiopia in recent years, the country's program effort remains among the weakest in the world.

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Chapter 4

THE STATUS OF THE FERTILITY TRANSITION:
A demographic accounting of past trends and recent levels

The nature and quality of the various sources of data to be used in this thesis have been examined in some detail in Chapter 2. In this chapter the fertility segment of these data is put under further investigation to obtain estimates of past trends and current levels of fertility that will permit a reasonable verdict on the pattern, timing and magnitude of fertility change in the study population.

Several demographic techniques were used in the analysis. P/F ratios (Brass *et al.*, 1968; Cleland *et al.*, 1991) were used as an evaluative tool. The 'own-children' technique (Cho *et al.*, 1986) was applied to the 1984 and 1994 Censuses and the household schedules of the two fertility surveys, the 1990 NFFS and 1995 AFS, to generate alternative estimates of period fertility for years before the respective enumeration periods. Total and age-specific period rates were also estimated from alternative types of data: status and duration of pregnancy, and dates of last and penultimate live births, available from the partial birth histories collected in the 1995 AFS. To further assess internal consistency as well as to understand the nature of change, patterns of deliberate fertility control were analyzed using censored parity progression ratios (Rodríguez and Hobcraft, 1980; Brass and Juarez, 1983). This procedure has the advantage of being unaffected by errors in the time location of births (Cohen, 1993: 43; Brass, Juarez and Scott, 1995: 13-14), thus providing an added opportunity for ascertaining data consistency.

The chapter is organized in six sections. Aimed at providing a benchmark for subsequent investigations, an overview of reported rates obtained from the various censuses and sample surveys is discussed following this introductory section. This is then followed by a closer analysis of trends in cohort and period rates as well as a discussion of patterns of fertility change in the next three sections. The age structure of fertility, an important dimension of fertility change, is also discussed in the last part of the section (i.e. Section 4.4). Section 4.5 examines fertility intentions and family size preference in the capital city, while the last section (Section 4.6) of the chapter, mainly by way of synthesis, presents some concluding remarks on the status of fertility transition in Addis Ababa.

4.1 Trends in reported fertility and P/F ratio analysis

Table 4.1 shows total and age-specific fertility rates obtained from information on births in the year prior to enumeration gathered in the censuses of 1984 and 1994, the Addis Ababa Fertility Survey of 1995 and the Demographic Sample Survey of 1978. Also presented in the table are comparable measures derived from information on year of birth collected in the birth history data of the 1990 NFFS.

Table 4.1: Reported total and age-specific fertility rates, Addis Ababa, 1978 - 1995

Age Group	**Age-specific and total fertility: 1978- 1995 ***					
	1978 Survey [a]	1984 Census [b]	1990 NFFS [c]	1994 Census [d]	1995 AFS [e]	% Decline 1978 to 1995
15-19	.0546	.0225	.0172	.0135	.0110	80
20-24	.1847	.1041	.1239	.0575	.0496	73
25-29	.2038	.1757	.1692	.1065	.1227	40
30-34	.1320	.1391	.0760	.0848	.0830	37
35-39	.1001	.1193	.0724	.0615	.0817	18
40-44	.0427	.0538	.0560	.0254	.0000	41 **
45-49	.0436	.0315	.0073	.0098	.0000	78 **
TFR	3.81	3.23	2.61	1.80	1.74	54

Notes: * The distributions of births by age presented in the table are adjusted to make them correspond to conventional age intervals (See United Nations, 1983: 32 - 34). ** Represents % decline between 1978 and 1994.
Sources: [a] Central Statistical Office, 1979: 55 - 58; [b] Office of the Population and Housing Census Commission, 1987: 185; [c] Central Statistical Authority, 1993: 117; [d] Office of the Population and Housing Census Commission, 1995: 163; [e] Central Statistical Authority, 1997: 45.

Results from these sources show a consistent trend, whereby total fertility which was about four in the late 1970s declined to about three in the first half of the 1980s, to 2.6 in 1990, 1.8 in 1994 and 1.7 in 1995. Taken at face value, the trend from the reported data suggests a fall in the total fertility rate of about 15 per cent between 1978 and 1984, 19 per cent between 1984 and 1990 and a further 30 per cent in the first half of the 1990s. Overall, these changes represent a cumulated decline of about two children per woman and a drop in total fertility of 54 per cent in a span of about two decades. While all age groups are affected, the maximum decline has occurred among women in the youngest and oldest age groups. In these age groups, rates in the 1990s were as

much as 80 per cent below the 1970s level. Probably as a reflection of the increasing postponement of marriage well into the late 20s observed in the area (see Section 5.1) and early termination of childbearing, the smallest age-specific fertility decline during this period was recorded among women 30-34 and 35-39 years old.

The classical P/F ratio method of comparing life time cohort fertility (P) with cumulated current fertility (*F*), proposed by William Brass (Brass *et al.*, 1968), under certain assumptions, provides a simple but powerful rule that helps to distinguish a genuine fertility decline from trends arising from reporting errors. Accordingly, in a constant fertility situation and where births in the past year have been reported accurately, the ratios of cohort mean parity (P) to its period equivalent (F) are generally expected to follow a pattern that is fairly constant and close to unity for all ages. In contrast, a classical sign of fertility decline linked with increasing fertility control by women in the middle and higher reproductive age groups is expected to exhibit a set of P/F ratios that are close to unity at younger age groups and rise steadily with age (Cleland *et al.*, 1991: 8).

Figure 4.1: P/F Ratios by age of women and survey/census date, Addis Ababa, 1978-1995

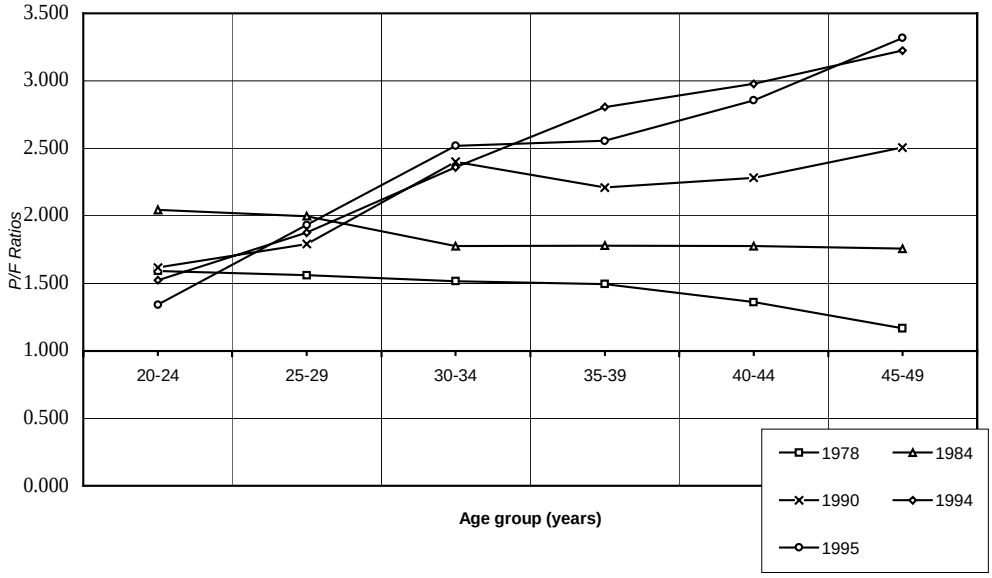


Figure 4.1 plots these ratios by women's age and year of enumeration calculated from all the five sources of data used in Table 4.1. For the four main sets of data, the 1984 and 1994 Census and the fertility surveys of 1990 and 1995, the synthetic mean

parity estimates (F) needed for the calculation of the P/F ratios were obtained directly from the raw data following the procedure proposed by Hobcraft, Goldman and Chidambaran (1982: 293-295). This approach involves cumulating the reported period age-specific fertility by single year of age at enumeration and then weighting the result by the single-years age distribution corresponding to the respective conventional five-year grouping. Results produced by this procedure are expected to provide a better approximation of synthetic cohort parity estimates than those frequently constructed by applying a set of standard multipliers on data on cumulated fertility by five year age groups. The latter approach, mainly because of its dependence on model patterns of fertility, is believed to underestimate fertility, particularly at young ages, causing an upward bias in the P/F ratios (Hobcraft *et al.*, 1982: 293-295).

Figure 4.1 shows invariably high P/F ratios, mostly well above unity, for practically all age groups from all sources of data. Except for 1978 and to some degree the 1984 data sets, which exhibited relatively uniform ratios across most age groups, the values obtained from the data sources tend to increase with age of women. The gradient of these ratios also appears to be steeper for more recent sources. Over most age ranges, particularly 25 years or more, pairwise comparison of these ratios by age for different periods also reflects a consistent increase in the ratios with time. This pattern is most evident from the upward shift of the graphs for the different data sets that fairly corresponds with the sequence of the year of enumeration to which the sources belong. Within this general pattern, a widening gap in the range for corresponding ages is also evident from these data, as both time and age advance. The highest range in P/F ratios was observed for women in the most advanced ages, while the lowest was among the youngest age group.

Several features of these ratios are suggestive of a substantial fertility decline. With ratios that are markedly over unity and which increase progressively with age, the results for 1990, 1994 and 1995 clearly exhibit patterns of ratios that are often observed in conditions of fertility decline. The general regularity of these ratios with time and the evidence of higher ratios from more recent sources observed over most age groups (but most markedly over the age of 25) can indeed be viewed as strong indications of fertility change that seems to have intensified with time. The pattern of

ratios observed in 1978 and 1984, which exhibit values that are well over unity but fairly constant across most age groups, are also compatible with a time-period driven fertility decline affecting all age groups uniformly.

The periods around 1977-78 and 1983-84 to which the information on births in the last year from the two earliest data sources refer were both politically and economically the most unstable and insecure periods in Addis Ababa. 1977-78 was the time when the government launched what was termed by the regime itself as the *Red Terror* campaign, involving street executions and mass detentions of individuals suspected of being members or sympathisers of political organisations opposed to the system. Apart from the human cost of the terror, which by some accounts claimed up to 10,000 lives in the city and disrupted many more family lives, the period 1977-78 was thus an emotionally disturbing time for the residents of the city (Halliday and Molyneux, 1981: 123; Keller, 1988: 200; Human Rights Watch, 1991: 101-111). With drought and famine in most parts of the country, the period 1983-84 was, on the other hand, the time when Ethiopia's economic crisis was at its peak, and the effect of this crisis on the city life was reflected in high food prices. As the shock wave created by these period-specific events cut across all groups, the constant P/F ratios for all ages observed from the plots for these two periods are thus more likely to be reflections of the society's demographic response to these events.

However, patterns of P/F ratios such as those shown in Figure 4.1 while consonant with a genuine fertility change, may also represent a situation suggestive of inconsistency in the fertility data. Given the evidence that the data on lifetime fertility is relatively free of errors, as demonstrated in Chapter 2, the P/F ratios presented in the figure thus suggest a high degree of reference-period error or omission of births in all the data sets, with omission of births increasing from the earliest to the most recent source. However, seen against many of the conditions pertaining to data collection that prevailed at the time and are elaborated below, this explanation appears unrealistic. Moreover such a reading of the ratios is not consistent with the general expectation of higher-quality data for more recent than for earlier periods.

To start with, the data collection in Addis Ababa has, in most instances, been administered by relatively well educated interviewers (most if not all having at least 12 years of education), has had high standards of supervision and, almost always, also has received closer follow-up from the headquarters (CSA, 1993; Hassen and Strong, 1997). On some occasions, such as the 1995 AFS, the data collection agency, motivated to collect the very best data, exclusively used its own staff members as enumerators, while senior demographers and statisticians from the same office served as field editors (CSA, 1997).

Equally relevant to good data is the degree to which respondents could accurately report the timing as well as the total number of events of interest to the study. This depends on a number of factors, such as the general educational level of the population, the existence or lack of 'cultural resources' that favour event-reckoning practices in the society, and the degree to which periods of enumeration coincide with widely shared and easily remembered events of significance to the study population. For example, three of the five sources of data used in the present analysis, the 1978 Demographic Survey, the 1994 Census and the 1995 AFS, were conducted during a time that coincided with one of the country's most significant secular and cultural festivals, the Ethiopian New Year. Socially accompanied by cultural celebrations and marking the beginning of the year in all walks of life, the New Year, even for the most time-indifferent individual, is an easily recognisable reference date. It is, therefore, reasonable to expect these data sets to suffer very little, if at all, from reference- period error in the reporting of births in the previous year. Moreover, the most recent of these data, the 1995 AFS, was conducted exactly a year after the 1994 National Census, which had enjoyed broad and intensive publicity. Thus, one would, in this case, also expect such time-agreement between the two enumerations, to minimise further possible reference- period error in the later survey by making it fairly easy for respondents to distinguish the births which had occurred after and before the census. For the other two data sets, the 1984 Census and the 1990 NFFS, where data collection was carried out immediately before the beginning of Ethiopia's main rainy season in June, their timing no doubt also made recollection of the reference period relatively easy.

Moreover, there is also a custom of reckoning dates of events of importance, such as births or deaths or even times of 'misfortunes' and 'fortunes', with reference to some religious-event calendar (saint's day), particularly among Orthodox Christians (Coptic), who, as shown in the previous chapter, make up about 85 per cent of the city's population and for whom most days in each month are assigned to distinct spiritual figures or saints. For this reason too, chances for the current fertility data to suffer from reference period error on a significant scale should be small. In fact, consistent with this cultural practice, as observed in both the 1990 and 1995 surveys, more respondents in the study area supplied, both for themselves and their children, more complete information on month of birth than year of birth.

With regard to literacy status, the other essential element for good demographic data, the study community also had a fairly favourable educational composition. As shown in the previous chapter, about 40 per cent of the female population in 1978 and some 77 per cent in 1984 had at least primary education. During the period under examination, the proportion of women in the city with secondary or higher education also increased steadily: from 14 per cent in 1967 to 24 in 1978, 26 in 1984 and 43 per cent in 1995. In view of this moderately high level of female education and the better organisational resources, both at institutional and community levels, prevailing in the area, the observed high P/F ratios are more likely to be indications of a genuine fertility decline than reflections of error in the period fertility data.

The effects of migration on the observed P/F ratios deserve some mention, as migration generally facilitates the 'importation' of average parities that are not typical of the area and thus tend to distort the pattern of P/F ratios observed in the population in question (United Nations, 1983: 29). The magnitude and direction of the distortion arising from this depends on the nature of the 'imported' parities compared with those of the host population. In the present case, one would expect migrants to bring with them above average fertility compared to Addis Ababa's, so at any point of comparison the average parity data for the city, particularly for age groups heavily influenced by migration, would be higher than they would have been without the influx of migrants. The result is likely to be P/F ratios on the high side even when the basic assumptions of the P/F ratio are met. Such a problem, of course arises from the timeless nature of the

data on average parity (i.e. the data do not refer to a specific period in time) and the fact that the two measures, lifetime fertility data (P) and the synthetic equivalent (F), at the time of comparison do not refer to the same universe. One way of avoiding this problem is to tabulate the input data on children ever-born and births last year for migrants and non-migrants separately.

Table 4.2. P/F ratios by migration status, Addis Ababa, 1984-1995

Year of enumeration	P/F Ratios					
	20-24	25-29	30-34	35-39	40-44	45-49
PANEL A: Non-migrant						
1984	2.17	2.10	1.78	1.76	1.75	1.94
1990	1.65	1.78	2.36	2.37	2.41	2.67
1994	1.43	1.93	2.43	2.86	3.14	3.33
1995	0.93	2.01	2.49	2.53	3.10	3.49
PANEL B: Urban migrants						
1984	1.98	1.96	1.74	1.70	1.73	1.71
1990	1.57	1.93	2.26	1.90	2.01	2.41
1994	1.78	1.67	2.20	2.79	2.84	3.21
1995	1.04	1.71	2.27	2.36	2.86	3.30
PANEL C: Rural migrants						
1984	1.94	1.81	1.76	1.84	1.82	1.67
1990	1.59	1.76	2.47	2.15	2.23	2.39
1994	1.97	1.55	2.31	2.67	2.93	3.16
1995	2.91	2.57	2.61	2.71	2.81	3.21

Source: Computed by author from the computer record of the data sets.

Table 4.2 presents ratios of lifetime to synthetic cohort parities for three categories of migration status in the city: non-migrant, urban migrant and rural migrant. The synthetic parity equivalent estimates required for the computation of the P/F ratios have been calculated in the same way as before, following Hobcraft *et al.*'s (1982: 293-295) procedure. Results presented for non-migrant women generally exhibit a rising trend of ratios with age, indicating a consistent and substantial fertility decline among this group. A similar pattern of ratios is also evident for women who migrated from other urban areas. However, for these women, particularly for the earlier data sets years, patterns of rising ratios appear only after age 30. The data for rural

migrants, on the other hand, show the trend of rising P/F ratio exhibited by the other groups only in the two most recent data sources. For these women, in the other two data sets, the ratios reflect relatively constant patterns across all age groups, with a tendency toward lower ratios for older age groups in the 1984 data. However, as in the aggregate data, the ratios for all age groups in all migration categories remain well above unity. This may imply that although the P/F ratios presented earlier could have been potentially distorted by migratory movements, given that the same ratios calculated by migration status are large and, particularly for recent years, show a rise with age, confirm that the decline in fertility depicted by these ratios earlier is likely to be genuine.

Table 4.3: P/F ratios from the birth history data, Addis Ababa, 1990 NFFS

	Calendar period						
	1985-89	1980-84	1975-79	1970-74	1965-69	1960-64	1955-59
PANEL A: Obtained from all women and all births							
15-19	1.03	1.04	1.01	1.00	0.96	1.02	1.02
20-24	1.32	1.23	0.99	0.88	1.06	1.00	
25-29	1.69	1.26	0.85	0.95	1.04		
30-34	1.87	1.08	0.87	0.98			
35-39	1.67	1.08	0.87				
40-44	1.72	1.12					
45-49	1.82						
PANEL B: Obtained from lifetime city births							
15-19	1.00	1.18	1.03	1.02	0.94	0.98	1.07
20-24	1.26	1.30	0.97	0.91	1.06	1.01	
25-29	1.63	1.34	0.81	1.01	1.07		
30-34	1.93	1.09	0.88	1.07			
35-39	1.66	1.15	0.88				
40-44	1.78	1.18					
45-49	1.89						

Source: Computed by author from the computer record of the 1990 National Family and Fertility Survey

Birth history data also permit the comparison of historical and current fertility in the same way as has been done for the single-period enumeration data (Hobcraft *et al.*, 1982). Panel A of Table 4.3 shows the P/F ratios calculated on the basis of such data

collected in the 1990 NFFS. A general point to note in the interpretation of results of birth-history data for a subnational population, as in the present case, is that, being a record of a woman's lifetime fertility experience, the information collected in this way for some women may include events that occurred outside the area of interest; thus results from such data may not reflect actual trends of fertility in the area under study. However, if detailed information on the residence history of respondents is available, the analysis can be restricted to those births that took place in the city, considering only the exact person-years contributed by each woman in the area of current residence. For comparative purposes, results of this approach are produced in Panel B, Table 4.3. where results for all women and all births are presented. It may be pointed out that although in strict sense results for sub-national birth history data should be analysed following this strategy, the author is not aware of any such previous attempt.

For the periods before 1974, particularly for results in panel B, all ratios exhibit values that are fairly close to unity, implying constant fertility and no appreciable distortions in the data. The results for the period 1975-79, on the other hand, show values that are below unity. Given the fairly accurate reporting of data for the previous period, the most plausible explanation for such a pattern of ratios is an increase in the fertility rate during the period. In fact, 1974 being the year the Ethiopian revolution took place, the observed increase in fertility may not be entirely inconsistent with the socio-economic and political developments that prevailed at the time. As already alluded to in the previous chapter, following the fundamental political transformation in Ethiopia, the revolutionary government instituted a number of economic policies, mainly dealing with distributional aspects of resources, which might indirectly had a positive effect on reproductive behaviour. Measures of this kind were the nationalisation of rented houses and the substantial reduction in rents, in most cases up to 50 per cent of the previous level, in urban areas of Ethiopia. The change was particularly important since 70 per cent of the city residents at the time were living in rented premises (Markakis and Ayele, 1978: 141). These changes were accompanied by institutionalisation of a highly subsidised rationing system of distribution of household requirements in urban and rural areas (Clapham, 1988:141-147; Keller, 1988: 218; Harbeson, 1988: 136-139; Tiruneh, 1993: 112-118). Linked to the rationing was also the distribution of these goods on the basis of household size. These changes could have

caused a temporary rise in the disposable income of households, and were likely to bring with them an indirect subsidy to households in their costs of childbearing. The income and price effects linked with these changes, and the perception of a better future associated with the fundamental nature of the political change brought about by the revolution, were probably responsible for the brief but substantial fertility increase reflected in the low P/F ratios observed during the early years of the revolution.

This trend of increasing fertility in the subsequent years was overtaken by a rapid and significant fertility decline as shown by the P/F ratios for 1980s in Table 4.3. The ratios for 1985-89 and to some degree, particularly after age 30, for the period 1980-84, exhibit an increasing trend by age of women, a pattern known to be an indication of falling fertility. From this and similar evidence presented earlier, it may be concluded that the picture of a declining fertility trend, reflected through the high P/F ratios in these data sets, is genuine. Again, going by the patterns of these ratios, major fertility declines in the city appear to have occurred at all ages, but for recent years the decline was particularly large for older women. This suggests that while part of the transition in the early period could be time-period driven, the changes in the later years are increasingly associated with parity-dependent fertility control behaviour. Further evidence on these issues are presented in Section 4.4.

4.2 Estimates of period fertility from alternative sources

To consolidate further the evidence of fertility decline noted in the previous section, estimates of fertility were reconstructed from a range of other data at hand. One such data type is information on date of the last and penultimate live births, asked in the form of partial birth history in the 1995 AFS. From this information it is possible to obtain an estimate of the number of live births in the years before the interview and to relate these to the number of women in the various age groups at the time of interview. However, because the data show only a partial history of a woman's fertility experience, when one goes further back into the past the estimated number of births from the last two children is likely to miss lower-order births, which may constitute the majority of the births in those periods. For this reason, the estimates derived from this information are limited to the two- year period before the survey, 1994 and 1995.

Restriction of the analysis to the most recent period has the added advantage of rendering the estimates more reliable, because the events have occurred as recently as within the last two years, and in this instance, the chances of mothers remembering the dates of their two most recent live births are considered to be high. In fact, a check of the reported single months before date of interview for these births showed no tendency towards heaping of events in any particular month nor on either side of the 12 and 24 months before the survey. Estimates of total and age-specific fertility rates generated from these data are shown in columns IV and VII in Table 4.4. As with all other sets of estimates obtained from tabulations by mother's age at survey, rather than age at childbirth, the fertility rates calculated here for 1994 and 1995 also refer to age groups that are approximately six months younger on average.

In addition, the respondents in the 1995 Survey were asked about their pregnancy status and its duration where appropriate. Again these responses can be related to the numbers of women in the various age groups to obtain estimates of both the level and age pattern of current fertility for the period immediately following the survey (Chowdhury, 1977; Sinquefield, 1978; Hobcraft, 1980; Goldman and Westoff, 1980). Thus, the estimates calculated from this procedure represent fertility in a more recent period than any of the other estimates for the area under study. However, there are two potential drawbacks to be considered before using information on current pregnancy for estimating age-specific and total fertility rates: the incidence of foetal loss, and the underreporting resulting from genuine uncertainty and concealment (Goldman and Westoff, 1980: 537; Hobcraft, 1980: 15). These two factors operate in opposite directions: foetal loss, if unaccounted, produces generally a higher fertility estimate than otherwise, while concealment leads to an underestimate of the true level; in the end they offset each other to some extent. However, it is recommended that one uses an optimum combination of the data for which the two problems are anticipated to be at a minimum. Goldman and Westoff (1980:537) propose the use of duration five to seven months for three reasons. First, it is far enough advanced to remove most uncertainty about the fact of pregnancy. Secondly, it makes concealment because of embarrassment or for other reasons more difficult. Thirdly, the period is beyond the stage of most foetal mortality. Taking account of these points, the total number of live births for the year can then be obtained simply by multiplying the number of women in

that duration by four (to make it a full year's exposure), while the age pattern is determined from the reported pregnancies of all durations (Goldman and Westoff, 1980:537). Estimates of total and age-specific fertility generated from the 1995 AFS data, following this procedure, are shown in column VIII in Table 4.4.

Period fertility rates were also constructed from the household data using the 'own-children' fertility estimation procedure (see the technical note in Annexe I for details). Age-specific and total fertility estimates generated using this technique for the years 1994 and 1995 are provided in columns I, II, III, V and VI in Table 4.4 . It may be noted that the estimates calculated from the 1995 AFS were presented for two different matching procedures: the RHH-type and the MPN-type matching. As indicated in Chapter 2, this was facilitated by the existence of additional information on Mother's Personal Line Number (MPN) in the 1995 Survey. As Table 4.4 (see cols. II, III, V and VI) and Figure 4.1A in Annexe I indicate, there is a remarkable closeness between the estimates generated alternatively from RHH and MPN types of matching. This observation is consistent with findings reported for other societies (Cho *et al.*, 1986: 44) where matching procedure is also observed to have little significance on the final results of the 'own-children' method.

The correspondence between the estimates derived from current pregnancy status data and those based on the age structure of already born children is also particularly worth noting as the two estimates are believed to suffer from different types of errors. The other equally interesting correspondence in Table 4.4 is between the various estimates generated from the 1994 Census and 1995 AFS and that obtained from alternative data collected by the London-based Marie Stopes International project office in Ethiopia. The Marie Stopes survey, which was conducted on a sample of *Kebelles* in Addis Ababa, produced, as shown in the penultimate column of Table 4.4, a fertility level of around 1.8 children per woman, a level almost identical with those obtained from the other data sets. Given the high degree of consistency, in both level and structure, between the estimates obtained from the various sources, it can therefore be concluded with some assurance that fertility in Addis Ababa in the first half of the 1990s was below replacement level.

As a further attempt to establish trends in fertility in the city before the mid-1990s, summary results from the own-children procedure and birth history data from the 1990 NFFS are presented in Table 4.5. As both estimates involve reconstruction of the fertility experience of women on the basis of information on lifetime fertility, the nature of these data poses some theoretical as well as practical difficulties when used for the estimation of long-term trends in a highly migration-affected area, such as a city. This is because in the case of birth history data for some women the information may include events that occurred outside the area of interest. Similarly, since not all children enumerated in a given period were born in the study area and that the fertility level in Addis Ababa is the lowest in the country, the construction of fertility estimates using the 'own-children' procedure from such data tends to produce an overestimate of past fertility levels. In the same way, not all women enumerated in the respective data sources constitute the mid-year population of the years before enumeration. Although the two effects operate in the opposite direction, the further back one goes, the more the estimates reflect non-urban fertility, because the women were living elsewhere. However, if detailed information on the residence history of respondents is available, this can be overcome by restricting the analysis to births that took place in the city and considering only exact person-years contributed by each woman in the area of current residence (see Annexe I for details). Although from a theoretical point of view the 'own-children' procedure places no restriction on the incorporation of migration in this dynamic sense, I am not aware of any previous attempt and, in this sense, the effort in the present study stands alone. Because of notable differences in the migration-adjusted and unadjusted estimates, as shown in Table 4.1A in Annexe I, the results shown in Columns I, III and IV in Table 4.5 were calculated only for the 1984 and 1994 Censuses, for which the relevant data required for adjustment were available. However

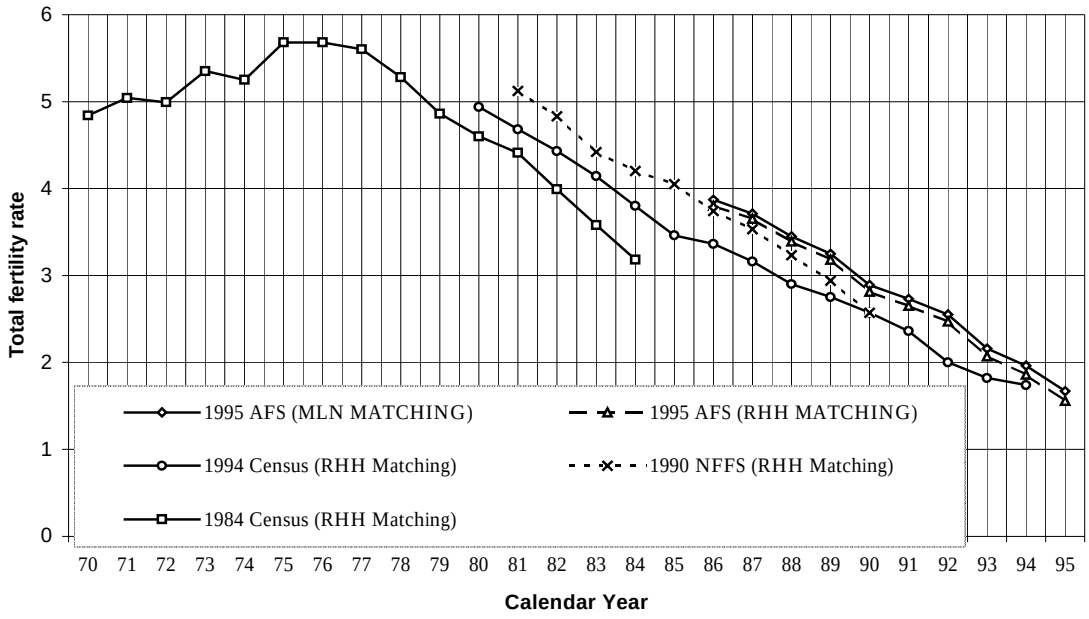
Table 4.4: Trends in total and age-specific fertility rates from alternative techniques of fertility estimation and sources of data, Addis Ababa, 1994 and 1995

Age Group	Year 1994				Year 1995				
	Own-children estimates			Year of birth 1995 AFS	Own-children estimates		Year of birth 1995 AFS	Pregnancy status 1995 AFS	Independent Source [a]
	RHH 1994 Census	RHH 1995 AFS	MPN 1995 AFS		RHH 1995 AFS	MPN 1995 AFS			
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**
15-19	0.011	0.014	0.010	0.015	0.007	0.007	0.009	0.046	0.010
20-24	0.053	0.063	0.054	0.063	0.044	0.038	0.043	0.075	0.074
25-29	0.097	0.084	0.084	0.114	0.099	0.102	0.110	0.107	0.094
30-34	0.102	0.125	0.150	0.097	0.112	0.113	0.095	0.063	0.086
35-39	0.064	0.096	0.097	0.077	0.080	0.088	0.091	0.033	0.037
40-44	0.026	0.045	0.000	0.048	0.000	0.000	0.000	0.008	0.054
45-49	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.014
TFR	**1.81**	**1.93**	**1.98**	**2.07**	**1.72**	**1.74**	**1.74**	**1.68**	**1.84**

Source: Results from 1994 Census and 1995 AFS were computed by the author from the computer records of the data sources. a Represents reported period rates calculated from tabulated data on births in the last twelve months obtained from a fertility survey conducted in 1996 in 12 Urban Dwellers' Associations (*Kebelles*) in the city of Addis Ababa by the London based Marie Stopes International project office in Ethiopia (MSI-E, 1997: 25).

to show the overall trend Figure 4.2 plots the single-year estimates obtained from all four sources of data and, in the case of the 1995 survey, for the two types of matching procedure. Note that the estimates for the two surveys were calculated only up to the 10 year period prior to the respective sources; this strategy was adopted to limit the bias associated with migration which, if not controlled, tends to increase as age advances. I also used three-year moving averages, both for the census and survey based estimates, mainly to minimise the year-to-year fluctuation in the single-year estimates arising from possible age mis-reporting of young children (United Nations, 1983: 187; Cho *et. al.*, 1986: 6). In other words, the individual single year estimate for any given year shown in the graph represents an average total fertility value obtained through the three years moving average procedure.

Figure 4.2: Overlapping estimates of total fertility rate from own-children procedure: Addis Ababa, 1970-1995



Note: The total fertility figures for each year represent three-year moving average values.

The existence of similar data on migration status and continuous residence in the individual questionnaire of the 1990 NFFS, permits the calculation of migration-adjusted estimates from the birth history data, which can then be compared with results constructed from the 'own-children' method for comparable periods (see columns II and III in Table 4.5). In computing migration-adjusted rates from the birth

history data, only those births which women have had since moving into the city have been considered. This was made possible by comparing the date of birth of each child with the data on duration of residence of the mother. The latter information was also used to exclude those women who were not living in the city during the period under investigation from the denominator and hence do not constitute the population at risk for the period.

Table 4.5. Estimated total and age-specific fertility rates, Addis Ababa, 1980- 1994 (migration adjusted)

Age group	1980-84	1985-89		1990-94
	From own-children 1984 census (RHH matching)	From Birth history 1990 NFFS	From own-children 1994 census (RHH matching)	From own-children 1994 census (RHH matching)
	(I)	**(II)**	**(III)**	**(VI)**
15-19	.031	.060	.033	.015
20-24	.132	.077	.122	.063
25-29	.179	.123	.160	.119
30-34	.183	.168	.161	.109
35-39	.118	.112	.111	.074
40-44	.062	.082	.056	.034
45-49	.033	.031	.021	.014
TFR	3.69	2.99	3.32	2.14

Source: Computed by Author from the computer record of respective sources.

Once again, the data in Table 4.5 and Figure 4.2 reveal consistency both between the different data sources and with the trends shown in Table 4.1. Figure 4.2 shows a slight increase in total fertility to the mid-1970s followed by a consistent decline thereafter. In periods for which estimates overlap, the total fertility rates display a reasonable degree of consistency. Along with the summary results shown in Table 4.5, these estimates suggest a consistent decline in fertility from more than five children per woman in the mid 1970s to about two children per woman in the first half of the 1990s. These changes represent a fall in overall fertility of about 12-19 per cent between the period 1980-84 and 1985-89 and 27-33 per cent between 1985-89 and 1990-94. Interestingly, these estimates also fit quite well with earlier results, and support

the conclusion that the fertility level in Addis Ababa in the early 1990s was near, if not below replacement.

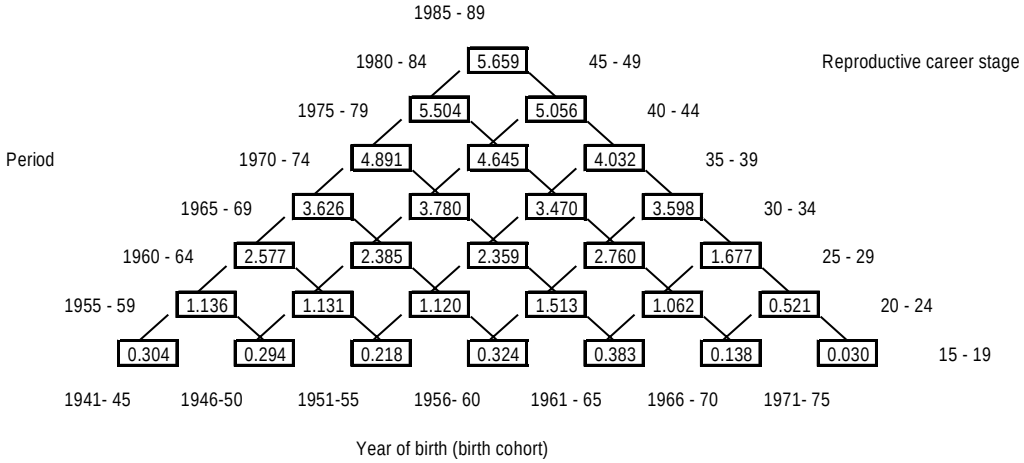
4.3. Trends in cohort fertility

Because they are synthetic cohort measures, movements in period rates reflect changes in starting, spacing and stopping behaviour of women of varying reproductive experiences. Thus, to assess the extent to which the changes reflected in the period rates relate to changes in the reproductive behaviour of individual cohorts, measures of cohort fertility are further explored in this section. Figure 4.3 exhibits a fertility pyramid showing the experience of a group of actual cohorts at different stages of their reproductive career and year of observation, derived from the birth-history data collected in the 1990 NFFS. When these values are examined from the bottom towards the left side of the pyramid diagonally, the figures are like those one would observe from a single-round inquiry: they represent mean parities of different cohorts of women (of course, each at a different stage of their reproductive careers) in a specified period of observation. Similarly, a view of the values diagonally from the bottom towards the right shows mean parities of an actual cohort at different reproductive career stages. A horizontal comparison shows the fertility experience of different cohorts at the same reproductive stage. The pyramid, therefore, presents three important demographic dimensions: birth cohort, aggregated in groups of five calendar years; period of observation, also measured in groups of five calendar years; and reproductive career stage, represented by conventional five-year age groups. Once again, the values in the pyramid are obtained after the necessary adjustment for migration has been made.

It is seen that cohort fertility remained fairly stable to 1970-74, increased during the period 1970-74 to 1975-79, and declined thereafter. Mean parities attained at age 35-39 fell from 4.9 children per woman for the cohort who attained that age in 1975-79, to 4.0 for those who attained the same age ten years later. Similarly, at age 25-29, cohort fertility fell from 2.4 in 1975-79 to 1.7 in 1985-89; and at age 20-24, mean parity declined from 1.5 births per woman in 1975-79 to 0.5 ten years later. This cohort fertility decline is consistent with the decline shown by reported period fertility and the 'own-children' estimates. The increase in fertility observed for the period 1970-74

to 1975-79 is also consistent with the modest rise in the mid-1970s shown by the 'own-children' estimates (see Figure 4.2).

Figure 4.3*:* Cohort fertility per woman, Addis Ababa, 1990 NFFS



The foregoing analysis thus points to a high degree of consistency in the fertility estimates obtained from different data sources. While this may not decisively prove the absence of data-related errors, it strongly suggests that even allowing for the possibility of slight underreporting of births, the declining trend, in both cohort and period fertility, to lower rates is broadly accurate. In the following section I extend the analysis further and explore trends in parity-dependent fertility performance, using a procedure that is more sensitive to changes in fertility than conventional measures and more robust to instabilities and time location errors which are of concern for data from developing societies. The analysis, therefore not only serves as a consistency check but also helps in mapping changes in family building strategies in Addis Ababa.

4.4. Trends in censored parity progression ratios

Many procedures have been devised to study family building strategies and trends in parity-dependent fertility control across both cohorts and time-periods. The best known approach is through the calculation of parity progression ratios (PPR) (Ryder,

1982; Feeney and Yu, 1987). These ratios represent the proportion of women in a cohort with *n* births who go on to have *n+1* births, hence they contain a history of the family formation process of that particular cohort (Brass, 1985; Aoun and Airey, 1988; Cohen, 1993).

The parity progression ratios possess several useful advantages over conventional measures: they are less affected by errors in the time location of births (Brass *et al.*, 1995: 13-14; Cohen, 1993: 43); they are less influenced by the transient effects of alterations in mating patterns (Collumbien, Timaeus and Acharya 1997: 10; Brass *et al.*, 1995:1); and still less affected by changes in other proximate determinants, such as birth intervals or sterility (Brass, 1996: 459). These strengths make PPRs helpful tools for detecting changes in family size resulting from the adoption of family limitation (Brass *et al.*, 1995: 1).

The parity progression ratios (PPRs) in principle can be calculated for women in both younger and older age groups, but the problem of truncation by the dates of interview in the younger group prevents direct cross-sectional comparison of these measures between women in different age groups. On the other hand, although the measures for older women beyond reproductive age contain a complete history of their reproductive achievements, the fact that their fertility experience refers to some time in the past makes them less useful for studying recent changes in the process of family formation in a given population (Brass, 1996: 460).

The approach, therefore, has been extended to cohorts of incomplete fertility, which are normally found in cross-sectional surveys, by the calculation of surrogate measures of parity progression, which are known as censored parity progression ratios (CPPR) (Rodríguez and Hobcraft, 1980: 12-13). The incomplete nature of the birth histories from cross-sectional data, however, introduces two types of biases, namely selectivity and censoring. Such bias, particularly that of censoring, can be solved by applying a life table form of analysis to births of each order (Rodríguez and Hobcraft, 1980: 12-14). The procedure involves computation of life table transitions from an n^{th} to an $(n+1)^{th}$ birth during a fixed period of time. Rodríguez and Hobcraft (1980: 12) propose B_{60}, the proportion of women who had a birth within five years of the reference

event, as the most convenient indicator, as most births occur within five years of the previous birth.

However, the procedure proposed by Rodríguez and Hobcraft (1980) is appreciably biased at any birth order because of differentials in speed of reproduction (Brass and Juarez, 1983). In order to eliminate this selectivity bias Brass and Juarez (1983) propose a simple adjustment procedure to make comparisons between the B_{60} values for pairs of successive age groups, with the reports of births in the last five years removed from the older age group (see Brass and Juarez, 1983 for details). These adjusted B_{60} values calculated from the 1990 NFFFS data for Addis Ababa are presented in Table 4.6.

Table 4.6: Censored parity progression ratios by age and time period, Addis Ababa, 1990 NFFS

PANEL A: Progression ratios by age

Age at survey	Progression from parity I to i+1						
	1-2	2-3	3-4	4-5	5-6	6-7	7-8
15-19	.3683						
20-24	.5468	.5379	.3465				
25-29	.7307	.6029	.5754	.5478			
30-34	.7957	.7900	.7154	.6293	.5455	.3740	
35-39	.7952	.7540	.7878	.7018	.6823	.5772	.4399
40-44	.7440	.8108	.7372	.6983	.6930	.6990	.5724
45-49	.7500	.7750	.7973	.8030	.7705	.7241	.7179

PANEL B: Progression ratios by time period

	Years preceding survey						
	0	% ($_0\Delta_{15}$)	5	% ($_5\Delta_{15}$)	10	% ($_{10}\Delta_{15}$)	15
1-2	.5468	-45.4	.7307	-8.8	.7957	0.1	.7952
2-3	.5611	-39.4	.6964	-12.3	.7720	-1.3	.7824
3-4	.5754	-28.1	.7154	-3.1	.7878	6.4	.7372
4-5	.5605	-33.9	.6655	-12.8	.7001	-7.2	.7507
5-6	.5455	-41.2	.6823	-12.9	.6930	-11.0	.7705
6-7	.4927	-44.4 [b]	.6381	-11.5 [a]	.7116		
7-8	.4399	-63.2 [b]	.5724	-25.4 [a]	.7179		

Notes: The symbol denotes change; [a] refers to % ($_5\Delta_{10}$) ; [b] refers to % ($_0\Delta_{10}$).
Source: Computed by author from the 1990 NFFS computer record file.

The results shown in Table 4.6 provide further evidence of fertility decline. Even after the effects of censoring and selectivity are taken into account, these ratios show that among those aged 15-19 years only about a third had a second child, compared to 70-80 per cent of women aged 30 years or over (Panel A). Ratios for the other birth orders also demonstrate a significant decline in the transition to higher parities. Changes in parity progression ratios with age were more pronounced for transitions from first to second, third to fourth, sixth to seventh and seventh to eighth births.

Censored parity progression ratios are displayed by time period in Panel B. Changes in these ratios over time indicate that at higher birth orders (progression to fifth and sixth), initial signs of parity-dependent fertility control had begun by 1975 (see penultimate column). However, an all-encompassing and general change in censored parity-progression ratios is apparent only after 1980. Both the magnitude and the momentum of the decline in progression to higher parities increase with time. In 1980, progression to second child was as high as 80 per cent, while the equivalent proportion 10 years later was only 55 per cent. Between 1975 and 1990, parity progression ratios declined by 28 to 45 per cent and probably more at high parities. This evidence of increasing deliberate fertility control clearly supports the observed declining fertility trend. It also shows that this decline was achieved through a reduction across all birth orders and among women of all age groups. This observation is clearly consistent with the results of the analysis from the fertility pyramid in Figure 4.3 and the P/F ratio analysis shown earlier, which both suggested a similar decline in fertility across cohorts beginning in the 1980s.

Table 4.7: Trends in Coale's indices of marriage (I_m), marital fertility (I_g) and overall fertility (I_f), Addis Ababa, 1967 - 1994.

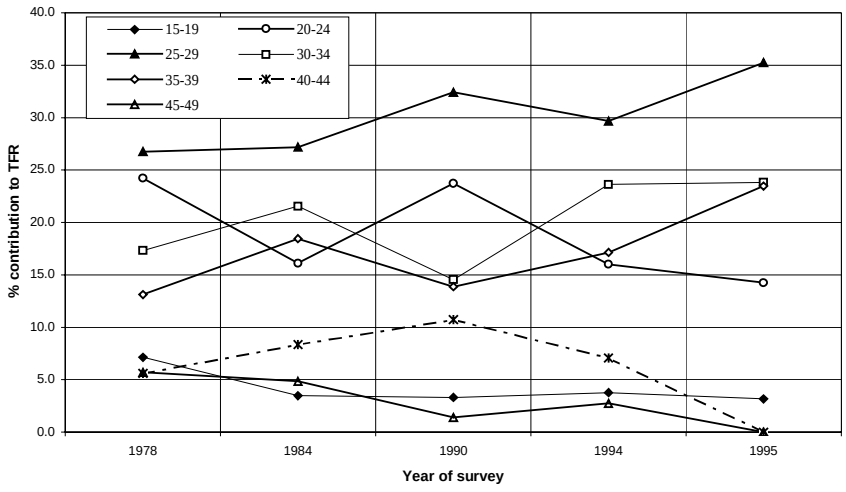
Cole's Indices	Year of census/survey			
	1967 Survey	1978 Survey	1984 Census	1994 Census
I_f	.3309	.2961	.2181	.1203
I_g			.3986	.3218
I_m	.6276	.5041	.4617	.3191

Source: Computed by author from the respective data sources.

Presented in Table 4.7 are trends in Coale's (1967) indices of marriage (I_m), marital fertility (I_g) and overall fertility (I_f) calculated from several of the data sources used in the study. The notable drop in the indices of marital fertility and overall fertility are consistent with the declining fertility already observed. The (I_f) index of 0.12 in 1994 suggests a level of fertility of only a tenth of Hutterite fertility, and clearly confirms a significant level of deliberate fertility control as indicated by the analysis of censored parity progression ratios. The 20 per cent decline in the values of I_g is substantially higher than the 10 per cent fall that has come to be conventionally regarded as signifying the onset of irreversible fertility transition (Andorka, 1978: 21; Caldwell *et al.*, 1992: 211), and clearly supports the previous evidence of parity-dependent fertility control and over all fertility decline.

The consistent downward trend in the proportion married, as measured by (I_m), also supports the fertility decline. I_m fell by about half between 1967 and 1994 and reached a record level of 0.32 in 1994. These are compared with I_m values for rural Ethiopia of 0.87 in 1970, 0.85 in 1980, 0.85 in 1984 and 0.83 in 1990 which are close to the highest I_m of 0.91 for Korea in 1930 (Coale, 1975: 349; Tesfaghiorghis, 1990: 191; Kinfu, 1994: 147). The wide discrepancy in the values of I_m between the rural population and that of Addis Ababa also clearly indicates the magnitude of the transition in marriage that has taken place in the city. In fact, as shown in the following chapter SMAM (singulate mean age at marriage) calculated from the recent data (1995 AFS) shows a value as high as 27 years for females.

Figure 4.4: Contribution to total fertility rate, Addis Ababa, 1978 - 1995



As a consequence of the changes in the pattern of marriage (see Section 5.1) and in parity-specific fertility control, the age structure of fertility in Addis Ababa, over time, also underwent significant changes. A striking observation from Figure 4.4 is the increasing dominance of the contributions to total fertility by women aged 25-39 years and a consequent decline for the other age groups. The dominance of the middle age groups in the age structure of fertility of the city became apparent in the first half of the 1980s and has been sustained thereafter. At present over 80 per cent of births in the city are contributed by these women. Women aged 35-39 years alone contributed about a quarter of the births in 1995. The contributions of women in the lowest and highest age groups have not only been low but have declined over time, each contributing less than 5 per cent of the total births in 1994. The contributions of women in the 20-24 and 40-44 age groups have also declined substantially. Women aged 20-24 contributed less than 15 per cent in 1995; those aged 40-44 contributed 7 per cent in 1994 and none in 1995.

4.5. Trends in the demand for children

In several empirical works on fertility and in a number of propositions on demographic transition, a shift towards low fertility is believed to be closely associated with a change in the demand for children (Notestein, 1945; Becker, 1981; Easterlin and Crimmins, 1985; Pritchett, 1994; Bankole and Singh, 1997; Kirk and Pillet, 1998; APPRC, 1998). As a result, fertility desires are perceived not only as good predicators of actual fertility, both at societal and individual levels, but also as a succinct indicator of the prevailing societal norms about family size and the future direction of fertility (Pritchett, 1994; Bankole and Singh, 1997). Globally, about 90 per cent of the differences in actual fertility across countries were accounted for by differences in desired fertility between countries (Pritchett, 1994: 4). Although this view has been challenged in relation to the experiences of Asia and Latin America (Cleland, 1985; Cleland and Wilson, 1987), a growing number of studies from Africa indicate a significant shift in fertility desires either preceding or in parallel with the recent fertility decline in the region (Kirk and Pillet , 1998: 11; APPRC, 1998: 57-67; Bankole and Westoff, 1995).

Attempts to measure reproductive desires have been incorporated in both the fertility surveys used in the previous sections. In the earlier of these surveys, the 1990 NFFS, the information on fertility preference was obtained based on both retrospective and prospective measures while in the 1995 inquiry the questions were mainly limited to prospective desires. Both for the sake of maintaining comparability between the results of the two surveys and because of the problem of reliability of responses elicited from retrospective measures, the discussion in this section relies exclusively on the questions about future fertility desires. The choice of prospective over retrospective measures is based on two further considerations. Reproductive desires obtained in a retrospective fashion tend to suffer from *ex-post* rationalisation (Pritchett, 1994: 7). On the other hand, prospective measures are not only free from this drawback but also have an added advantage of reflecting the most recent trends in family-size preferences, and thus should be more indicative of fertility developments in the near future (Knodel, Chamratrithirong and Debavalya, 1987: 60; Pritchett, 1994: 8)

Table 4.8: Desire for additional children among fecund currently-married women by number of children everborn (including current pregnancy) at time of survey, Addis Ababa, 1990 and 1995

Number of children	Want more %		Want no more %		Undecided %		Mean additional desired children	
	1990	1995	1990	1995	1990	1995	1990	1995
0	91.4	89.4	0.0	5.7	8.6	4.9	3.38	2.75
1	88.7	83.8	7.5	14.4	3.7	1.8	2.53	1.99
2	59.9	67.8	28.7	30.6	11.4	1.6	1.47	1.26
3	64.1	59.9	30.5	36.8	5.4	3.4	1.22	1.11
4+	23.8	26.8	69.5	70.5	6.6	2.8	0.44	0.38
Total	45.6	52.0	47.5	45.5	6.9	2.5	1.03	1.00

Source: Computed by author from the computer record of the respective data files.

In both surveys information on prospective fertility desires was obtained by asking all fecund currently married women whether they would like to have another child, and if so, how many additional children they want. Shown in Table 4.8 are the percentages of currently-married fecund women who wanted more children or no more children or who were 'undecided' in the 1990 NFFS and 1995 AFS. Also presented in Table 4.8 are mean desired numbers of children for those who responded as wanting additional children. Consistent with the pattern of low fertility observed for recent

years, in both 1990 and 1995 a substantial proportion of currently-married fecund women showed no desire for additional children. This proportion was generally greater for women of higher parity and, once parity is controlled, for the more recent period. The most notable changes between the two periods were for low-parity women: for those with no children, the proportion increased from zero to six per cent and for those with one child the proportion almost doubled.

The data in Table 4.8 further show that among women who desired additional children, the number desired has decreased. In a span of only five years, the mean additional desired number of children for those with no children has declined from 3.4 to 2.8 and for those with one child, from 2.5 to 2.0, signifying in both cases a decline of about half a child. Perhaps equally revealing in the results presented above is the drop in the proportion of women who responded 'undecided', falling from 7 per cent in 1990 to less than 3 in 1995. Considering that one of the three preconditions for fertility decline identified by Coale (1973) is that reproduction should be within the 'calculus of conscious choice', the increasing proportion of women willing to state their fertility aspirations may indeed be seen as supporting evidence for the fertility decline documented in this chapter.

4.6. Concluding remarks

Although it is difficult to identify precisely the year in which the decisive move towards controlled and low fertility in Addis Ababa began, there is clear evidence from the results discussed in this chapter that a major fall in fertility has occurred since the late 1970s. Before the decline, the city had a temporary increase in fertility in the mid-1970s, probably in 1975-77. Expressed as annual rates of change, the total fertility rate declined at a rate of 0.10 births per woman per year for 1978-84, 0.14 for the intercensal period 1984-94, and 0.15 for the period 1990-1995. These declines, notably those which have been observed since the mid-1980s, during the intercensal period of 1984 to 1994 and between the surveys of 1990 and 1995, were comparable in magnitude with those observed for Mexico (0.15) and Indonesia (0.12) during the period 1970-92, and were only marginally lower than those of Taiwan (0.18), Singapore (0.18), Hong Kong (0.18), Malaysia (0.17), Thailand (0.17) and Vietnam (0.17) during the most rapid period of

their demographic transition (Haughton, 1997: 20). By the early 1990s, total fertility in Addis Ababa had already fallen below two children per woman, that is, well below replacement. This level of fertility is probably one of the lowest among cities in Africa, both south and north of the Sahara, and may only be paralleled by levels found in the most affluent urban areas and segments of the population of South Africa (Chimere-Dan, 1997: 5; 1998: 3).

Consistent with these changes, there has been a general decline in the indices of overall fertility and marital fertility. A parallel and perhaps more profound decline in nuptiality has also been noted from this analysis. This issue will be further discussed in detail in the following chapter. As a consequence of the changes in the pattern of marriage and the decline in marital fertility, the age structure of fertility in Addis Ababa underwent significant changes during the period of transition. A striking observation from the analysis was the increasing dominance of the relative contribution to total fertility by women aged 25-39 years and a consequent decline for the other age groups.

The analyses on censored parity progression ratios showed that the observed fertility decline was achieved through a reduction across all birth orders and among women of all age groups. This finding is consistent with those observed in other parts of Africa, but stands in sharp contrast with those observed in other developing areas such as Asia and Latin America, where fertility declines started in the middle parities and moved successively to the higher and then lower birth orders (Caldwell *et al.*, 1992; Brass *et al.*, 1995; Hinde and Mturi, 2000).

Consistent with the trends in period and cohort fertility observed in the city, the study noted not only the high proportion of women wanting no more children but also the low mean desired number of children even among women who want additional children. Over the years, there has been a drop in the proportion of women who responded 'undecided' to the question on the desire for additional children, suggesting that fertility decisions are becoming more deliberate.

To sum up, one of the key questions raised earlier in the thesis was whether the overall trend of fertility and its recent decline to below replacement level observed in Addis Ababa is real. This chapter strongly supports an affirmative answer.

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Chapter 5

THE DEMOGRAPHIC COMPONENTS OF FERTILITY CHANGE: *Trends, patterns and relative importance of proximate determinants of fertility*

As was demonstrated in the previous chapter, Addis Ababa may now be undergoing one of the most fundamental reproductive transformations of its kind in a country and a region that are mostly yet to join the global transition to a small family size norm. Some of the important changes in the area have been a significant decline in period and cohort fertility, a shift in the distribution of childbearing toward much later age and a simultaneous fall in family size preferences. This chapter takes-up two further questions raised in the context of the overall study in Chapter 1: how consistent are these changes with the trends and patterns of the components of reproductive change and which of these components are paramount in bringing down the total fertility rate to the level it has reached in recent years. Focussing primarily on those intermediate variables known for their importance in fertility change (Bongaarts, 1978, 1982; Bongaarts and Potter, 1983; Bongaarts, *et al.*, 1984, 1990), the first four sections of the present chapter will examine the trends and patterns of marriage, deliberate fertility control (including induced abortion), postpartum infecundability and pathological sterility in the study area. Section 5.5, using the Bongaarts model, will analyse the relative importance of each of these determinants to the attainment of below replacement level fertility in Addis Ababa. On account of the significance of marriage as the principal proximate determinant of period fertility change in the study area, in Section 5.6 the socio-economic determinants of first marriage are examined. Section 5.7 provides concluding remarks.

5.1 Nuptiality trends and patterns

Although marriage *per se* played a minor role in the historical fertility decline observed in Europe, partly owing to the existence of widespread marriage postponement and spinsterhood long before the transition to small family size in that region, in many contemporary developing nations change in marital behaviour has been a key component of their fertility transition (Hajnal, 1956; Cho and Retherford, 1974; Mauldin and Berelson, 1978; Watkins, 1981; Smith, 1983; Dyson and Murphy, 1985; Rosero-Bixby, 1996; Rashad, 2000). Mauldin and Berelson (1978), for instance, showed

that in ten developing countries where a major fertility decline had been recorded between 1965 and 1975, delayed marriage had contributed between 35 and 40 per cent of the observed fertility reduction. Cho and Retherford's (1974) study of seven Asian populations which experienced a significant fertility decline between 1960 and 1970, also revealed that the contribution of marriage in these countries ranged from 23 per cent in Taiwan to as high as 102 per cent in the Philippines. Although in sub-Saharan Africa, as in Latin America, the ongoing fertility transition in the region has been largely dominated by increased use of contraception, the declines recorded in Senegal and Sudan are particularly linked to profound changes in patterns of marriage in these countries (Cleland *et al*., 1991; Jolly and Gribble, 1993; Moreno and Singh, 1996; Rosero-Bixby, 1996). The importance of marriage in the fertility transition of Arab countries has also been recently demonstrated (Rashad, 2000). In this section I will examine the trends and patterns of marital behaviour in Addis Ababa; its relative contribution to fertility decline will be analysed in a subsequent section (Section 5.5). However, to put the study in context, I shall begin the present section with a brief discussion on the forms and types of marriage in Ethiopia as a whole.

Three forms of marriage, customary, civil and religious marriages, are recognised by the civil code in Ethiopia (Hailemariam and Kloos, 1993: 56). Religious marriages are entered into by a minority of people who are devout believers, and such marriages are in principle, and also probably to some degree in reality, indissoluble. Civil contract marriages are practiced by most urbanites, whereas customary marriages are practised by the majority of the rural and a significant proportion of the urban population. The latter type of marriage is commonly known as *semanya*, a term used particularly to designate its strict contractual nature. In this type of marriage divorce is relatively frequent (Lipsky, 1962; Tilson and Larsen, 2000).

Most marriages in Ethiopia are monogamous. In 1990, less than 15 per cent (14.7) of women in the country were in polygynous unions (CSA, 1993: 103). This contrasts significantly with that found in most other sub-Saharan African countries, where the proportion of women in polygnous unions reaches, in some cases, as high as one third or more (Njogu, 1989; Caldwell *et al*., 1992; CSO [Zambia], Ministry of Health and MI, 1997). However, in Ethiopia itself the prevalence of polygamy varies

substantially between the various sectors of the society. It is much higher among Muslims and women adhering to 'traditional religion' than Christians, and among women from the southern than the northern part of the country. For instance, among the Coptic dominated Amhara, the dominant ethnic group in northern Ethiopia, levels of polygamy are as low as 1.8 per cent, while it is about 30 per cent among members of the country's southern ethnic groups, who are largely adherents of 'indigenous' or 'traditional' religion. Among Muslims, who account for a third of Ethiopia's and about one-fifth of Addis Ababa's population, polygamous marriages constitute approximately 19 per cent of all unions. Only four per cent of women in Addis Ababa, the majority of whom are over 30 years of age, live in polygamous unions (figures for Addis Ababa are from primary analysis of the 1990 NFFS by the author).

Traditionally, and still for the great majority of rural Ethiopians, marriage is arranged by parents. Among the Amhara and Tigrawi, the two culturally dominant ethnic groups, this involves no payment of bridewealth, except for gift contributions by both families to the couple (Tesfaghiorghis, 1990: 80). Among the Oromo, the largest ethnic group, and other ethnic groups of Southern Ethiopia, traditionally marriage involves payment of bridewealth by the bridegroom's father to the bride's father. However, in Addis Ababa, both due to the influences of urban life and the dominance of the Amhara–Tigrawi culture (for reasons of history and demography), the practice of payment of bridewealth, even for groups known to have such a tradition, is non-existent. Marital union in Addis Ababa is also increasingly being dominated by self-arranged marriages. According to the 1990 NFFS, compared to fewer than 10 per cent of women aged 45-49 years who claimed to have arranged their marriage by themselves, 37.9 per cent of those in age group 20-24, who were most likely to have been married in the late 1980s, reported that they had arranged their marriage on their own (figures are from primary analysis of the 1990 NFFS by the author).

A similar increasing trend toward self-arranged marriage is also evident for the other age cohorts. The proportion of women who chose their own marriage partner rises from 15 per cent for women aged 40-44 years, to 17 per cent for women aged 35-39, to approximately 30 per cent for women aged 30-34 years and 34 per cent for women aged 25-29 years (figures are from primary analysis of the 1990 NFFS by the author). These figures contrast sharply with those for rural areas, where during the same period,

almost all women, in both younger and older age groups, reported having their marriage arranged by someone other than themselves (CSA, 1993: 106). The change in marital behaviour observed in Addis Ababa may be linked to changes in the educational composition of the general population and the rise in status and autonomy of women in the society. The rise in status and autonomy of women in the area may in part be linked to the increase in their educational attainment and labour force participation as well as to the direct effort made by the government—particularly through propagating the idea of gender equity and supporting women's associations—during the revolutionary period.

Table 5.1: Trends in the proportion of never-married adults in selected age groups, Addis Ababa, 1967-1995

Year	Females			Males		
	% single 15 - 19	% single 20 - 24	% single 15 - 49	% single 20 -24	% single 25 - 29	% single 15 - 49
1967 [a]	66.2	13.6	15.6	77.4	37.7	38.5
1978 [b]	81.2	29.0	25.0	80.2	40.6	45.8
1984 [c]	89.1	52.6	32.6	88.3	63.7	53.2
1990 [c]	96.3	65.7	43.9	94.7	76.6	51.7
1994 [c]	94.8	74.9	53.7	94.4	75.8	66.5
1995 [c]	94.4	77.5	52.5	96.4	80.5	65.3

Sources: a CSO, 1972: 48-53; b CSO, 1979, Table 2: 83-84; c Computed by author from the respective data sets.

A rise in self-arranged marriages often goes hand-in-hand with a lower propensity of marriage (Caldwell, 1996). Accordingly, the recent marriage pattern in Addis Ababa is best characterized by a steady rise in the proportion of single adults. As illustrated in Table 5.1, the proportion of never-married women in the reproductive age group increased from well below one-fifth in 1967 to approximately a third in 1984 and to well over half in the first half of the 1990s. The same was also the case for men, where the proportion single in the age group 15-49 years increased from the already high figure of about 39 per cent in 1967 to approximately 67 per cent in 1994.

These changes were caused primarily by the increase in the proportion of never-married persons in the younger ages. As shown in the table, for women, the proportion who were single in the age group 20-24 increased from about 14 per cent in 1967 to more than double that proportion (29 per cent) in 1978, a period which is immediately after the 1974 Ethiopian revolution, and to 53 per cent in 1984. By 1995, this proportion had climbed further to well over three-quarters. During this period, changes in teenage

marriage among females were particularly significant: in the 1990s only about five per cent of women married before age 20 compared with one-third some 25 years before. The data for men also demonstrate a similar trend whereby in recent years fewer than five per cent of men were married before age 25 and as many as four-fifths were still single in the age group 25-29 years. In a cultural environment where childbearing outside of marriage is not tolerated (see section 6.1) the fertility impact of such a profound increase in the proportion of never-married women in the younger ages is self evident.

The dramatic nature of the change in marriage pattern in Addis Ababa can also be seen by comparing the evidence for the city with that of the country at large. For instance in rural areas, the proportion of single women in age group 15-19 years in the past twenty-five years increased from 33 per cent in 1970 to 65 per cent in 1994 (Kinfu, 1994; OPHCC, 1998). And the proportion in the age group 20-24 years increased from less than 5 per cent in 1970 to almost 20 per cent in 1994. However, even with such a significant increase, the proportion of never-married women recorded in the rural areas in 1994 was still lower than the 29 per cent single observed in Addis Ababa in the second half of the 1970s (see Table 5.1). A comparison of the data for men suggests a similar conclusion. The proportions single recorded in 1994 for rural men in age groups 20-24 and 25-29, which were 65.2 and 26.7, respectively, were lower than those observed for Addis Ababa in 1967 (see Table 5.1) (Kinfu, 1994; OPHCC, 1998). This evidence therefore underscores the rapid and dramatic nature of the nuptiality transition in Addis Ababa.

One convenient summary measure of change in nuptiality pattern is the singulate mean age at marriage (SMAM), an estimate of the age at first marriage derived from the proportions single by age (United Nations, 1983: 225). This measure is preferable than that constructed from marriage histories in depicting marriage trends, because the estimate it provides corresponds to a more recent time-period (Van de Walle, 1993: 132). Although SMAM could be subject to some biases, especially when there is a rapid change in marriage pattern, a procedure for circumventing these has been proposed by the United Nations (1983: 227). The procedure involves constructing hypothetical cohort marriage rates from data at two points of time, and

calculating the SMAM on the basis of these values. The resulting calculation thus reflects the age at marriage implied by the nuptiality experience during the period intervening between the two sets of observations, and is no longer affected by changes in marriage pattern that may have occurred before the first observation. Table 5.2 presents SMAM values for Addis Ababa calculated on the basis of a similar procedure. Also shown in the table are estimates for rural and other parts of Ethiopia for comparison.

The SMAM values presented in the table demonstrate the profound change in the timing of marriage in Addis Ababa. The singulate mean age at marriage in Addis Ababa among females and males increased respectively by about 2 years and 0.8 years between 1967 and 1978, 2.3 years and 2.6 years between 1978 and 1984, and 3.5 and 2.9 years between 1984 and 1994. The disproportionately faster rate of increase in SMAM values for females is of demographic interest for it leads to a decline in spousal age difference which may have implications for promoting husband-wife communication and fostering discussions on matters pertinent to the family's welfare, including issues of family size.

Table 5.2: Singulate mean age at marriage (SMAM) , Addis Ababa and other parts of Ethiopia, 1967-1995.

Year	Source	Ethiopia					
		Addis Ababa		Other urban areas		Rural areas	
		Females	Males	Females	Males	Females	Males
1967	Survey	19.0 [a]	26.1 [a]	u	u	u	U
1970	Survey	u	u	u	u	16.3 [e]	22.9 [e]
1978	Survey	20.9 [b]	26.9 [b]	18.2 [d]	25.1 [d]	u	U
1984	Census	23.2 [c]	29.5 [c]	21.5 [e]	27.8 [e]	16.7 [e]	23.4 [e]
1990	Survey	24.5 [c]	32.3	u	u	u	U
1994	Census	26.7 [c]	32.4 [c]	23.9 [f]	29.5 [f]	19.4 [g]	24.7 [g]
1995	Survey	26.5 [c]	33.6 [c]	u	u	u	U

Note: u Data not available. *Sources*: a Computed from CSO, 1972: 48-53; b Computed from CSO, 1979, Table 2: 83-84; c Computed from computed data sets; d Computed from CSO, 1980, Tables 8a, 8b & 8c: 65-67; e Kinfu, 1994, Tables 3.9 & 3.10; f Computed from OPHCC, 1998, Table 2.24b: 142 and OPHCC, 1995, Table 2.16b: 68; g Computed from OPHCC, 1998, Table 2.24c: 143.

As can be seen from the table, the increase in age at marriage in Addis Ababa was much faster than in other parts of Ethiopia. This has contributed to the widening of the gap in age at marriage between Addis Ababa and particularly the rural part of

the country. For instance, the SMAM value calculated for rural females for 1994 is still not that different from what was obtained for the female population of Addis Ababa in 1967. This suggests that the recent marriage pattern in Addis Ababa is roughly a quarter of a century ahead of that of the rural part of Ethiopia, and is further evidence of the extent and rapidity of change in marriage behaviour in Addis Ababa. As shown in the table, by 1995 SMAM values for Addis Ababa reached quite high levels: 27 years for females and about 34 years for males.

Few areas in sub-Saharan Africa and indeed in the developing world exhibit an age at marriage and proportion of single persons as high as that observed in Addis Ababa. In sub-Saharan Africa, levels matching that of the city are probably found only in southern African nations, such as Botswana (Gaisie, 1998). Available data show that in Botswana in 1991 as many as 58 per cent of women aged 15-49 years were single, while the SMAM during the same period was 27 years, both of which are quite comparable to that of Addis Ababa's (Gaisie, 1998: 288) . However, since in Botswana a substantial proportion of births occur outside formal unions (about 51 per cent in 1991 as against 3.8 per cent in Addis Ababa in 1995), marriage does not exert as much influence as it does in Addis Ababa (Jolly and Gribble, 1993: 82; Gaisie, 1998: 283; CSA, 1997: 53).

To assess the extent of change in the intensity and timing of marriage in Addis Ababa in a broader continent-wide context, the various indices of marriages calculated for Addis Ababa have been compared with a model nuptiality pattern for sub-Saharan Africa (Lesthaeghe, 1984). Using data from 23 countries and subregions of Africa, Lesthaeghe outlined four nuptiality regimes in the subcontinent. These were:

i. early marriage pattern which is characterized by a SMAM value of less than 16.7 years and per cent single at age group 15-19 of less than 30;

ii. medium-low in which the percentage single at age group 15-19 falls between 30 and49.9 and the SMAM values range from 16.7 to 17.9 years;

iii. medium-high where the SMAM ranges from 18.0 to 19.6 years and the percentage single at age group 15-19 falls between 50 and 69.9; and

iv. late-marriage in which the percentage single at age group 15-19 is 70 or more and the SMAM is 19.7 years or over.

Not unexpectedly, this categorization also confirms to the low propensity of marriage in Addis Ababa. The city's marriage pattern, which was already in the second highest group, the medium-high category, as early as in the second half of the 1960s, entered into the stage described as a late-marriage pattern before the end of 1970s. However, as can be seen from the changes in the nuptiality indictors shown earlier in Tables 5.1 and 5.2, the move toward non-marriage and delayed marriage observed in Addis Ababa was more dramatic after the second half of the 1970s; this is a period that coincides with the 1974 Ethiopian revolution. For instance, in the 11-year period between 1967 and 1978 the SMAM values for males and females in Addis Ababa increased only by about 0.8 years and 1.9 years, respectively, whilst between 1978 and 1984, a period which is immediately after the revolution, it increased by 2.3 years for females and 2.6 for males. Similar transitions also seem to have occurred in other parts of Ethiopia. By Lesthaeghe's classification, the other urban areas of Ethiopia had moved into what is regarded as the 'late marriage' pattern before mid-1980, while rural areas had joined the upper range of the medium-high category by 1994. However, as shown in Table 5.2, the greater part of the change in age at marriage in rural Ethiopia is of recent origin. This may be partly due to the fact that, as discussed in Chapter 3, in the early periods following the 1974 revolution access to farm land in rural Ethiopia was chiefly determined on the basis of demographic considerations: newly weds and households with large family size had fairly easy access to community land. This change in the rules governing access to land, the key resource base in rural Ethiopia, may therefore have contributed to the stagnation of age at marriage in rural areas until recent period. On the other hand, the recent change in age at marriage in these areas may be linked to both increased scarcity of land, which made access relatively difficult for young adults, and an increase in the general educational status of the population.

Marital composition is another aspect of nuptiality that has an important bearing on the level and trends of fertility in a given society (Smith, 1983). Other things being equal, a society in which large proportions of women are in union and marital dissolution, voluntary or involuntary, is infrequent is likely to have higher fertility than a population in which fewer persons are in a stable union, due to either high levels of marital disruption or non-marriage. The marital composition of Addis Ababa obtained

from the latest census indicates that in 1994, well over half (53.7 per cent) of women of reproductive age were single, 13 per cent were either widows (4.1 per cent) or separated or divorced (8.7), and only about a third were currently in union (figures are from primary analysis of the 1994 Census by author). These distributions represent significant departures from the situation in the earlier periods; in 1967 almost 56 per cent of the women in reproductive age group were married and only about one sixth (15.6 per cent) were single (CSA, 1997: 27). Other things being equal, these proportions, therefore, illustrate that the recent marital structure of Addis Ababa is considerably less favourable to high fertility than was before.

The effect of marital status composition on fertility can be assessed even more directly using what are known as 'indices of marital status' (Smith, 1978). These indices are obtained through standardising the marital composition of the study population by the marital fertility distribution of Hutterite women. One advantage of these indices is that, unlike simple standardized rates but more like the familiar Coale's indices (1967), they not only reflect the age-standardized marital structure of the population, but also of its potential fertility-reducing impact, taking into account that reproductive potential varies with age (Smith, 1978; Knodel *et al.*, 1987). For example, the same proportion of widowed women at the beginning and end of the reproductive age group do not have the same effect on fertility: a high proportion of widowed women in the younger age group carries more weight than at later ages, when reproductive potential is presumed to be lower. Table 5.3 presents the results of these indices for Addis Ababa.

The results presented in Table 5.3 (See Panel A) indicate that about 47 per cent of the reproductive potential of the city in 1978 could not be realized because of delay of entry to first marriage (27 per cent), or dissolution of marriage, arising from death of partners (16 per cent) and divorce (4 per cent). The high level of widowhood observed for 1978 may reflect the effect of the 1977/78 political violence in the city. As mentioned in Chapter 3, this state-sponsored violence, which led to the death of many citizens, about 10,000 by some accounts in Addis Ababa alone (Halliday and Molyneux, 1981: 123; Keller, 1988: 200; Human Rights Watch, 1991: 101-111), was largely directed at the youth and those in the middle ages owing to their active political participation and

alleged involvement in organizations that were opposed to the regime. Since most of these victims were likely to have been married to women who, at the time, were in the younger reproductive age ranges, where the potential effect on fertility is higher, the high level of the index may reflect the high mortality of young married men during the period of violence. However, for the recent period there is a substantial reduction in the effect of widowhood on the city's potential fertility level. This may be due to either increased incidence of widow remarriage or improvement in adult mortality among younger men or both.

Table 5.3: Indices of marital status and proportion of ever-married women, Addis Ababa, 1978-1994.

Nuptiality Characteristics	Year of enumeration		
	1978 Survey	1994 Census	% change 1978-94
Panel A: Indices of marital status[1]			
Index of proportion single (I_s)	.272	.553	103.3
Index of proportion currently married (I_m)	.535	.331	-38.1
Index of proportion widowed (I_w)	.157	.030	-80.9
Index of proportion divorced or separated (I_d)	.037	.086	132.4
Panel B: % ever-married women			
35-39	98.8	93.2	-5.7
40-44	98.9	96.6	-2.3
45-49	98.9	97.9	-1.0

Source: Computed by author from sources cited for Table 5.1.

As can be seen from the table, in contrast to widowhood, there has been a substantial increase in the fertility-reducing effect of non-marriage and marital dissolution in the city. The fertility potential of the population that was unrealized because of divorce or separation has increased from a level of 3.7 per cent in 1978 to about 9 per cent by 1994. However, by far the largest contributor to the reduction in the fertility potential of the city during the period under study was non-marriage. As shown in the table, the level of fertility in Addis Ababa in 1994 was about 55 per cent below its potential due to delayed or forgone entry into first marriage. The comparable

[1] $I_s = \frac{\Sigma Si\ Fi}{\Sigma Wi\ Fi}$ $I_m = \frac{\Sigma mi\ Fi}{\Sigma Wi\ Fi}$ $I_w = \frac{\Sigma wi\ Fi}{\Sigma Wi\ Fi}$ $I_d = \frac{\Sigma d\ i\ Fi}{\Sigma Wi\ Fi}$

Where s i, m i, w i, and d i refer to the number of single, married, widowed and divorced women respectively in age group i,; (i = 15-19, 20-24, 25-29…45-49). In the same way as in Coale's indices, Fi is used as a standard and represents the age-specific marital fertility of Hutterrite women married 1921-30. These values were .300, .550, .502, .447, .406, .222, .061 for age groups 15-19, 20-24…, 45-49. Wi represents the number of women reported in age group i.

figure in 1978 was well below 30 per cent; this produces a 103 per cent increase in the fertility reducing effect of non-marriage in the period between 1978 to 1994.

However, despite indications of a drastic move toward a pattern of late marriage, marriage in Addis Ababa is still a very common social institution: only a fraction of women in the area remain celibate. As shown in Panel B of Table 5.3, in 1978, close to 99 per cent of the women aged 35 years or over were either previously or currently-married. Although there has been growing evidence of an increase in the proportion of single women in these age groups, more than 95 per cent of women aged 40 years or over in 1994 were either married or had been previously-married at least once. But this pattern of universal marriage may not remain for long. For instance, as already shown earlier, in 1994 as many as 81 per cent of men and 78 per cent of women were still single by age 25-29 and 20-24 years (see Table 5.1), respectively. These are ages which are regarded as prime ages of marriage in many societies and yet the proportion of men and women who are not married is still quite high. In fact, even if one assumes a rapid pace of marriage after these ages it is most unlikely that the high proportion single observed in the younger ages will decline to levels reported in recent years for higher ages by the time those men and women who are now in the younger ages reach advanced age groups. This, indicates that the cohort that have entered the marriage market in recent years may no more partake in the universal marriage pattern that now prevails among older women in the area.

Recent research from developed and developing countries demonstrates that an imbalance in the relative 'availability' of men and women could exert significant impact on patterns of marriage (Goldman, Westoff and Hammerslough, 1984: 5; De Silva, 1997: 13). In the United States, the rise in age at marriage and the increase in the percentage of single women observed in the 1960s and 1970s were closely linked to the shortage of males in the prime marriageable ages (Heer and Grossbard-Schechtman, 1979; Guttentag and Secord, 1983). The classic example of a deficit of males comes from societies where a war has reduced the male population who make up the armies, as has happened, for instance, in countries caught up in the Second World War (De Silva, 1997). The long civil war in Ethiopia in the 1970s and 1980s (see Chapter 3), the demographic effect of which is now just beginning to be explored (Linderstorm and

Birhanu, 1999), is also worth citing in this respect, though a simple comparison of the age distributions in the 1994 and 1984 Censuses does not reveal any visible deficit in the age structure (OPHCC, 1991; OPHCC, 1998). However, in demographically 'open' societies, such as that of the study population, sex-selective migration is perhaps one of the most important sources of imbalance in the relative availability of men and women in marriageable age groups. Given that Addis Ababa is a net migration-receiving destination, could it also be possible that the steady rise in the proportion of single women and the simultaneous increase in age at marriage, shown in the preceding analyses, had resulted from a 'marriage squeeze', a pattern attributable to a numerical imbalance between males and females of marriageable age?

Technically, the relative 'supply' of men and women in the 'marriage market' can be measured through various indices (Goldman, Westoff and Hammerslough, 1984: 5). Of these, one of the most frequently cited is the population sex ratio, better known as overall sex ratio. However, this measure, like most other crude demographic measures, suffers from a lack of specificity; it includes persons who are already in union as well as others who are too young or too old to be at a significant risk of marriage. This limitation has led to the consideration of age and status-specific measures: measures that relate the number of single females in a given age group to the number of single males in the age groups from which women are most likely to choose. Table 5.4 presents one such availability index, measuring the relative supply of never-married men to never-married women, calculated on the basis of age ranges where most marriages take place, that is in the age group 15-29 for females and 20-34 for males. The computation of the indices implicitly assumes that women tend to marry, on average, men who are five years older than themselves, an assumption which is plausible in the face of the SMAM values presented earlier.

Table 5.4: Ratio of never-married males per hundred never-married females, Addis Ababa, 1984 and 1994

Sex and age	1984 Census	1994 Census
M (20 - 24) / F (15 - 19)	49.3	48.9
M (25 - 29) / F (20 - 24)	70.6	69.2
M (30 - 34) / F (25 - 29)	179.2	171.1

Source: Computed by author from the respective data sets.

Two important observations are evident from the ratios shown in Table 5.4: an apparent shortage of males in the two younger age groups and the lack of any significant time trend in these values between the two censuses. The latter observation is particularly of interest as it provides assurance that the rise in female age at marriage in the city may not necessarily be a direct result of the increasing shortage of men in the marriageable ages. In 1994, there were approximately only 50 single males aged 20-24 years for every 100 single females aged 15-19 years and about seven males aged 25-29 for every 10 females aged 20-24 years; but these 'shortages' were also of the same magnitude 10 years earlier.

The excess of females over males observed in both censuses may be attributed to the high level of female migration in to Addis Ababa, a pattern also common to other urban areas of Ethiopia (UNESCO, 1984: 16; OPHCC, 1987: 19; Delicho, 1993: 38). The existence of early and family-arranged marriages in some parts of rural Ethiopia and the relatively easy access to menial jobs for female migrants in the urban labour market, the former acting as a push and the latter as a pull factor, could have contributed to the dominance of female migrants in the city and through that to the imbalance in the sex ratio observed in the present analysis. The observed numerical imbalance between males and females in the area might also in part be linked to the age structure of the population. Even assuming that effects of sex-selective migration and sex-biased mortality differentials are negligible, in a young population, such as that of the study society, where fertility decline is of recent origin, it is expected that the number of persons enumerated, say in age group 20-24, is generally smaller than the number aged 15-19 years. This phenomenon, which gives rise to a surplus of marriageable females in relation to marriageable males in the corresponding ages, because of the consideration of lower ages for females compared to males in each level of comparison, may thus have to be taken into account while looking at the above results.

To sum up, the analyses and the discussions presented in this section demonstrate that fewer and fewer adults of both sex are now entering into marriage, and that even those who marry do so at a late age. Marital relations in the city have also become increasingly self-arranged, and, especially among the younger cohort marriage may no more be regarded as universal. Such patterns of marriage, especially

the decline in proportion of married women and the rise in age at marriage, are not only consistent with the trend of falling fertility documented in the previous chapter but, as will be shown, also turn out to be the principal determinants of the attainment of below-replacement-level fertility in Addis Ababa.

5.2 Deliberate fertility control

5.2.1. Contraceptive use

In the previous chapter (see Section 4.4) it was demonstrated that a decline in censored parity progression ratios at all ages and parity groups was one of the major components of reproductive change in Addis Ababa since the late 1970s. The attainment of low fertility, depend mainly, if not entirely, on two factors: the proportion of women who use contraception and the efficiency of the method or methods practiced by these women. On the other hand, both the use of contraception and the choice of an efficient method are in turn linked to attitude towards, and knowledge and availability of contraception. Other things being equal, in a society where knowledge about family planning is generally high and the attitude toward using it relatively positive, women are expected to start practising contraception early in their life and adopt highly efficient methods.

According to data from the 1990 NFFS and 1995 AFS, knowledge of contraception in Addis Ababa is almost universal: in 1990 and 1995, respectively 98.1 and 98.5 per cent of currently married women reported knowledge of a modern method (figures are from primary analysis of the 1990 NFFS and the 1995 AFS by the author). These proportions compare favorably with those reported for Accra (98.3 in 1993) and Nairobi (96.4 in 1993), capital cities of two sub-Saharan African countries, Ghana and Kenya, which have had a population policy since the 1960s (NCPD, CBS and MI, 1994; GSS and MI, 1994; Adoo, 1994: 35-37; Anrudh and Kekovole, 1996: 113-156). The level of knowledge of family planning methods reported for Addis Ababa is also only marginally, about 1.5 per cent, lower than that of Dhaka, the capital of Bangladesh, another country known for its strong family planning effort (Cleland *et al.*, 1994; NIPORT and MI, 1995). Given the weak government commitment and the absence of population policy in Ethiopia until recent time, 1993, these results therefore show that

adequate progress in the area of family planning can still be made independently of a concerted effort and commitment by the agencies of government.

Table 5.5: Percentage of currently married non-pregnant women aged 15-49, reporting current use of contraception, by specific method, 1990 NFFS and 1995 AFS

Method	Date of survey	
	1990	1995
Any method	32.8	41.6
Any modern	20.8	27.7
Pill	13.6	13.2
IUD	5.2	4.4
Injectables	-	3.9
Diaphragm/Foam/ Jelly	-	0.3
Condom	0.5	1.7
Female sterilization	1.6	3.6
Male sterilization		0.3
Norplant	-	0.3
Any traditional	12.0	13.9
Periodic abstinence	8.0	7.7
Sexual abstinence	2.0	2.0
Withdrawal	1.6	2.6
Douche	0.4	0.4
Other traditional	-	1.2

Source: Computed by author from the respective data sets.

The two demographic surveys, the 1990 NFFS and the 1995 AFS, also indicate that as many as 42 per cent of ever-married women in 1990 and 61 per cent in 1995 have ever-used a modern method of contraception (figures are from the primary analysis of the respective data sets by the author). During the same period, current use of contraception, both modern and traditional, among currently-married women increased from 33 per cent in 1990 to 42 per cent in 1995. Not unexpectedly, these proportions are much higher than the levels for the rest of Ethiopia where fertility is also high (see Section 1.1): only 2.6 per cent of currently-married women in rural areas and approximately 20 per cent of those in 'Other urban' areas were using any form of contraception in 1990 (CSA, 1993: 194-196).

The specific methods of contraception used by respondents in Addis Ababa are indicated in Table 5.5. In both 1990 and 1995, the contraceptive pill was the most popular method of pregnancy control, followed by periodic abstinence and the IUD (Intra Uterine Device). In 1995, of those currently using contraception, approximately 32 per cent were using the pill, about 19 per cent were practising periodic abstinence (calendar method) and some 30 per cent used IUDs, or injectables, or Norplant, or were

sterilised. During the two survey periods, the relative share of modern methods in the contraceptive method mix rose from 63 per cent in 1990 to 67 per cent in 1995. Side by side with this increase in the relative share of modern methods as a whole, there was also a shift toward more efficient and relatively permanent contraception. Use of injectables and female sterilisation, methods that are known to be most effective in controlling pregnancy had registered significant increases. Such a shift toward more efficient methods can be expected to reinforce the ongoing reproductive change in Addis Ababa.

Although the level of current use of contraception in Addis Ababa is not that high even by the standards found in some cities in other sub-Saharan African countries, more women in Addis Ababa use relatively efficient methods than women in most other African cities (NCPD, CBS and MI, 1994: 43; GSS and MI, 1994: 41; CSO [Zimbabwe] and MI, 1995: 47). A comparison of data for 1995 with results from DHS surveys for comparable periods suggest that the proportions who were sterilised in Addis Ababa were more than twice as high as in Accra, 80 per cent higher than in Nairobi, and 44 per cent higher than in Harare. Given that use of contraception is in general higher in urban than rural areas and that the above cities are found in countries of sub-Saharan Africa which, according to some researchers (Blanc and Poukouta, 1997), are experiencing 'larger than expected' fertility declines in the region, it is highly likely that the proportion of sterlilised women observed in Addis Ababa could be among, if not, one of the highest in sub-Saharan Africa. However, it should be noted that compared to the figures for other developing countries, the rate recorded for Addis Ababa is still on the low side (do Valle Silva *et. al.*, 1990) .

A similar comparison for other methods reveals that a higher proportion of currently-married women in Addis Ababa were using injectables, another efficient method of birth control, than their African counterparts living in any of the cities cited above, except Nairobi. The proportion of currently-married women using injectables in Addis Ababa was more than 34 per cent higher than that in Accra and about 5 per cent higher than in Harare. Even the proportion of women practicing periodic abstinence and withdrawal, methods which require a better knowledge of one's reproductive system and greater co-operation between partners, were also higher in Addis Ababa

than any of these cities, except Accra (NCPD, CBS and MI, 1994: 43; GSS and MI, 1994: 41; CSO and MI, 1995: 47). Although the differentials in method mix observed between the cities to some degree reflect local program emphasis in each country, it is noteworthy that a relatively high proportion of women in Addis Ababa depends on more permanent methods.

Table 5.6: Distribution of women aged 15-49 years at first use of contraception by current age, number of living children at time of use and method at first use, Addis Ababa, 1990 NFFS

Number of living children and method	Current age							All ages
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
Panel A: % distribution of living children at time of first use of contraception								
0	26.8	32.5	31.7	7.1	8.7	7.8	6.8	20.0
1 – 2	66.4	55.2	47.2	54.6	37.3	28.7	32.3	45.7
3 – 5	6.8	8.5	20.2	31.5	47.1	46.5	37.7	28.1
6 +	0.0	3.8	0.9	7.8	6.9	16.9	23.3	6.2
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Panel B: % distribution of women by method at first use								
Any modern method	64.8	59.0	61.4	74.3	77.6	75.5	71.9	67.9
Pill	49.8	57.8	48.9	66.0	64.5	55.1	43.7	56.9
IUD	10.8	1.2	7.7	6.4	8.2	12.3	5.6	6.9
Other modern	4.2	0.0	4.8	1.9	4.9	8.1	22.6	4.1
Any traditional	35.2	41	38.6	25.7	22.4	24.5	28.1	32.1
Periodic abstinence	20.1	30.9	33.8	13.0	13.8	11.8	12.6	22.4
Withdrawal	1.9	6.2	2.7	0.9	0.0	0.0	0.0	2.0
Other traditional	13.2	3.9	2.1	11.8	8.6	12.7	15.5	7.7
All methods	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Computed by author from the 1990 NFFS data set.

The reproductive career stage at which women start using birth control methods is another aspect of contraceptive use behaviour which is of interest in fertility analysis. Table 5.6 presents the distribution of women by number of living children at first use of contraception obtained from the 1990 NFFS, the only one of the two fertility surveys from which such information was available. As can be seen from the table, about one in five women in Addis Ababa had begun practising contraception before they had one living child and only about one third, 34.3 per cent, had used contraception for the first time after having three or more children. Generally, women belonging to the younger cohort (15-29) were more likely to use contraception at an earlier stage of their reproductive career than women in the middle and older age

groups (30 years and over). While well over 25 per cent of women aged under 30 years had used contraception for the first time when they had no living children, the proportion who used contraception at the same parity level was less than eight per cent for women aged 30 years or over. The early adoption of contraception among younger women suggests a clear change in contraceptive use behaviour in Addis Ababa.

Table 5.7: Percentage distribution of currently married women using contraception at the time of survey by fertility intentions, age at survey and number of children ever born, Addis Ababa, 1990 NFFS and 1995 AFS

	Want more children		Do not want more		Undecided	
	1990	1995	1990	1995	1990	1995
Panel A: Fertility intentions by current age of women						
15-19	50.0	75.0	0.0	0.0	50.0	25.0
20-24	66.7	78.8	28.6	18.2	4.8	3.0
25-29	60.0	68.7	35.0	29.9	5.0	1.5
30-34	33.3	49.4	66.7	49.4	0.0	1.3
35-39	28.2	32.3	69.2	62.9	2.6	1.2
40-44	26.4	4.8	73.6	95.2	0.0	3.2
45-49	0.0	0.0	100.0	100.0	0.0	0.0
Panel B: Fertility intentions by number of children ever born						
0	100.0	88.9	0.0	11.1	0.0	0.0
1	81.8	86.0	13.6	11.6	4.5	2.3
2	57.1	56.8	38.1	40.9	4.8	2.3
3	59.5	54.8	38.1	45.2	2.4	0.0
4	37.5	26.7	59.4	68.4	3.1	4.9
5	37.5	30.4	62.5	69.6	0.0	0.0
6 or more	27.1	14.6	72.9	85.4	0.0	0.0

Source: Computed by author from the respective data sets.

However, it can be seen that although older women tend to use contraception much later in their reproductive career than do younger women, they appear to use more modern methods in their first use of contraception. For instance, a comparison of the figures for women aged 25-29 years and 30-34 years show that while as many as two-thirds of women aged 30-34 years had used pill as their first method, among women aged 25-29 years those who used the same method was only about 49 per cent. A similar pattern can also be seen clearly for periodic abstinence which was less frequently used among older than younger women at their first use of contraception.

Generally, these observations may suggest that most older women in Addis Ababa could be using contraception for regulating than spacing of births.

This is further illustrated by the data presented in Table 5.7. As can be seen from the table, while the majority of women who are using contraception in both surveys for spacing purposes, as approximated by their desire to have more children, are concentrated in the younger age groups, most of the users who do not want more children are in the older age group. A similar observation can also be made from Panel B, where the proportion of women wanting to have no additional child increases with parity. These observations, therefore, suggest that most older and high parity women who are currently using contraception in Addis Ababa are probably using them for stopping rather than spacing purposes. Moreover, the fact that, on each age group and parity level, the proportion of women who are currently using contraception and want no additional child is larger for the 1995 than the 1990 survey is also consistent with the trend of fertility decline observed between the two periods in the earlier chapter.

Table 5.8 presents trends in current use of contraception, between 1990 and 1995, among currently-married non-pregnant women by selected background characteristics. The evidence from the table indicates an increase in contraceptive prevalence rate across all socio-economic groups. Besides, for most groups, the increase in use of contraception was relatively large for women who had low prevalence rates in the previous survey, a pattern often associated with an advanced stage of fertility transition (Rodríguez and Arevana, 1991: 48). Hence, with respect to education, the increase was faster in the lower than in the higher educational groups, and the difference in current use of contraception between educational groups was also less pronounced in 1995 than in 1990. By 1995, almost half of the women with seven or more years of education, 42 per cent of those with 1-6 years of education and 31 per cent of women with no education were currently using a contraceptive method.

There has also been an increase in current use of contraception across all age groups. This observation is fairly consistent with the steep falls in fertility observed at both younger and older ages as well as at lower and higher birth orders in the previous chapter. Much in line with the rapid decline in fertility at higher birth orders noted in

the analysis of censored parity progression ratios in section 4.4, the rate of increase in current use of contraception in the present analysis was also considerably faster among older than younger women. As shown in the table, use of contraception in recent years has increased by 42 per cent among women aged 35 years or older, as against 11.4 and 24 per cent among women aged 15-24 and 25-34 years, respectively. By 1995, almost 49 per cent of women in the middle age group, 43 per cent of those in the age group 15-24 years and 35 per cent of those aged 35-49 years have been using contraception.

Table 5.8: Trends in current use of contraception among currently-married non-pregnant women by selected background characteristics of respondents, Addis Ababa, 1990 NFFS and 1995 AFS

Selected background characteristics of respondents	Currently using contraception (%)		% Change in contraceptive use 1990 - 1995
	1990	1995	
Addis Ababa	32.8	41.6	26.8
15-24	38.5	42.9	11.4
25-34	39.3	48.6	23.7
35-49	24.5	34.8	42.0
No education	15.2	31.0	103.9
1 – 6 years	35.0	42.4	21.1
7 – 8 years	36.9	49.3	33.6
9 or more years	47.8	50.0	4.6
Rural migrants	26.3	35.7	35.7
Urban migrants	41.2	51.4	24.8
Non-migrants	37.2	47.2	26.9
Coptic	32.8	40.9	24.7
Other Christian	35.9	44.2	23.1
Islam	19.6	43.8	123.5
Other religion	36.2	44.4	22.7
Amhara	37.2	43.5	16.9
Oromo	27.1	39.8	46.9
Gurage	25.4	39.2	54.3
Tigrawai	31.8	37.5	17.9
Others	33.0	50.0	51.5
Working	43.4	49.0	12.9
Not working	27.1	36.2	33.6

Source: Computed by author from the respective data sets.

With respect to migration status, prevalence rates were higher among respondents with non-rural background, probably because most of the women in this category are better educated and have longer exposure to an urban life style, both of which are likely to produce a lower demand for children and high contraceptive use

among these women. By 1995, 36 per cent of rural migrant women, 47 per cent of non-migrant women and 51.4 per cent of urban migrant women had reported using a contraceptive method. However, in recent years rural migrants are experiencing a much faster increase in contraceptive use than women born either in Addis Ababa or in other urban areas.

All ethnic and religious groups in Addis Ababa had experienced a substantial increase in contraceptive use during the 1990-95 period. However, once again, the increase was much higher for groups which previously had low level of contraceptive use, such as Muslims and women belonging to the Gurage and Oromo ethnic groups. A similar pattern is also evident for the data on work status. The increase in use of contraception among non-working women was more than twice than that observed among working women. As will be shown in the next chapter, these are also the same group of women who have experienced rapid fertility decline in the city in recent years.

5.2.2. Induced abortion

Apart from contraception, abortion is another method through which women attempt to control their fertility within the childbearing span; hence it has a direct impact on both individual and aggregate fertility performance (Bongaarts, 1982; Hobcraft, 1987; Bongaarts and Westoff, 2000). However, although this is recognised, most studies of proximate determinants of fertility in developing countries, especially in sub-Saharan Africa rarely examine the demographic effect of abortion, because of the absence of reliable data, and even if they do, the approach has been mostly indirect (Bongaarts and Potter, 1983; Casterline *et al.*, 1984; Jolly and Gribble, 1993; Blanc and Pokouta, 1997). Cultural sensitivity and legal restrictions on induced abortion in many societies around the world are the two main reasons responsible for the dearth of information.

On a theoretical level, two extreme patterns of induced abortion practices are expected in the transition from high to low fertility (Tietze and Bongaarts, 1976). The incidence of induced abortion is anticipated to be relatively small if historically widespread contraceptive use precedes abortion practices. Conversely, the incidence of induced abortion will be quite large if use of induced abortion preceded the widespread availability of contraception. Given the low program performance of the Ethiopian

family planning sector in general and the history of restriction of access to its services, until recent times, to only married women (Haile, 1991, also see Section 3.7) one would anticipate the pattern of abortion in Addis Ababa to resemble the latter type. The widespread acknowledgement of the existence of induced abortion by participants in the qualitative study, supports this assertion. Not only did all respondents report knowledge of the procedure (that is, induced abortion as a method of birth control), but several of them were also personally aware of someone (including themselves) who had had an abortion.

The 1990 and the 1995 fertility surveys collected four types of information on abortion from all women aged 15-49 years, which also confirm the widespread practice of induced abortion in the society. Specifically, the two surveys asked information on: (a) respondent's knowledge about induced abortion; (b) whether she knew of anyone who had an induced abortion; (c) ever use of such method by the respondent herself; and (d) for those who had ever used the method, the total number of abortions they had had up to the time of the survey. Table 5.9 provides some indices on ever-use and knowledge of induced abortion in Addis Ababa obtained from this information.

Table 5.9: Knowledge and ever-use of abortion, Addis Ababa, 1990 NFFS and 1995 AFS

Age at Survey	% knew of someone who had an abortion		% ever had an abortion	
	1990	1995	1990	1995
15 – 19	38.6	24.2	1.6	0.0
20 – 24	31.3	39.6	3.0	2.0
25 – 29	38.5	36.3	1.4	6.2
30 – 34	34.7	40.7	1.5	9.5
35 – 39	28.6	38.3	3.2	4.7
40 – 44	29.5	33.6	1.8	3.8
45 – 49	27.6	33.7	0.0	3.5
15 – 49	30.5	38.0	2.1	3.4

Source: Computed by author from the respective data sets.

As can be observed from the table, over 30 per cent of respondents in 1990 and 38 per cent in 1995 knew of someone who had had an induced abortion. A comparison of the figures between the two surveys across age groups, or on a cohort by cohort

basis, also shows that these proportions are generally higher in the later survey. Although these values do not inform us directly about the extent of abortion, the increasing trend implied in these proportions may be interpreted as an indirect evidence of the increasing prevalence of induced abortion in the area. As can be seen from the figures presented in the last two columns, the proportion of women aged 15-49 years who have ever used induced abortion in their lifetime rose from 2.1 per cent in 1990 to 3.4 per cent in 1995. While no women aged 45-49 years in 1990 reported ever having induced abortion, 3.5 per cent of those in the same age group five years later did so.

A similar pattern of an increase in ever-use of abortion is evident for all ages, except the two youngest age groups. As is seen from Table 5.9, in 1995 as many as 9.5 per cent of women aged 30-34 years, 6.5 per cent of those in age group 25-29, and about 5 per cent of those aged 35-39 years have had an abortion experience. In contrast, the proportions who had ever used abortion in 1990 in the indicated age groups were only 1.5, 1.4 and 3.2 per cent, respectively. The two youngest age groups, 15-19 and 20-24, were the only group for which a decline in the proportion of ever-use of induced abortion was observed between the two survey years. As shown previously, women who were in the younger age groups had reported using contraception early in their reproductive life and this may explain the decline in ever-use of induced abortion as a method of birth control recorded for these age groups. On the other hand, the increasing availability of backyard abortionists, which has reduced the financial cost of abortion, and the introduction, since the early 1990s, of menstrual regulation (MR) services in some family planning clinics operating in the city (MSI-E, 1996) may be responsible for the sharp increase in the proportion of ever-use of abortion observed for the other age groups.

From a methodological viewpoint, abortion analysis is not dissimilar to fertility analysis. Two measures are widely used: the general abortion rate, which measures the frequency of abortions per 1000 women of reproductive age for a specified period of time, generally one year; and the total abortion rate, which indicates the total number of induced abortions an average woman would have at the end of her reproductive period for a constant age-specific abortion rate (Bongaarts and Potter, 1983; Alan

Guttmacher Institute, 1999; Bongaarts and Westoff, 2000). Both of these measures in effect require period-specific data. However, the 1990 and 1995 fertility surveys from which relevant information on induced abortion are available did not collect such information. The relevant questions from these surveys, as stated above, sought data from each woman only on ever-use and number of abortions, but not on the period in which such abortions were undertaken. But the latter information is important in many respects: not only would it help to generate a period-specific measure of the incidence of abortion, which, like the total or general fertility rate, is a standard measure of comparison, but also it is only through such information that the impact of induced abortion on aggregate fertility can be assessed directly. To address this problem I propose a general procedure that enables to convert the time-less data on number of abortions collected at two points of time into a time-specific measure of induced abortion. Table 5.10 provides the application of this procedure on the available data, while the technical details of the method are presented in Annex II.

Table 5.10: Indirect estimates of total and age-specific abortion rates, Addis Ababa, estimated from 1990 NFFS and 1995 AFS

Age at survey	Average abortions per woman		Inter-survey cohort abortion increments 1990-95	Hypothetical Age-specific Abortion rates At midpoint 1990-95	Adjusted [a] inter-survey cohort abortion increments 1990-95	Adjusted [a] hypothetical age-specific abortion rates at midpoint 1990-95
	1990	1995				
15 – 19	.0161	.0000	.0000	0.0000	.0000	.0000
20 – 24	.0358	.0168	.0007	.00014	.0063	.0013
25 – 29	.0319	.0429	.0071	.00142	.0097	.0019
30 – 34	.0319	.1178	.0859	.01718	.1904	.0381
35 – 39	.0295	.0540	.0223	.00446	.1378	.0276
40 – 44	.0238	.0426	.0130	.00260	.2842	.0568
45 - 49	.0000	.0474	.0236	.00472	.1391	.0278
TAR				.1526		.7674

Source: Computed by author from the respective data sets. a Includes reports of miscarriages which are assumed to be abortions.

The hypothetical age-specific abortion rates shown in Table 5.10 indicate that the highest rate of abortion in Addis Ababa occurs to women in the age group 30-34: for every 1000 women in that age group about 17 abortions take place every year. The rates for women in the younger age groups are generally lower. The total abortion rate (TAR) calculated from the data suggest that subject to the hypothetical age-specific

abortion rates, an average woman in Addis Ababa can expect to have 0.15 abortions by the end of her reproductive years. Taking the inter-survey mid-year female population as a simple average of the female population enumerated in the two surveys, the age-specific abortion estimates shown in the table translate into an annual general abortion ratio of 3.4 abortions per thousand women of reproductive age. For the city as a whole, with a population of about 2.1 million persons in 1994 (OPHCC, 1995:20), this also gives a total of 1592 abortions per year. Considering that a significant proportion of respondents in the two fertility surveys as well as the qualitative study have reported knowledge of someone who had used induced abortion as a method of birth control, and from my own knowledge of the study area, these figures appear low.

The low level of the estimates probably arises from the combined effects of under-reporting and measurement error associated with the method used for deriving these rates. For instance, the derivation of the inter-survey abortion increments in the present analysis, much in the same way as those used in fertility estimation, was based on the implicit assumption that the abortion experience of those who did not survive was the same as those who survived and were enumerated in the respective surveys. However, there are chances that this assumption may be violated because in societies such as the study area where the majority of women seeking abortion services often end up in the hands of backyard abortionists, those who undergo abortion may have higher mortality than the general population. In other words, this means that the women who happen to survive and be enumerated in each of the surveys may represent a select group of women with a high survival rate and less experience of abortion. This in turn means a lower average rate of abortion per woman than would otherwise be. The same applies to the effect of migration, since particularly in the study area, owing to the high stigma attached to premarital pregnancy those who are in this situation are likely to move out of their usual area of residence for an abortion. These factors may therefore partly explain the low abortion rate observed in the present analysis.

Moreover, because of both cultural sensitivity and the illegal nature of abortion, it is not entirely unlikely that respondents could have deliberately understated their experience to interviewers. There are several studies which indicate that women are often reluctant to admit to survey interviewers that they have terminated a pregnancy

(Singh *et al.*, 1997: 100; Okonofua *et al.*, 1999: 67). Given this problem of under-reporting, in some cases, researchers combine miscarriage and abortions into a single value under the assumption that some respondents report induced abortions as miscarriages (do Valle Silva *et al.*, 1990: 11).

Estimates calculated on the basis of a similar assumption for Addis Ababa (see the adjusted estimates) increase the inter-survey general abortion rate to 14.2 per thousand women of reproductive age and the total abortion rate to 0.77 abortions. The adjusted estimate also indicates a total number of 6705 abortions per year for the city. While there are no independent sources to verify the accuracy of these estimates, they are likely to be more accurate than those based on reports of abortions alone, since the huge gap between the two estimates would have meant the existence of an extremely high level of 'miscarriages' in the city. This is unlikely given the fact that intrauterine mortality is one such proximate determinant of fertility that varies little among populations and has a minor effect on aggregate fertility level (Bongaarts, 1982: 180; Wood, 1994: 515). However, for a number of reasons the results presented in this section may still need to be treated with some caution. For instance, the age-specific lifetime abortion rates shown in the first two columns of Table 5.10, as well as the proportions on ever-use of abortion presented in Table 5.9, do not display a clear rising trend with age as would 'normally' be anticipated from a lifetime-based measure. Although this pattern may in part reflect genuine cohort differences in level of involvement in unplanned sexual activity, views on abortion and access to family planning services, the actual reasons are difficult to ascertain from the available data, hence some caution is desirable.

5.3. Postpartum insusceptibility

Apart from use of deliberate birth control devices, there are several behavioural and physiological factors which can directly or indirectly influence the fertility performance of a woman. For instance, following childbirth, each woman experiences a period of temporary infecundability, commonly refereed to as the postpartum non-susceptibile period, during which she does not ovulate (Page and Lesthaeghe, 1981; Bongaarts and Potter, 1983; Page, Lesthaeghe and Shah, 1982). However, since amenorrhoea is easier to observe than anovulation, most researchers instead use the duration of amenorrhoea as

a proxy measure of the postpartum non-susceptible period (Page *et al.*, 1982: 8; Bongarrts, 1983: 105). The duration of both lactational amenorrhoea and anovulatory interval is in turn determined by the duration, intensity and pattern of breastfeeding. Research findings show that breastfeeding leads to the release of prolactin which inhibits the release of gonadotrophin, the hormone which initiates the resumption of the menstrual cycle (McNeilly, 1993). This implies that the longer and the more intensive breastfeeding is, the greater the release of prolactin and therefore the greater the contraceptive effect of breastfeeding (Leridon, 1977 cited in Bongaarts and Potter, 1983: 25; Page *et al.*, 1982). Besides, in most of sub-Saharan Africa women tend to abstain from sexual intercourse while breastfeeding their children; this postpartum practice can also have a significant impact on fertility performance (Page *et al.*, 1982: 9; Gaisie, 1984: 21; Jolly and Gribble, 1993: 73).

The 1990 NFFS and the 1995 AFS provide data on breastfeeding, amenorrhoea and practices of postpartum abstinence relating to the two most recent births that can be used to examine the fertility-reducing impact of postpartum-related factors in the study area. However, given the problem of heaping of responses, and selectivity and censoring biases associated with such data, it is recommended that analysts consider using aspects of the data that provide current status information (that is whether the woman is still amenorrhoeic, whether she is still abstaining, whether she is still breastfeeding since the birth in question) and focus only on births pertaining to a specific period of time preceding enumeration rather than using the entire data set (Page *et al.*, 1982; Trusell *et al.*, 1992; Cleland *et al.*, 1994). These considerations require setting an appropriate cut-off point for determining the length of the reference period so as to avoid any bias associated with restricting the analysis to a section of the data. For instance, a reference period which is too short, such as that lasting only one to two years prior to enumeration, could produce a biased estimate on postpartum variables, especially in societies where a significant proportion of women breastfeed or abstain for a period longer than that chosen for analysis (Page *et al.*, 1982: 16). The issue of sample size is also of concern especially when one considers a very short reference period, since the shorter the period the smaller the number of births that will fall within the sample and the greater the variability of the postpartum indicators that will be estimated from such a source (Shah, 1984: 127; Trussell *et al.*, 1992: 290). On the other

hand, with a longer reference period it must also be considered that the further one goes back, the more likely it is for women with short birth-intervals to be over-represented or even have more than two births during the period under consideration, hence creating the problem of omission of births to this group of women, since such information is to be extracted from the two most recent births. Page and her colleagues (1982: 22) suggest that the cut-off point for determining the length of the reference period for analysis can be 'most conveniently defined as equal to or longer than the longest duration of breastfeeding in the population.' Following this proposal and a preliminary exploration of the two surveys used for analysis, the 1990 NFFS and the 1995 AFS, a three year reference period was chosen for the present study.

Having set the period of interest, the information on postpartum variables is then grouped according to the number of single months elapsed since the birth of the index child, t, and the proportions for which the mothers were still breastfeeding, were still amenorrhoeic and still abstaining were computed. These proportions, *S(t)*, are taken directly as estimates of the lifetable survivorship function l_x and employed in estimating the mean duration of the postpartum variables shown in Table 5.11 (Page *et al.*, 1982: 25-29). However, since the survival function in the present analysis, like in most other cases, was non-monotonic (because of digit preference and, more particularly, because of fragmentation of the sample into small sub-samples of births which occurred t months ago), estimates of quartiles could not be obtained directly from these data. For this reason, the observed survival function was therefore first adjusted using the pool-adjacent-violators algorithm[2] and the relevant measures of quartiles were estimated there after (Trussell *et al.*, 1992: 292).

Table 5.11 presents mean duration and quartiles estimated following the above procedures. Also presented in the table are the mean duration of postpartum variables estimated using an alternative procedure, the 'prevalence-incidence' method (Mosley, Werner and Becker, 1982: 5-7; Cleland *et al.*, 1994: 28). More like the methods used in epidemiology, this approach involves comparing the prevalence of a phenomenon (*P*)

[2] This procedure involves moving along the survivor curve until one encounters a value that is higher than the value for the duration younger than it. Then one backtracks over as many durations as necessary for their average to exceed or equal the proportion surviving at the point which the monotonicity requirement initially failed (Trussell *et al.*, 1992: 292).

with its incidence (*I*), that is *P/I*. When applied to postpartum variables, prevalence refers to the number still breastfeeding, amenorrhoeic or abstaining at the time of survey, and incidence is the average number of births per month. One advantage of this procedure over that based on the life-table technique is that it requires no information on dates at all, a major concern in data on postpartum variables (Page *et al.*, 1982: 31). Although the prevalence-incidence procedure assumes a constant flow of births during the period under consideration, which may not strictly hold under conditions of rapid fertility change (as is the case in the present study for instance), it is regarded as a robust technique and has been extensively used in the analysis of proximate determinants of fertility (Knodel *et al.*, 1987: 80; do valle Silva *et al.*, 1990: 11; Jolley and Gribble, 1993: 105; Cleland *et al.*, 1994: 28; Moreno and Singh, 1996: 116).

Table 5.11: Duration of postpartum variables (in months) following a live birth, estimate based on births in last three years preceding survey, Addis Ababa, 1990 NFFS and 1995 AFS

Postpartum variables (duration in months)	Quartiles				Mean I [b]	Mean II [c]	Prop. ever breastfed S(0)
	Q_1	Q_2	Q_3	Trimean[a]			
Breastfeeding							
1990	8.24	16.50	25.00	16.60	19.99	19.28	96.6
1995	9.00	17.41	25.50	17.33	20.20	20.19	96.8
Amenorrhoea							
1990	7.00	14.50	23.60	14.90	11.58	10.97	
1995	8.51	14.82	24.00	15.54	13.30	12.61	
Abstinence							
1990	3.10	6.10	12.30	6.23	5.93	6.03	
1995	3.40	5.70	11.90	6.67	7.03	6.51	

Source: Computed by author from the respective data sets. *Notes*: Q_1, Q_2, Q_3 are the duration (in months) at which 25 per cent, 50 per cent (median), and 75 per cent are no longer breastfeeding, amenorhoeic, or abstaining from sexual intercourse following the birth of a child; [a] Trimean = $(Q_1 + 2Q_2 + Q_3)/ 4$; [b] Estimated mean duration using lifetable technique; [c] Estimated mean duration using Prevalence-Incidence method.

The data for both 1990 and 1995 show that breastfeeding in Addis Ababa is both universal and long. About 97 per cent of children born in the three years preceding the respective surveys had received some form of breastfeeding. The estimates of the duration of breastfeeding obtained from both the life-table technique and the prevalence-incidence method show that in both periods women tend to breastfeed their children for an average duration of 19-20 months. The median duration (Q_2) of breastfeeding is about 17 months, while the upper twenty-five per cent (Q_3) of women

seem to breastfed their children for well over two years. The median duration of breastfeeding (Q_2) estimated for Addis Ababa is exceptionally long compared to results for other cities in sub-Saharan Africa and certainly to countries with a similar fertility level as Addis Ababa's (NCPD, CBS and MI, 1994; GSS and MI, 1994; CSO [Zimbabwe] and MI, 1995; CSO [Zambia] and MI, 1997: 124). It is also interesting to note that the custom of prolonged breastfeeding in Addis Ababa appears to have remained unchanged over time. The mean duration of breastfeeding, calculated on the basis of the two methods, shows a value close to 20 months for both 1990 and 1995. This pattern corroborates Casterline's observation that 'fertility declines are not necessarily associated with significant changes in breastfeeding behaviour' (Casterline, 1991: 75).

The stability of breastfeeding duration does not necessarily imply that its fertility-reducing impact is also constant. The frequency, duration and diurnal pattern of suckling are all important factors in the inhibition of ovulation (Cleland *et al.*, 1994: 29). However, as stated earlier the return of ovulation can not be measured precisely in surveys, but the timing of the return of menses can be used as its surrogate measure. Estimates of the mean duration of amenorrhoea obtained from both methods (that is the life-table and the prevalence-incidence method) demonstrate that there is no sign of decline in the length of lactational protection in the study area. The median length of lactational protection in both 1990 and 1995 was about 15 months. This estimate is also long even by sub-Saharan African standard. A comparison of the estimate obtained for Addis Ababa with other selected cities in the region show that the median duration of amenorrhoea observed in Addis Ababa was 5.3 months longer than that of Accra (1993), 6.3 months longer than that in Lusaka (1996) and about 10 months longer than that of Nairobi (1993). As a matter of fact, the mean duration of lactational protection observed in Ethiopia as a whole, 19.9 months in 1990 (CSA, 1993: 166), was, also like that in the city, the longest in the sub-continent, paralleled perhaps only by that found in Burundi, a country which had a mean amenorrhoeic duration of 19.4 months in 1987 (Jolly and Gribble (1993: 74). The conclusion that emerges from the above analysis is, therefore, that the length of lactational protection in Addis Ababa as well as in Ethiopia is generally longer than that found in most countries and cities in other parts of sub-Saharan Africa. Such a pattern of postpartum practice can therefore be expected to

have a significant effect on fertility, since long duration of amenorrhoea generally leads to a long non-susceptible period.

The data presented in Table 5.11 also show that women in Addis Ababa abstained for an average of about six months in 1990 and about seven months in 1995, suggesting a slight increase of about one month in recent years. However, given that both estimates are significantly shorter than the duration of breastfeeding and amenorrhoea observed in the corresponding periods, the change in the length of postpartum abstinence will have very little effect on the fertility performance of women in the area. Yet, it may be interesting to note that the duration of abstinence observed in Addis Ababa is generally longer than that found in most Eastern and Southern African cities but significantly shorter than that found in parts of West Africa, where sexual activity during lactation is considered a taboo (Page *et al.*, 1982: 9; Gaisie, 1984: 21; Jolly and Gribble, 1993: 74).

5.4 Fertility impairment

Impaired fertility is a well-documented public health issue in Africa and another important proximate determinant of fertility in the region (Frank, 1983; Bongaarts *et al.*, 1984, 1990; Larsen, 1995, 1996). For the 21 African countries for which data were available as early as the 1960s and 1970s, levels of childlessness were reported to be as high as 12 per cent for the majority of countries, while small areas in Central Africa had rates reaching as high as 30-40 per cent (Frank, 1983). The implication of such a high prevalence of infertility for studies on fertility and its determinants in the region is self evident. As Frank points out, taking account of natural infertility, which is estimated to be around three per cent in a developing-country context (Frank, 1983; Bongaarts *et al.*, 1984), the above data suggest that fertility in these countries had been reduced from its potential level by as much as one live birth per woman (Frank, 1983). Although subsequent studies carried out in the region, using more recent sources, show a general and significant decline in fertility impairment in many parts of sub-Saharan Africa, its prevalence still remains high by most standards (Mammo and Morgan, 1986; Tesfaghiorgis, 1990; Larsen, 1993, 1995, 1996). Using DHS and WFS data for 23 African countries, a recent study indicated that the proportion sterile at age 34 in the subcontinent still ranges from 11 per cent in Burundi to 41 per cent in Cameroon

(Larsen, 1993). As a region, the highest levels of fertility-impaired women in sub-Saharan Africa are found in the countries of Central Africa, where rates reach 20 per cent or higher, followed by East Africa and West Africa, which have 12-19 and 3-11 per cent infertile women, respectively (Frank, 1983; Bongaarts *et al.*, 1990). This high rate of childlessness and its geographic variation is usually linked to the widespread incidence of sexually transmitted diseases in the region (Bongaarts and Potter, 1983: 41; Stover, 1998: 259).

Although there is little evidence on high sexual mobility that often fosters the spread of sexually transmitted diseases, existing evidence on Ethiopia, albeit limited, reveals the existence of infertility problems in the country (Mammo and Morgan, 1986; Tesfaghiorhgis, 1990). According to these studies, the prevalence of fertility impairment in the country ranges from as low as three per cent, which is the expected natural infertility rate for any developing-country population, in the southeastern part of the country, to as high as 16 per cent in the southwestern tip of Ethiopia (Tesfaghiorghis, 1990). The existence of such high level of fertility impairment in some parts of Ethiopia poses a question regarding the level and trends of fertility in the study area. In other words, Addis Ababa being the national capital and a source of attraction to people from different parts of the country, to what extent can the low level of fertility observed in the previous chapter be then regarded as free from elevated levels of childlessness and sub-fertility that arises from possible differential patterns of in-migration to the city?

Two aspects of fertility impairment, childlessness or primary sterility and sub-fertility or secondary sterility, are of special interest in understanding the magnitude of fertility impairment and its effect on fertility performance (Gray, 1983; Larsen and Menken, 1989; Larsen, 1994). As used in this study, primary infertility refers to the proportion of women who have never been able to bear a child, while secondary infertility measures the proportion of women who could not produce more than one birth (Larsen, 1994: 459-461). These measures are often estimated for women aged 30 years or over, mainly to avoid the incidence of childlessness that arises from variations in exposure to the risk of pregnancy and childbirth that are largely a result of patterns

of marriage rather than actual problem of fertility impairment. Table 5.12 presents similar measures estimated for women in Addis Ababa.

Table 5.12: Some measures of fertility impairment, Addis Ababa, 1990 NFFS and 1995 AFS

Age at survey	% childless		% Has no second child *	
	1990	1995	1990	1995
Panel A: All women				
30-39	7.4	14.4	8.0	11.4
40-49	6.5	4.1	8.1	8.1
Panel B: Women married continuously for five or more years				
30-39	3.8	2.2	4.6	8.2
40-49	3.6	2.1	5.5	2.1

Note: *The figures are obtained from data for women with at least one live birth; Source: Computed by author from the respective data sets.

Panel A shows that among women aged 30-39 years, the proportion childless was twice as high in 1995 as in 1990, and both proportions were also higher than that recorded for women in the 40-49 age group in both surveys. These measures are theoretically consistent with an increase in the incidence of cohort childlessness, but in the present case they are more likely to be a reflection of the changes in marriage patterns in the area. As shown previously in this chapter, on average, women in the city in recent years marry in their late twenties, so by their early thirties many women may have not spent sufficiently long in the married state, and some may still be looking for a partner. Hence, both these factors tend to produce a higher proportion of childless women in age group 30-39 years which may not necessarily reflect higher levels of sterility among younger cohorts, but their reduced exposure to risk of pregnancy. In fact, a cross-comparison of cohort results from the two surveys shows that of the seven per cent women reported childless at age 30-39 years in 1990, only four per cent were childless after ten years, at age group 40-49 years. The latter proportion is indeed significantly lower than the 6.5 per cent observed for women of the same age group, 40-49 years, in the earlier survey (in 1990). This demonstrates that by the end of their reproductive age fewer women in 1995 were childless than were women who reached the same stage in 1990, a trend that suggests a decline in primary sterility in the study area.

An additional measure of childlessness was constructed by restricting the analysis to women who had been married continuously for at least five years (Larsen,

1996). This measure helps to directly control in the estimated proportions the bias that is related to non-marriage or loss of exposure to risk of pregnancy and childbirth. However, since in areas such Addis Ababa, as in many other places in sub-Saharan Africa, childless women tend to be abandoned by their husbands, measures of both childlessness and secondary infertility that are based merely on married women are likely to give relatively low estimates of childlessness (Menken and Larsen, 1994). Notwithstanding this limitation, the estimates calculated for Addis Ababa and presented in Table 5.12 show that the proportion childless among women aged 40 years and over in 1995 was only about two per cent and the corresponding proportion for 1990 was 3.6 per cent. Not only do these proportions indicate a declining trend over time, they are low by any standards (Bongaarts and Potter, 1983). This suggests that the study population does not suffer from any significant problem of childlessness.

The data on secondary sterility, measured as a proportion of women with no second child and who did not practise any form of contraception, obtained from both all women and women who have been married continuously for five or more years, point to a similar pattern of a decline in the proportion of women with fertility impairment. As can be seen from the values shown in Table 5.12, the proportion of women aged 40-49 years with only one child has declined from 5.5 per cent in 1990 to 2.1 in 1995. A similar trend of a decline in both primary and secondary sterility in rural Ethiopia has been reported by previous researchers (Mammo and Morgan, 1986; Tesfaghiorghis, 1990). Mammo and Morgan (1986) reported that childlessness in rural Ethiopia declined from 12 per cent in 1970 and earlier periods to just five per cent in the late 1980s. The decline in fertility impairment may be attributed to the general improvement in public health and the significant decline in malaria infection, resulting from state-organised intervention programs in areas that are exposed to such risks (Mammo and Morgan, 1986; Tesfaghiorgis, 1990).

To sum up, although the relative influence of sterility on the level of aggregate fertility in Addis Ababa is to be closely assessed in the following section, using the Bongaarts model, the results and the discussion presented in this section demonstrate the absence of any notable fertility impairment problem in the area that could explain the low level of fertility observed in the previous chapter. The existing data present

clear evidence of a decline in childlessness and secondary sterility in Addis Ababa. This in actual fact implies that had it not been for the compensating effects of the remaining core proximate determinants, the trends in fertility impairment implied in the present analysis could have produced an increase in fertility in the study area.

5.5. Relative importance of the proximate determinants of fertility: An aggregate analysis

Having examined the evidence concerning the pattern and trends of each of the proximate determinants of fertility, the focus in this section is on estimating the fertility-reducing impact and relative importance of each of these factors to the recent change in period (aggregate) fertility in the study area. For this purpose, I use the 1990 and 1995 fertility surveys as my main sources of data and base the analysis on the model proposed by Bongaarts and his colleagues (Bongaarts, 1978, 1982; and Bongaarts and Potter, 1983; Bongaarts *et al.*, 1984, 1990). The Bongaarts model is, however, by no means the only approach to analyse the fertility-reducing impact of proximate determinants of fertility. A number of researchers in the past have proposed alternative procedures (Gaslonde and Bocaz, 1970 cited in Hobcraft, 1987; Mosley, Werner and Becker, 1982; Hobcraft and Little, 1984; Moreno, 1991; Wood, 1994). However, the elaborate nature of the data requirement of some of the models (for instance, Hobcraft and Little's Fertility Exposure Analysis and Moreno's 'alternative' model to the Bongaarts' framework) and the absence of some key proximate determinants in others (postpartum infecundability in the case of Gaslonde and Bocaz's model and deliberate fertility control methods in the case of Wood's and Mosley *et al.*'s frameworks) make these procedures unsuitable for most purposes, including the present analysis. By contrast, the information required for the application of the Bongaarts's model is easily available from most fertility surveys and the model also incorporates almost all the principal proximate determinants of fertility. Moreover, it is by far the most widely used integrated framework, making comparison of results with other societies and prior studies possible (Hobcraft, 1987, 826; 1992; Moreno and Singh, 1996: 114; Stover, 1998: 255).

The Bongaarts framework identifies seven proximate determinants of fertility and proposes separate indices that measure the fertility-inhibiting effects of five of the

factors, namely marriage, contraception, induced abortion, postpartum susceptibility and pathological sterility. For each of these factors, their individual fertility-reducing impact is assessed by comparing an estimate of the fertility level that would prevail in its presence and then in its absence. The proposed indices range in value from 0 to 1. When a given proximate determinant has no fertility-inhibiting effect, the corresponding index equals 1; if fertility inhibition is complete, the index equals 0. Thus, the lower the index, the more influential is the proximate determinant in reducing the fertility rate from its potential maximum level.

The Bongaarts model may be expressed using the following algebraic expression (Bongaarts, 1982; Bongaarts and Potter, 1983; Bongaarts *et al.*, 1984, 1990).

$$TFR = C_m \, x \, C_c \, x \, C_i \, x \, C_a \, x \, C_p \, x \, TF \quad \ldots\ldots\ldots\ldots\ldots (5.1)$$

Where *TF* and *TFR* are the total fecundity and total fertility rate, and C_m , C_c , C_i, C_a and C_p are the various indices that measure the fertility-inhibiting effect of the five intermediate variables of fertility, namely marriage, contraception, lactational infecundability, abortion and pathological sterility. C_m measures the extent to which the total fertility is lower than it would be if all women were continuously married between ages 15 and 49, and experienced throughout this period the observed age-specific marital fertility rates. The index of marriage equals 1 if all women of reproductive age are married throughout the entire reproductive life span and 0 in the absence of marriage. C_c is an index of contraception reflecting the relative loss of potential fertility within marriage due to use of contraception. The index of contraception equals 1 in the absence of contraception and 0 if all fecund women use 100 per cent effective contraception. C_i reflects the reduction in marital fertility from its maximum potential for reasons of postpartum practices and behaviour (amenorrhoea or abstinence, whichever is longer). C_a is an index of abortion, that reflects the reduction in fertility due to practices of induced abortion, and C_p is a measure of the inhibiting effects of sterility on fertility. The original Bongaarts model did not include the index of sterility, it is in a later work that the index was added

(Bongaarts *et al.*, 1984, 1990). The calculation of this index is based on a three per cent standard rate of childlessness in developing countries at age 45-49 that was established by Frank (1983) and Bongaarts *et al.* (1984, 1990). Hence, the index will take a value of unity if three per cent of women at the end of their reproductive ages are childless, and it decreases as the proportion of these women increases. However, some studies in sub-Saharan Africa have recently documented C*p* values of greater than one, which indicate that levels of sterility in those societies were lower than the three per cent level, which Frank (1983) and Bongaarts *et al.* (1984, 1990) stipulated as the minimum for a developing country (see Sibanda, 1999: 93, for Kenya, 1988-89 and 1993, and Zimbabwe, 1988-89 and 1994; Jolly and Gribble, 1993: 78, for Burundi, 1988, Ghana, 1988, Kenya, 1988-89, Ondo State of Nigeria, 1986-87, and Togo, 1988).

Although the Bongaarts model is used most widely in its aggregate form, that is as applied to all age groups, in the present investigation an age-specific version of the model has been used (Bongaarts and Potter, 1983: 114-119; Stover, 1998: 265). This helps to examine if there are any age-related variations in the impact of individual proximate determinants of fertility in the area. The final results of the analysis are prepared for three broad age groups, namely 15-24, 25-34 and 35-49, as well as for all ages combined. Moreover, in order to distinguish between the two distinct effects of loss of union exposure on potential fertility, one which is due to non-marriage or delayed marriage and the other due to dissolution of marriage, the general effect of marriage as given by the index of C_m has been dis-aggregated into two components: an index that measures the proportionate reduction in fertility due to celibacy and delayed marriage and represented by the index C_{em}; and an index that reflects the further proportionate reduction due to voluntary and involuntary marital dissolution (that is, separation, divorce and death) and represented by C_{diss} (Casterline *et al.*, 1984: 19). The index of contraception, C_c ,has also been disaggregated into two components. These were a component that measures the inhibiting effect of modern methods C_{mod} and one that measures that of the effects of traditional contraception C_{trad}. The basic model employed in the present analysis, therefore, has the following form:

$$TFR = C_{em} \; x \; C_{diss} \, x \, C_{mod} \, x \, C_{trad} \; x \, C_i \; x \, C_a \, x \, C_p \, x \, TF \quad \ldots\ldots\ldots\ldots (5.2)$$

Where C_{em} measures the proportionate reduction in fertility due to celibacy and of delayed marriage, and C_{diss} reflects the further proportionate reduction due to marital dissolution. The product of the two indices (C_{diss} x C_{ems}) provides the overall effect of loss of union exposure (that is, C_m) on potential fertility. Similarly, C_{mod} and C_{trad} respectively represent the effects on marital fertility of the use of modern and traditional contraception methods. The product of these two indices provides the overall effect of contraception use, that is C_c , on marital fertility. The other five variables, including TF and TFR, are as defined in 5.1.

Alternative ways of estimating some of the above indices have been recently proposed by Stover (1998), but could not be employed in the present study for lack of data. However, the new approach is expected to produce more robust result than that of the original Bongaarts model in the following three cases: when a considerable amount of childbearing takes place outside of marriage; when the prevalence of sterility is high; and when sterilisation is the 'principal method of contraception' (Stover, 1998: 266). In the study population, in 1995, less than four per cent of women had been using sterilisation as a method of contraception (CSA, 1997: 105). For the same period, only 3.3 per cent of the women aged 45-49 years had had no live birth, an indication of the low level of primary sterility in the area (CSA, 1997: 43). According to the same data, births among never married women constituted barely 3.8 per cent of the total reported for the period prior to survey, which suggests a low prevalence of premarital childbearing (CSA, 1997: 53). Judging from these statistics and the conditions set out above, it is, therefore, highly likely that even if the relevant data were available and the measures and revisions proposed by Stover had been incorporated, the final conclusions would have been similar to those presented in this section using the Bongaarts original model. However, in the present analysis, Stover's (1998: 258) observation on the need to include a measure of contraceptive effectiveness, to adjust the contraceptive prevalence measure used in the formula for the computation of the index of abortion, is taken into account in the computation of the relevant index, as it is logical for the prevalence of contraception to be weighted against the effectiveness of

the method or methods used, which is missing in the original formula given in Bongaarts (1982; Bongaarts and Potter, 1983). Details of the measurements used and the computational procedures followed in the present analysis are presented in Annex III. Tables 5.13a and 5.13b show the results of the application of the Bongaarts model and some measures of reproduction used in the computation of the indexes for 1990 and 1995, respectively.

Table 5.13a: Estimates of selected reproductive measures and derived indices of five proximate determinants according to Bongaarts's model, Addis Ababa, 1990 NFFS

	Age group			All ages
	15-24	25-34	35-49	
Measure				
Total fertility rate	.667	1.195	.751	2.61
Total ever-married fertility rate	1.959	1.253	.758	3.971
Total marital fertility rate	2.528	1.591	.821	4.940
Contraceptive prevalence (%)	38.5	39.3	24.5	32.8
Modern (%)	31.5	22.7	16.0	20.8
Traditional (%)	7.0	16.6	8.5	12.0
Total abortion rate	.0063	.2001	.5611	.7674
Duration of postpartum amenorrhoea (mean months)	10.0	11.4	10.9	10.97
Model Indices				
Index of marriage (Cm)	*.264*	*.751*	*.914*	*.528*
Index of non-marriage (C*em)*	.340	.953	.990	.657
Index of marital dissolution (C*diss*)	.775	.788	.923	.804
Index of Contraception (Cc)	*.699*	*.730*	*.775*	*.746*
Index of modern contraception (C*mod*)	.735	.809	.821	.806
Index of traditional contraception (C*trad*)	.952	.902	.944	.926
Index of abortion (Ca)	*.996*	*.923*	*.765*	*.866*
Index of postpartum insusceptibility (Ci)	*.702*	*.669*	*.680*	*.679*
Index of sterility (Cp)	*.953*	*.953*	*.953*	*.953*

Source: computed by the author from the 1990 NFFS data set. See Annex 4 for the computational procedures used in the table.

These tables show that almost all indices, with the exception of the index of sterility, have declined with time, which is an indication of the increasing influence of these factors on the fertility performance of the study society. Overall, the index of marriage declined from an already low level of 0.53 in 1990 to 0.36 in 1995. The lower an index is, the greater its inhibiting effect on fertility. These figures, therefore, suggest that loss of marital exposure had suppressed the level of fertility in the city from attaining its potential by about 47 per cent in 1990 and even more, 64 per cent, in 1995. The low values of the index of marriage, C_m, in both periods, and the decline in the

magnitude of these indices over time, are consistent with the profound changes in marriage patterns observed in the earlier part of this chapter.

Table 5.13b: Estimates of selected reproductive measures and derived indices of five proximate determinants according to Bongaarts's model, Addis Ababa, 1995 AFS

	Age group			All ages
	15-24	25-34	35-49	
Measure				
Total fertility rate	.261	1.026	.454	1.74
Total ever-married fertility rate	1.395	1.517	.481	3.39
Total marital fertility rate	2.334	1.998	.539	4.87
Contraceptive prevalence (%)	42.9	48.6	34.8	41.6
Modern (%)	33.8	32.5	21.6	27.3
Traditional (%)	9.1	16.1	13.2	13.3
Total abortion rate	.0063	.2001	.5611	.7674
Duration of postpartum amenorrhoea (mean months)	11.2	12.7	13.7	12.61
Model Indices				
Index of marriage (Cm)	*.112*	*.513*	*.843*	*.357*
Index of non-marriage (C*em*)	.187	.676	.945	.513
Index of marital dissolution (C*diss*)	.599	.759	.892	.697
Index of Contraception (Cc)	*.678*	*.648*	*.686*	*.669*
Index of modern contraception (C*mod*)	.723	.731	.767	.747
Index of traditional contraception (C*trad*)	.937	.887	.895	.896
Index of abortion (Ca)	*.987*	*.905*	*.620*	*.814*
Index of postpartum insusceptibility (Ci)	*.673*	*.641*	*.621*	*.673*
Index of sterility (Cp)	*.995*	*.995*	*.995*	*.995*

Source: computed by the author from the 1995 NFFS data set. See Annex 4 for the computational procedures used in the table.

In both periods, marriage pattern had the strongest fertility-inhibiting effect during the younger ages. As shown in the tables, in the age group 15-24 marriage alone reduces the potential fertility of these women by as much as 89 per cent in 1995 and 74 per cent in 1990. The increasing inhibiting effect of delayed marriage and celibacy on the fertility potential of women in the middle age group is also evident from the two tables. As in the youngest age group, most of the fertility-reducing effect of marriage among these women operates through non-marriage and postponement of marriage, although in both age groups the impact of marital dissolution on fertility (C*diss*) is also far from negligible.

The high marital instability index observed among women in the younger and middle age groups may be linked to the rise in self-arranged marriages and the increasing independence of women in Addis Ababa, both of which, as discussed earlier, may be associated with the rise in female labour force participation as well as the

increase in their educational attainment and over all status in the society. However, even in the past divorce in Ethiopia was not uncommon, and this should also be borne in mind when looking at this seemingly high index of marital instability in the city. Pankrust (1992 cited in Tilson and Larsen, 2000: 355), indicates that 'divorce has been a common and largely accepted practice in Ethiopia for centuries.' The same source points out that 'as early as the 16th century divorce was referred to as the custom of the country.' The social acceptance of divorce and its prevalence in Ethiopia is seen by many researchers as a reflection of the empowered position of women to leave a relationship that is unsatisfactory (Levine, 1965: 259; Clapham, 1988: 138; Pankrust, 1992 cited in Tilson and Larsen, 2000: 357). In support of this claim Clapham (1988: 138) states:

> though the status of women in pre-revolutionary Christian Ethiopia did not remotely approach equality with men, they did not suffer from many of the institutionalised inequalities found in Islamic societies and in many other parts of Africa. They were not secluded, they had equal rights of marriage, divorce and property ownership, and they could at times reach positions of substantial political influence.

This view was reiterated by Levine (1965: 258) who stated that divorce could be initiated by either husband or wife. Levine related the cultural acceptance of divorce to the nature of the family structure in the society. In his view, in the dominantly nuclear family structure prevailing in the area (see Section 3.3) divorce serves as a mechanism to 'safeguard the individual rights within the nuclear family'. Partly as a reflection of the dominance of this family structure among the Amhara and their greater social tolerance for divorce, several studies in Ethiopia also show higher rates of divorce among Amhara than other ethnic groups (Lipsky, 1962; Tesfaghiorgis, 1990; Teferra, 1994). Given the demographic weight that the Amhara has in Addis Ababa (see Section 3.3) these observations also partly explain the evidence of high marital dissolution observed in the present analysis. The high marital instability index may also be a result of the high rate of in-migration of divorced women, seeking alternative employment, into Addis Ababa. As shown in Section 3.2 (see Table 3.3), the migrant population of Addis Ababa has a high proportion of women in dissolved marriages, about 8.4 as against 5.7 for the general population in 1994.

However, despite the existence of high rate of divorce, remarriage is also equally frequent, although it usually happens after several years (Hassen, Hailemariam and Zewoldi, 1994: 11). The large values of C*diss* (hence, the minor effect of marital dissolution on fertility) observed among older women, despite the existence of high levels of divorce in the younger ages, partly confirm the existence of high level of re-marriage in the study area; see Tables 5.13a and 5.13b. Both tables also show that in the oldest age group marriage in general poses a very limited influence on fertility level, a result which indicates the prevalence of both universal marriage and high rate of re-marriage among older women in the area. However, as illustrated by the consistent decline in the indices of marriage presented in the two tables, the fertility behaviour of both young and older women is now increasingly being modified by the changing pattern of marriage in the area.

As a population moves from high to low fertility there is also an increase in deliberate marital fertility control (Bongaarts, 1982: 184). The profound decline in the index of contraception as well as the modest change in the index of abortion recorded in Tables 5.13a and 5.13b clearly reflects this pattern in Addis Ababa. Overall, the index of contraception had declined from 0.746 in 1990 to 0.669 in 1995, which suggests that marital fertility rate in the city was reduced from its maximum by 25 per cent in 1990 and 33 per cent in 1995 through use of contraception. These changes, as shown previously in Section 5.2.1, resulted from the substantial increase in contraceptive use observed across all ages and socio-economic groups in the area. Although both modern and traditional methods contributed to the reduction in marital fertility the smaller values of C*mod* than C*trad* clearly demonstrate the greater importance of the adoption of modern contraception to the achievement of low fertility in Addis Ababa.

Analysis of the indices of contraception further shows that, while in 1990 contraception had the strongest effect among younger women, aged 15-24, its effect in 1995 was highest for women in the middle age group, aged 25-34. To some degree, this shifting influence of contraception may be seen as a cohort phenomenon, since a segment of those aged 25-34 in 1995 were aged 15-24 in 1990. However, in general there is a clear trend of convergence in the effect of contraception on the fertility performance of women in the various age groups, which suggests that in recent years deliberate

fertility control is increasingly practised almost equally by both younger and older women as well as those in the middle age group. This observation clearly supports the steep falls in fertility at both younger and older ages as well as at lower and higher birth orders observed in Chapter 4.

Similarly, the index of induced abortion also demostartes the increasing practice of induced abortion as a mechanism of deliberate fertility control in the area. According to these estimates, the practice of induced abortion has reduced the fertility rate in the area from its potential maximum by about 11 per cent in 1990 and 19 per cent in 1995. These results, however, should be treated with caution, given the problems often associated with survey based measures of abortion.

With regard to the index of postpartum infecundability, the relevant indices shown in the tables suggest that in both periods the existence of long duration of lactational protection had kept the fertility level of the study population from attaining its maximum by a magnitude of about 33 per cent. This shows the strong effect of lactational protection on the fertility level of Addis Ababa, a phenomenon which is perhaps not commonly observed in populations with similar fertility levels as that of Addis Ababa's[3] (Bongaarts, 1982: 185). The near stability of the effect of lactational protection with time is also in contrast to the pattern suggested by Bongaarts (1982: 186). Bongaarts contends that a typical transition from natural to controlled fertility should usually be accompanied by a shortening of postpartum infecundability, which, looking at the values for 1990 and 1995, does not seem to be the case for Addis Ababa. However, the fact that the indices of postpartum infecundability are relatively higher for women in the 15-29 age group than women in the middle and older age groups indicate a gradual weakening of the importance of lactational protection among younger women.

The index of sterility is close to one in both surveys, but especially in 1995, going from 0.953 to 0.995. Thus this result shows that pathological sterility played a very minor role in keeping fertility low in 1990, and virtually no role at all in 1995.

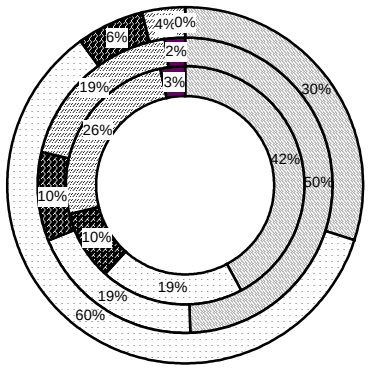
[3] For nine population groups which had an average total fertility rate of 2.06 Bongaarts (1982: 185) provides an index of postpartum infecundability of .930 which is much higher than 0.679 and 0.673 observed in Addis Ababa in 1990 and 1995,

Figure 5.1: The relative strength of influence of the five proximate determinants of fertility: A comparison of data for Addis Ababa with the average for countries having a similar fertility level as that of Addis Ababa

Legend:

1. The outer most circle shows the average result for nine populations which had a total fertility rate of between 1.61 and 2.34 births per woman (The input values used in the figure are taken from Bongarrts, 1982: 185, Table 4). Bongaarts grouped these countries (namely, Denmark (1970), Finland (1971), France (1972), Hungary (1966), Poland (1972), UK (1967), USA (1967), Yugoslavia (1970) and Hongkong (1978)) in the last category of his four-phase transition hypothesis . According to him, they represent populations which have completed most or all of the fertility transition; hence when the fertility transtion in a typical developing country reaches to the same stage the components of its proximate determinants should also more or less correspond to that achieived by these countries. The average total fertility rate for these countries was 2.06 children per woman.

2. The inner most and the middle circle show the relative contribution of the proximate determinants in Addis Ababa for 1990 and 1995, respectively.



The results of the Bongaarts model which are discussed individually so far, can also be put together to give an approximate picture of the relative strength of influence of each of the proximate determinants on the level of fertility observed in 1990 and 1995.[4] These results are graphically presented in Figure 5.1. In both period, marriage

respectively. This shows the strong effect of postpartum infecundability in Addis Ababa compared to other populations with similar fertility level. See also Figure 5.1 and the discussion that goes with the graph for more details.

[4] The relative strength of influence of each of the intermediate factors on the fertility rate of a given period can be calculated using the following formula (Casterline, *et al.*, 1984: 35). Let Xm, Xc, Xa, Xi, Xs respectively represent the contribution of marriage, contraception, abortion, postpartum infecundability and sterility. Then,

Xm = (Ln cm / (Ln Cm + Ln Cc + Ln Ca + Ln Ci + Ln Cs)) * 100;
Xc = (Ln Cc / (Ln Cm + Ln Cc + Ln Ca + Ln Ci + Ln Cs)) * 100;
Xa = (Ln Ca / (Ln Cm + Ln Cc + Ln Ca + Ln Ci + Ln Cs)) * 100;
Xi = (Ln Ci / (Ln Cm + Ln Cc + Ln Ca + Ln Ci + Ln Cs)) * 100;
Xp = (Ln Cp / (Ln Cm + Ln Cc + Ln Ca + Ln Ci + Ln Cs)) * 100;

Where Ln denotes the natural logarithm and Cm, Cc, Ca, Ci and Cp respectively denote the five intermediate variables of marriage, contraception, abortion, postpartum infecundability and sterility.

had the highest fertility reduction effect, accounting for 42 per cent in 1990 and 50 per cent in 1995. Lactational protection has accounted for 26 per cent in 1990 and 19 per cent in 1995, while contraceptive use contributed about 19 per cent in both period. Compared to indices derived form populations with similar fertility level, the fertility-inhibiting effect of contraception observed in Addis Ababa is considerably weaker (see Figure 5.1). However, this shortfall was compensated by the strong impact of lactational protection and non-marriage, both of which were significantly larger than the average of countries with a similar fertility level as that of the city. This evidence demonstrates that even if the fertility level in Addis Ababa is now similar to that found at an advanced stage of fertility transition its components are significantly different. Contraception has a smaller contribution, while the effects of marriage and postpartum infecundability are stronger in the case of Addis Ababa.

Table 5.14: Decomposition [a] of the change in total fertility in Addis Ababa between 1990 and 1995

Factor responsible	% change in total fertility	Distribution of percentage change in total fertility
Proportion of women married	-32.4	-97.2
Contraceptive practice	-10.3	-31.0
Practice of induced abortion	-6.0	-18.1
Postpartum infecundability	-0.9	-2.7
Sterility	+4.4	+13.2
Other proximate factors and interaction effect	+11.9	+35.7
Total	-33.3	100.0

Source: Computed by author from the output shown in Tables 5.13a and 5.13b. a. The decomposition of the total fertility rate into its components were made using the following formula (Bongaarts and Potter, 1983: 107-108):
Pt = Pm + Pc + Pa + Pi + Ps + Po + Pr where,
Pt = (TFR 1995/ TFR 1990) - 1; Pm = (Cm 1995/ Cm 1990) - 1; Pc = (Cc 1995/ Cc 1990) - 1; Pa = (Ca 1995/ Ca 1990) - 1;
Pi = (Ci 1995/ Ci 1990) - 1; Ps = (Cs 1995/ Cs 1990) - 1; and Po and Pr are determined as residuals of the result of the above equation and together represent the interaction effect and the effects of proximate variables not measured in the model. Pt represents change in the total fertility rate (TFR) between 1990 and 1995; Pm, Pc, Pa, Pi and Ps represent the proportional change in total fertility that are due to marriage, contraception use, practice of induced abortion, postpartum infecundability and sterility, respectively. Cm, Cc, Ca, Ci and Cs are as defined before in the text.

Results from Bongaarts's model may also be decomposed to give an approximate picture of the relative contribution of each proximate determinant to the recent change in total fertility rate in the study area. These results are presented in Table 5.14. Table 5.14 reveals that the most important determinant of aggregate fertility decline in the early 1990s was the change in marriage pattern in the area. An increase in the use and effectiveness of contraceptives and the practice of induced abortion also played a significant role in the fertility decline observed between 1990 and 1995. The 33.3 per cent period fertility decline observed between 1990 and 1995, can be decomposed into a 32.4 per cent decline due to increased level of non-marriage and

marital instability, a 16.3 per cent decline because of increased use of deliberate fertility control methods, and a one per cent decline due the strengthening of the effects of lactational protection. The interaction effect and the proximate determinants not included directly in the basic model together increased the total fertility rate by just over 16 per cent. The large increase in the effect of the residual variables may be attributed to the unmeasured effect of increased fecundity, mainly resulting from a decline in the incidence of spousal separation which was brought about by the end of the civil-war in the country in 1991 that allowed the return of former combatants to their families. Similarly, the decline in the level of sterility in the city has led to a 4.4 per cent increase in the level of fertility between 1990 and 1995.

The same table also presents the decomposition results that are standardised to add to 100 %. According to this result, the change in the proportion of married women was responsible for about 97 per cent of the decline, while deliberate fertility control accounted for 31 per cent of the change. The practice of long postpartum behaviour contributed about 2.2 per cent. This analysis therefore clearly demonstrates that the fertility decline observed in Addis Ababa in recent years is largely driven by the change in marriage pattern in the area. This evidence is in contrast to the findings for most other sub-Saharan Africa societies where recent fertility declines have largely been linked to increased contraceptive use (Cleland et al., 1991; Kizito et al., 1991; Robinson, 1992; Blanc and Pokouto, 1997; Kirk and Pillet, 1998).

The increasing move toward non-marriage and delayed marriage observed in Addis Ababa might be linked to the changing educational composition of the population and the rise in labour force participation and overall status of women in the society, the latter of which, as stated earlier, was partly a result of direct propagation of the idea of gender equity by the agencies of government such as the *Kebelles* and the women's and youth associations organised within these institutions. The severe shortage of accommodation and the high and rising rate of unemployment among men which were discussed in Chapter 3 might also have contributed to the increase in non-marriage observed in the city in recent years. As shown in Chapter 3, the unemployment rate among young men, aged 20-24, increased from 8.7 per cent in 1978 to 16 per cent in 1984 and 50 per cent in 1994. By 1994, unemployment had reached as

high as one in three among those aged 25-29, and about one in five among those aged 30-34 years. Given the nuclear family arrangement prevalent in the study area and the implicit cultural taboo against marriage if a prospective couple do not have their own physically separate house and a reasonable expectation of an income sufficient to maintain economic independence (Levine, 1965: 124; Kebede, 1990: 60), such a high level of unemployment among men of marriageable age, coupled with the fall in real income of working adults, also documented in Chapter 3, mean that adults have had to wait a number of years to achieve financial stability and acquire reasonable property so as to become culturally as well as economically eligible for the marriage market. The importance of economic forces in shaping the marriage pattern in the study area might have also been enhanced by the rising aspiration of what constitutes to be a minimal match by the now increasingly educated and materialistic youth. The increasing move toward self-arranged marriages noted in the earlier part of this chapter may have also contributed to the rise in age at marriage and consequently to the change in patterns of marriage observed in recent years in the area.

The Bongaarts model, the main tool of analysis used in the foregoing analysis, is built under several simplifying assumptions, hence it is appropriate to sum up the section with a note on the implication of the violation of one or more of these assumptions on the results discussed so far. For instance, both Menken (1984) and Reinis (1992) point out that the Bongaarts model performs less efficiently when women use contraception to stop rather than to space births, where there is a pattern of delayed marriage, and when contraceptive use is most prevalent at older ages. As shown in the analysis, although there are clear evidences that contraception in Addis Ababa is being used both by old and younger women and for both spacing as well as termination purposes, the late marriage pattern observed in the area may have introduced some bias which I was not able to measure or control in the present analysis. This needs to be borne in mind.

5.6. Determinants of first marriage: A multivariate analysis

Having established that the change in marital behaviour is the principal source of fertility decline in Addis Ababa and also having speculated on its macro-level causes, I

now turn to identify the factors that operate at the individual level and influence the risk of first marriage in the study area. Although no prior study exists in this direction in Ethiopia, various studies conducted in different parts of the world demonstrate the importance of socio-economic and cultural factors in determining the age at which individuals enter into marriage (McCarty, 1982; United Nations, 1987; Lesthaeghe, 1989; De Silva, 1997; Bracher and Santow, 1998; Adedokun, 1999). Age at marriage tends to increase with years of schooling and is generally higher among persons born in urban than in rural areas (Njogu, 1989; De Silva, 1997; Adedokun, 1999). A good number of studies have also investigated the links between age at marriage and female employment (Preston and Richards, 1975; Molise, 1984; United Nations, 1987; Bracher and Santow, 1998). Generally, women who have had work experience prior to marriage tend to marry later than those who did not work before marriage. Religion and ethnic affiliation, largely due to the normative and behvaioural influence they exert up on their members, have also been among the factors that have received considerable attention in the analysis of the timing of first marriage in both developed and developing countries (Njogu, 1989; Isiugo-Abanhie, Edigbola and Adewuyi, 1991; Halli and Rao, 1992; De Silva, 1997). Guided by the results of these studies and availability of data, the effects on first marriage of a total of seven variables are examined in this section, using a multivariate approach. These are educational attainment, work status, ethnicity and religious affiliation, migration status, ownership of television and age of respondents. In the present analysis, ownership of television is used as a proxy measure of the economic status of respondents. Since all the variables were categorical or nominal scale, to facilitate the analysis dummy or indicator variables were created. As is conventional, when the dummy variables were formed, the number of categories constructed was one less than the original number of categories with the omitted one being used as the reference group or category (Hosmer and Lemshow, 1989: 48).

In most multivariate analyses of the determinants of first marriage two main analytical strategies are in wide use: one that employs the information only from ever-married women and the other which employs the data for all women (Smith, 1983; Trussell and Bloom, 1983; Rao, 1989; Bracher and Santow, 1998). However, when a large proportion of women are in the never-married state, as in the present study, an analysis that is based solely on ever-married women may produce a biased result. This

is primarily because such data reflect the experience of a select group of fast marrying women rather than of the total population whose experience, due to rapid changes in marriage pattern, may be different from those who are already in union. For this reason the present analysis uses data from all women. Aside from the possible problem of quality of data related to reporting of age at and date of marriage, which is common to both approaches, the only problem with the approach that uses data for all women is that the age at marriage of currently-single women cannot be determined from the data, as these women are censored by the date of interview. But the development of life-table-based techniques has adequately addressed this concern over censored responses. The Cox proportional hazard model is one commonly used multivariate approach and is used in this study (Trussell and Bloom, 1983; Halli and Rao, 1992; Bracher and Santow, 1998; Hosmer and Lemeshow, 1999).

Table 5.15 Coefficients and relative risks of first marriage from Cox proportional hazard model, Addis Ababa, 1990 NFFS and 1995 AFS

Variable/ category	1990		1995	
	Regression Coefficients (β)	Relative Risk $e^{(\beta)}$	Regression Coefficients (β)	Relative Risk $e^{(\beta)}$
Highest grade completed (base = none)				
1 - 6 years	-.1148	.8915	-.0029	.9971
7 - 8 years	-.8413 [a]	.4312	-.6105 [a]	.5431
9 years or above	-1.3038 [a]	.2715	-.9340 [a]	.3930
Ownership of television (base = has no television)				
Has television	-.1139	.8924	-.1172	.8894
Work status (base = not working				
Working	-.0081	.9920	-.0817	.9215
Migration status (base = Rural migrant)				
Urban migrant	-.0637	.9393	-.1337	.8748
Non-migrant	-.4816 [a]	.6178	-.7154 [a]	.4890
Current age (base = 35 - 49 years)				
Under 35 years	-.6906 [a]	.5013	-1.1376 [a]	.3206
Religion (base = Coptic)				
Other Christian	-.4287 [b]	.6513	-.2924 [b]	.7465
Muslim	.2097	1.2310	.0670	1.0693
Other religion	-.7655	.4651	-.8697	.4191
Ethnic origin (base = Amhara)				
Oromo	-.3528	.7027	-.0673	.9349
Gurage	-.3608	.6971	-.2020	.8171
Tigrawai	-.2769	.7582	-.0173	.9829
Others	-.4018	.6691	-.3170	.7284
- 2 ln Log likelihood	10723.3		14417.4	
Model χ^2	682.3 [a]		1086.5 [a]	

Notes: a — refers to $p \leq .01$; b — refers to $p \leq .05$; Source: Computed by author from the respective data sets.

Table 5.15 displays the proportional hazards coefficients (β) and the associated relative risks $e^{(\beta)}$ of first marriage in Addis Ababa. These results are shown for the 1990 and 1995 surveys, mainly to assess the changing role of socio-economic factors on the timing of first marriage in the study area. $e^{(\beta)}$ represents the risk of first marriage associated with each covariate, relative to the risk for the reference or base line category. The relative risk for the base category of each factor is unity ($e^{(0)} = 1$), thus a coefficient of 1.00 for any of the other categories indicates that the variable category in question has the same effect as for the reference or base line group on the timing of first marriage (Halli and Rao, 1992: 158). A value of $e^{(\beta)}$ higher than one indicates greater risk of first marriage than the base line category, whereas values less than unity indicate a lower risk.

The effect of education on age at first marriage is evident from the regression coefficients shown in the table. In both surveys, with the exception of 1-6 years of education (primary education), which did not show any significant effect, the chance of marriage tends to decline with years of schooling. Net of other factors, 7-8 years of education tends to reduce the risk of first marriage by about 57 per cent in 1990 and 46 per cent in 1995, while nine or more years of schooling depresses the risk of marriage approximately by 73 per cent in 1990 and 61 per cent in 1995. Given the general expectation of completing one's education before marriage, the lower risks of marriage observed in the present study among educated women may be partly attributed to the long years that such women spend in schools. Education is also likely to raise women's aspirations about what constitutes a suitable match, thus if such expectations are not met, women may also tend to postpone marriage until they find a suitable match. Another influence of education on first marriage may operate through the labour market opportunities that education brings to women. Since education can equip women for roles other than the domestic and raise their economic independence, educated women may lose the incentive for marriage and focus on career options, which is often reflected in the decline in risk of marriage as education increases (Becker, 1981). However, the decline in the magnitude of difference in the coefficients shown for the various educational categories, between 1990 and 1995, may illustrate

that, despite still being an important determinant, its relative effect on the risk of first marriage may have declined in importance overtime.

Migration status also tends to have a significant effect on the risk of first marriage. Controlling for the effects of possible differences in education and other socio-economic and cultural factors shown in the model, women who were born in Addis Ababa had about a 38 per cent lower risk of marriage in 1990 and 51 per cent in 1995 than women born in rural areas. These differences are highly statistically significant. The estimates for women born in other urban areas also indicate a similar lower risk of first marriage, but the difference is generally statistically insignificant. On the other hand, the fact that the regression coefficients for women born in Addis Ababa are higher for 1995 than 1990 indicate that in recent years women born in Addis Ababa are experiencing a much lower risk of getting married relative to women born outside of the city. These differences are not outcomes of possible educational and other related socio-economic advantages that women born in the city might have had, because these factors are already controlled in the analysis. The rapid change in marital behaviour observed among women born in the city is rather likely to be due to the much greater change in the status of women in Addis Ababa, which in turn may be linked to the intensity of the propagation of gender equity and the existence of strong women's associations that may have facilitated the diffusion of such ideas easily in Addis Ababa. The generally low risk of marriage observed for women born in Addis Ababa may also in part be linked to the relatively high aspirations of these women, arising from their long exposure to an urban life-style.

The risk of first marriage also tends to vary among women of different age groups (cohorts). Net of the effects of other socio-economic factors, younger women had almost a 50 per cent reduced hazard of first marriage in 1990, and 68 per cent in 1995, than older women in the area. Both relationships are highly significant. This result can be viewed as one that shows both a cohort as well as an age effect. The fact that in each of the surveys the risk of first marriage is lower for younger than older women confirms the generally expected inverse association between age and risk of first marriage. However, the fact that the magnitude of the coefficient for the recent period is larger than that for the earlier period illustrates that an effect other than age may be in operation. Also, given that the coefficients shown in the table represent net

effects, this may mean that the observed phenomenon is unlikely to be a result of mere changes in the educational composition or other relevant characteristics of women in recent years. It may instead reflect normative changes in patterns of marriage that may be associated with broad social and economic change affecting all sectors of the population. For instance, the increasing problem of accommodation, which in the case of the study area was more of a structural problem, and had comparable impact on all sectors of the population, irrespective of social and economic status, may be one possible explanation for the decline in the intensity of marriage among the younger cohort. Changes in the status and aspirations of women may also have contributed to the observed pattern.

By contrast, the results for ethnicity and religion show that net of the effects of other variables, religious affiliation and ethnic origin generally have a negligible effect on the risk of first marriage. The only significant category is the 'Other Christian' group, but even in this case, as can be seen from the regression coefficients which are showing smaller values for 1995 than 1990, its importance as a determinant of the risk of first marriage seems to be on the decline. The same appears to be the case for the rest of the categories. As shown in the table, not only do all the remaining categories of religion and ethnicity depict statistically insignificant relationships, but their associated regression coefficients had become even smaller with time. This also illustrates the further weakening of the importance of religion and ethnicity as determinants of the risk of first marriage in Addis Ababa. Similarly, once the effects of other socio-economic factors are controlled, neither ownership of television nor work status seems to have any significant effect on the risk of first marriage.

5.7 Concluding remarks

Consistent with the dramatic transition toward low fertility documented in the previous chapter, the analyses presented in this chapter demonstrate a parallel and profound change in the proximate determinants of fertility in Addis Ababa. Some of the principal changes in the area were a growing move toward self-arranged marriages, a dramatic rise in age at marriage, observed among both men and women, and a significant increase in deliberate fertility control observed across all age groups.

The mean age at marriage for females increased from below 20 years in 1967 to about 21 years in 1978 and to over 23 years in 1984. By 1995, this rose further to about 27 years, while that of males reached 34 years. The proportion of women in the reproductive age group who were single has also increased substantially, from less than 15 per cent in the late 1960s to well over half, 54 per cent, in 1994. In a region where, until recently, marriage was both universal and early, and a country where the average female age at marriage remains still below 20 years, the changes in age at marriage and proportion of married women recorded in Addis Ababa are indeed remarkable, if not, revolutionary. In sub-Saharan Africa, levels matching that of Addis Ababa are probably found only in southern African nations such as Botswana (Gaisie, 1998). However, even in Botswana, since a substantial proportion of births occur outside of formal unions, marriage does not exert as much influence as it does in Addis Ababa (Jolly and Gribble, 1993; Gaisie, 1998). These phenomena thus make the situation and the city appear as the 'Ireland of Tropical Africa.'

Hand in hand with the dramatic change in marriage patterns observed in the city, the practice of deliberate fertility control within marriage has also increased with time. In the first half of 1990s, a period that corresponds to the city's progression toward below-replacement level fertility, the use of contraception has increased at a rate of about five per cent per annum. The observed increase in the use of contraception has not only been notable in all sectors of the population but also was relatively large among groups with previously low prevalence rates. This is a pattern that is mostly found at an advanced stage of fertility transition, hence supporting the evidence of rapid and substantial fertility decline recorded in the previous chapter (Rodríguez and Aravena, 1991).

However, a comparison of the relative strength of influence of the various proximate determinants of fertility showed that the role of contraception in Addis Ababa was less prominent than usually found in societies with a similar fertility level. This shortfall was, however, compensated by the strong effects of lactational protection and non-marriage, both of which were considerably larger in Addis Ababa than that observed in countries with a similar fertility level. This observation thus demonstrates that even if the total fertility level in Addis Ababa is now comparable to that found in

demographically advanced societies, its components are significantly different, a finding which shows that the demographic routes to low fertility can be as varied as its socio-economic causes. However, in a manner similar to most populations, the overall effect of sterility on fertility has generally been insignificant, and has declined even further with time.

In sum, one of the key questions raised in the context of formulating the research problem of this study was whether the transition toward low fertility observed in Addis Ababa was a result of a change in the onset of reproduction or increased use of contraception or both. The present chapter clearly demonstrates that both factors have contributed to the change in aggregate fertility and its convergence to below-replacement level in recent years. However, unlike the case in other sub-Saharan African societies, where recent changes in fertility have been closely associated with increased use of contraception, the fertility decline observed in Addis Ababa is primarily a 'Malthusian transition, led by both non-marriage and delayed marriage (Cleland *et al.*, 1991; Robinson, 1992; Blanc and Poukouta, 1997; Kirk and Pillet, 1998).

The rise in non-marriage and the corresponding trend of late marriage observed in this study are not related at all to any notable change in the sex composition of the marriageable-age population, but to broad institutional factors that prompted a change in the status and aspiration of women in the area. The deterioration of employment opportunity among men of marriageable ages and the severe housing shortage in the city were also among the factors that contributed to the pattern of late marriage and non-marriage observed in this chapter. At the individual level, the timing of marriage was significantly related to years of schooling, age or cohort and birth experience in Addis Ababa.

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Chapter 6

FERTILITY VARIATIONS AND DIFFERENTIALS IN FERTILITY DECLINE:
The impact of socio-economic and cultural factors

The previous chapter has described what has to be explained with respect to the components of aggregate fertility change in Addis Ababa. The major mechanisms of change, in order of their significance, were delayed marriage and increased practice of contraception among all women, the latter (as demonstrated in Chapter 4) resulting in steep falls in fertility at both younger and older ages as well as at lower and higher birth orders. However, a complete understanding of reproductive change requires not only the mapping out of the demographic forces influencing the period or aggregate fertility outcome, but also the determination of the background and ultimate factors that affect long-term individual fertility behaviour. This chapter is an attempt in that direction; it looks into the determinants of lifetime fertility and the components of its temporal change in Addis Ababa.

The chapter begins with an investigation of the impact of socio-economic and cultural factors on lifetime fertility from a bivariate perspective. A total of eight variables, namely educational attainment, labour force participation, migration status, child loss experience, economic status (measured by ownership of a television set), ethnic origin, religious affiliation and marital status, were examined in the bivariate analysis. This analysis was followed by a multivariate analysis in which all the independent variables were considered simultaneously and the net impact of each factor was isolated. Both the multivariate and bivariate analysis are based on the 1984 and 1994 Census data.

Socio-economic and cultural factors do not influence fertility behaviour directly, they instead operate through a set of other intermediate variables. Therefore, in section 6.3, following Easterlin's synthesis framework, the links between socio-economic variables and the demand for children, the supply of births and the cost of fertility regulation, factors which are regarded as the ultimate determinants of fertility performance, are explored. Because the analysis requires information on proximate determinants as well as data on fertility preference, the data for this section were obtained from the 1990 NFFS, the only set of data with the relevant information for the intended analysis. Section 6.4 presents the concluding remarks.

6.1. Socio-economic and cultural determinants of fertility: A bivariate analysis

The level, movement, and components of aggregate fertility, the subject of analyses in the preceding two chapters, reflect the behaviour of thousands of individual couples. However, as an outcome, fertility is a result of the action of individual men and women. This, of course, is not to deny the role of societal and other lower level collectives in exerting an influence on fertility behaviour. In fact, as evidence from both developed and developing countries attests, societies do play central role in fostering or retarding the growth of aggregate fertility, particularly by altering the context in which decisions about fertility and family formation are made. Collectivities smaller than the whole society, such as the extended family, can likewise stimulate or depress family size in subsequent generations by, for example, underwriting the costs of setting up a neo-local residence, providing child-care for grandchildren, and arranging old-age security. However, a number of studies conducted in both developed and developing countries have demonstrated that, over and above such societal and family level forces, fertility performance is also importantly linked with factors operating at the individual or micro level. In this section, the effect of eight socio-economic and cultural factors on individual fertility performance, measured in terms of number of children ever born, is explored. The variables included in the analyses are education, labour force participation, marital status, migration status, child loss experience, economic status (as measured by ownership of a television set), ethnic origin and religion.

6.1.1. Education and fertility

Research findings from almost all large scale surveys in the developing world consistently indicate parental education, particularly female education, as the single most important determinant of fertility behaviour (Cochrane, 1979, 1983; Cleland and Rodríguez, 1988; United Nations, 1987, 1990a). The few studies carried out in rural and selected urban centers in Ethiopia also reveal the existence of some association between education and fertility (Jimma, 1989; Gebre Sellassie, 1990; Halefom, 1990; Tesfaghiorgis, 1990; Gebisa, 1991; Tola, 1991; Kinfu, 1994). In general, the relationship between educational attainment and fertility is complex and there is also hardly any unique mechanism which links education to fertility behaviour (Hodge and Ogawa,

1991: 25). However, there are a variety of hypotheses about why expanding educational opportunities at a macro level and actual years of schooling completed at a micro level are inversely associated with fertility (Cochrane, 1979; Ashurst, Balkaran, and Casterline, 1984). First, because women are unlikely to marry while they are still in school, schooling is associated with delayed marriage and reduced exposure to conception. Second, better-educated women and better-educated populations are likely to have a greater knowledge of contraception and the ability to practice it more effectively. Third, for women with advanced education, childbearing involves large opportunity costs in the form of forgone income. Fourth, for these same women, there may be an intergenerational effect owing to their educational aspirations for their offspring. Fifth, within a budget constraint there is always a trade-off between quantity and quality when it comes to children; better-educated women may opt for fewer children with high-quality lives, choosing, in a manner of speaking, to reproduce themselves socially rather than simply physiologically. It is, therefore, expected that the more educated a woman is the lower her fertility performance. Results showing the bivariate relationship between female education and fertility in Addis Ababa are reported in Table 6.1. The data in this table refer to all women of childbearing age and are derived from the 1984 and 1994 censuses. The use of data from two points in time provides an opportunity to examine changes, if any, in the relationship between educational attainment and fertility over time.

As can be seen, there is a general inverse association between number of children ever born and educational status. The age-standardised mean parities for 1984 indicate that as compared to having 'no formal education', attainment of up to six years of schooling lowers lifetime fertility by 0.3 births per woman, while 7 to 8 and 9 or more years of education depress fertility by about 0.8 and 1.1 births per woman, respectively. However, by 1994 the differentials between the best and least educated women had dropped to 0.94 children per woman and those of between no education and 7 to 8 years of schooling decreased to 0.46 births per woman. For the same census, once the differentials in age composition were controlled, women without education also did not exhibit any difference in fertility behaviour from those educated up to primary level (that is women with 1 to 6 years of schooling). These observations are

Table 6.1: Bivariate differentials and differential rate of change in average lifetime fertility, Addis Ababa, 1984 and 1994.

Socio-economic and cultural factors	Age of women									All ages						% of women in each socio-economic group	
	15-24			25-34			35-49			Reported parity			Standardised parity[a]				
	1984	1994	% change	1984	1994	% change	1984	1994	% change	1984	1994	% change	1984	1994	% change	1984	1994
Educational attainment																	
None	0.77	0.27	-64.9	3.33	2.65	-20.4	5.03	5.17	+2.8	3.67	3.19	-13.1	2.56	2.15	-16.0	21.6	22.6
1-6 years	0.50	0.26	-48.0	3.06	2.52	-17.6	4.63	5.35	+15.6	2.51	2.17	-13.5	2.26	2.15	-4.9	43.3	24.5
7-8 years	0.29	0.14	-51.7	2.66	1.96	-26.3	3.66	4.38	+19.7	1.10	0.94	-14.5	1.81	1.69	-6.6	11.0	15.3
9 or more years	0.23	0.11	-52.2	1.94	1.15	-40.7	3.25	3.46	+6.5	0.93	0.78	-16.1	1.46	1.21	-17.1	24.1	37.6
Labour force participation																	
Employed	0.43	0.17	-60.5	2.22	1.52	-31.5	3.65	4.00	+9.6	1.78	1.65	-7.3	1.74	1.48	-38.5	34.9	29.1
Unemployed	0.19	0.14	-26.3	1.59	0.87	-45.3	4.43	3.15	-28.9	0.88	0.59	-33.0	1.61	1.07	-33.5	6.0	23.0
Economically inactive	0.42	0.19	-54.8	3.43	2.98	-13.1	5.12	5.60	+9.4	2.69	2.24	-16.7	2.45	2.32	-5.3	59.1	47.9
Ownership of television																	
Has television	0.30	0.08	-73.3	2.51	1.49	-40.6	4.49	4.81	+7.1	1.92	1.47	-23.4	1.96	1.62	-17.3	23.5	24.5
Has no television	0.43	0.20	-53.5	3.01	2.04	-32.3	4.79	4.92	+2.7	2.39	1.80	-24.7	2.25	1.87	-16.9	76.5	75.5
Child loss experience [b]																	
None	1.78	1.39	-21.9	3.10	2.67	-13.9	4.17	4.43	+5.9	3.16	3.14	-0.6	2.75	2..50	-9.1	69.6	72.4
One	2.42	2.00	-17.4	4.27	4.08	-4.4	5.56	5.53	- 0.2	4.71	4.78	+1.5	3.72	3.47	-6.7	16.4	15.9
Two or more	4.67	3.40	-11.8	5.98	5.86	-2.0	7.72	7.77	+0.6	7.13	7.34	+2.9	5.79	5.48	-5.4	14.0	11.7
Migration status																	
Non-migrant	0.28	0.12	-53.6	2.62	1.51	-42.3	4.38	4.86	+9.9	1.40	0.99	-29.3	1.96	1.66	-15.3	35.6	42.5
Urban migrant	0.48	0.17	-64.6	2.96	1.81	-38.9	4.66	4.53	- 2.8	2.71	1.79	-33.9	2.24	1.70	-24.1	24.4	25.1
Rural migrant	0.54	0.29	-46.3	3.02	2.34	-20.9	4.86	5.08	+ 4.5	2.77	2.51	-9.4	2.30	2.04	-11.3	40.0	32.3

(continuation of Table 6.1)																
Ethnic origin																
Amhara	0.38	0.16	-57.9	2.70	1.66	-38.5	4.47	4.52	+1.1	2.13	1.56	-26.8	2.05	1.64	-20.0	57.5	53.2
Gurage	0.43	0.17	-60.5	3.60	2.32	-35.6	6.15	6.50	+5.7	2.80	1.97	-29.6	2.75	2.31	-16.0	10.5	14.4
Oromo	0.53	0.18	-66.0	3.23	2.24	-30.7	4.78	5.20	+8.8	2.61	1.81	-30.7	2.36	1.99	-15.7	19.7	19.6
Tigrawai	0.27	0.14	-48.1	2.60	2.18	-16.2	4.23	4.05	-4.3	1.86	1.81	-2.7	1.79	1.68	-6.1	6.7	7.6
Others	0.33	0.19	42.4	2.70	1.75	-35.2	4.23	4.72	+11.6	1.83	1.63	-10.9	1.95	1.78	-8.7	5.6	5.3
Religious affiliation																
Coptic	0.40	0.17	-57.5	2.86	1.89	-33.9	4.61	4.82	+4.6	2.26	1.71	-24.3	2.14	1.72	-19.6	89.4	83.6
Other Christian	0.29	0.13	-55.2	1.86	1.40	-24.7	3.93	4.32	+9.9	1.51	1.13	-25.2	1.63	1.50	-8.0	2.7	6.0
Muslim	0.48	0.17	-64.6	3.39	2.40	-29.2	5.74	5.80	+1.0	2.72	1.84	-32.4	2.62	1.84	-17.6	7.5	9.9
Others	0.40	0.16	-60.0	2.70	1.79	-34.8	4.35	4.71	+8.3	2.27	1.00	-55.9	2.02	1.73	-14.4	0.4	0.5
Marital status																
Never married	0.12	0.03	-75.0	0.62	0.24	-61.3	1.29	0.51	-60.5	0.21	0.08	-61.9	0.65	0.21	-67.7	40.0	53.4
Currently married	1.46	1.12	-23.3	3.50	2.99	-14.6	5.28	5.44	+3.0	3.83	3.76	-1.8	2.98	2.71	-9.1	43.1	33.8
Divorced/Separated	0.77	0.63	-18.2	1.96	1.67	-14.8	2.82	3.29	+16.7	1.90	2.16	+13.7	1.59	1.57	-1.3	13.2	8.7
Widow	1.00	0.78	-22.0	3.35	3.44	+2.3	4.72	5.46	+15.7	4.16	4.67	+12.3	2.60	2.70	+3.8	3.7	4.0

Notes: [a] Standardised using the 1978 age distribution of women for Addis Ababa. The choice of the 1978 data was guided by the finding in Chapter 4 that the city had little change in fertility behaviour prior to the indicated year; [b] The result was obtained only for women who have had at least one live birth; *Source:* Computed by author from the 1984 and 1994 Population and Housing Censuses

consistent with the much faster increase in contraceptive use reported among less-educated women in the previous chapter. The decline in inter-group differences in fertility behaviour observed in the above results is also generally in line with a pattern often found in a later phase of demographic transition where differentials in fertility behaviour become progressively narrower (Cochrane, 1983; Hodge and Ogawa, 1991; Rodríguez and Aravena, 1991).

These relationships were still maintained when the data for each age group in place of age-standardised mean parities were examined. In all age groups, except 35-49 in 1994, where the fertility rate for women with 1-6 years of education was slightly higher than for women in the 'no education' category, long years of education is almost always inversely associated with lifetime fertility performance. The difference in average parity between less and highly educated women also tends to increase with age, a relationship which is suggestive of increased practice of deliberate fertility control among better than less educated women as age advances.

Table 6.1 also shows the differentials in the rate of fertility change by educational status of respondents. These data present clear evidence of fertility decline at all levels of education. However, as can be seen, for all women, irrespective of educational status, the decline was concentrated among those aged 34 years or younger and generally large in the 15-24 age range. In these age groups the magnitude of the decline appears to vary markedly by level of educational attainment. In the youngest age group, which represents the fertility experience of women who entered into reproduction in recent years, the largest decline was observed among women without any formal education. By contrast, in the 25 -34 age group, the magnitude of the decline was much faster for women with 9 or more years of education, followed by those with 7-8 years of education. However, a different pattern of fertility change was evident in the oldest age group. In this age group, not only that all women exhibit a fertility increase but also that the observed increase was larger among better than less educated women. In fact, illiterate women exhibit the lowest fertility increase in the area.

6.1.2 Female labour force participation and fertility

Female labour force participation is another socio-economic characteristic whose link with fertility behaviour has received considerable attention in the literature (United Nations, 1981, 1987; Bulatao, 1983, 1984; Casterline, 1984; Mboup and Shah, 1998). The basis for investigating the relationship between fertility and labour force participation is partly rooted in the general observation that certain types of employment, particularly in the modern sector of the economy, require long-term institutionalised training. For this reason, women employed in the modern sector of the economy or preparing themselves for such positions are more likely to get married late and consequently attain lower fertility than non-working women who may have been married at an earlier age. Employment in the modern sector of the economy is also characterised by rules and regulations that can directly influence the degree of compatibility between the productive and reproductive role of women. In societies where alternative child-care arrangements are limited and where effective and culturally acceptable birth control technology is easily available, incompatibility between the two roles (the roles of mother and worker) is more likely to result in lower fertility among working than non-working women (Stycos and Weller, 1967: 210-217; Weller, 1968: 509). A collectivised work environment, such as that in the modern sector, is also more conducive for the diffusion and legitimisation of reproductive innovations (Agadajanian, 2000: 17-35). For these reasons, employment status, both attained as well as anticipated, is expected to have an adverse effect on fertility behaviour. Table 6.1 presents the bivariate relationship between fertility and labour force participation in Addis Ababa.

Three categories of employment status were considered in the present analysis: economically inactive, unemployed and working. The working group consisted of women who were engaged in economically gainful activity, formal or informal, for at least one day in the week prior to enumeration. The unemployed category comprised women who did not have job at the time of enumeration but were actively seeking one. By contrast, the inactive category included women who were neither working nor had the intention to do so in future. In most previous studies on the subject little, if any, distinction is made between the latter two groups. In general, women who are actively seeking a job and those who do not have such intention are grouped under a single

category, unemployed. However, what is often overlooked in such approaches is that the difference in motivation for work observed between the groups may reflect a difference in their aspirations about life and their opinion of non-domestic roles for women, factors which in themselves have far reaching implications on the fertility behaviour of the respective groups. The two groups of women may also differ from one another in terms of certain characteristics such as educational attainment, which is also known to be an important determinant of fertility behaviour in its own right.

As is clear from the figures presented in Table 6.1, in Addis Ababa, in almost all age groups and during both census years unemployed women exhibit the lowest average number of children per woman, followed by employed and inactive women. The age-standardised parities shown in the table indicate that unemployed women had 0.84 and 0.13 fewer children in 1984 and 1.25 and 0.41 fewer children in 1994 than inactive and employed women, respectively. These data suggest a widening of differentials in fertility behaviour between unemployed women and women in the other employment groups. The data presented for age group 25-34 years for both censuses and age group 35-49 years for the latest census, show similar relationships to that observed for all ages. According to the two censuses, most unemployed women were unmarried, and they also have higher educational status than both their working and inactive counterparts, which partly explains their low level of fertility. Moreover, given the fact that most working women, as shown in Chapter 3, are employed in the sales and services sector, which, in the case of the study area, is dominated by informal activities and is taken up often to make up shortfalls in household income, the relatively high fertility rate observed among working than unemployed women could also have, therefore, resulted from a selection effect, whereby high-fertility women are attracted to the working category as a result of their strong need for income.

Once again, as in the case of education, the data presented in Table 6.1 show clear evidence of fertility decline for all women, although the timing and intensity of the change appear to differ markedly by type of employment status. As can be seen, the decline in cohort fertility in the city seems to have begun among unemployed women, who experienced a decline in lifetime fertility in all age groups, and later expanded to working and inactive women, for whom the observed change was restricted to the two

younger age groups. For working and inactive women the greatest fertility decline was observed in the youngest age group, while for unemployed women the decline was larger in the 25-34 age group.

6.1.3 Economic status and fertility

Empirical and theoretical research in demography and related subjects has long recognised the independent effect of income on demographic behaviour (Schultz 1981; LeVine *et al.*, 1991; Montgomery *et al.*, 2000). In general, a high standard of living, measured either at a macro or at a household level, is invariably associated with low fertility and high contraceptive use. Available evidence from different parts of the world shows that countries with high per capita income generally have low fertility, while high fertility rates are commonly prevalent in economically less-developed societies. Similarly, at a household level, largely through creating conditions for the substitution of quality for quantity of children, high economic status is inversely associated with the adoption of a small family-size norm (Becker and Lewis, 1973).

However, despite the recognition accorded to the subject in the literature, the measurement of economic status at a household level still remains complex. Besides, in most developing countries socio-economic and demographic surveys, the major sources of data for social research, seldom gather information on household economic status, leaving researchers instead to resort to surrogate measures available from these surveys. In the literature at least three sets of such measures have been commonly in use: availability of household amenities (such as drinking water and type of toilet facility), quality of dwelling unit and type of consumer durables owned by households (Montgomery *et al.*, 2000: 156). In a recent study conducted on a group of six developing countries, two from Africa, one from Asia and three from Latin America, Montgomery and his colleagues demonstrated the reliability of such surrogate measures, particularly of ownership of consumer durables, in adequately reflecting the economic status of households, and their usefulness in studying the links between living standards and demographic behaviour in developing countries (Montgomery *et al.*, 2000: 155-174). In this section, using ownership of a television as a proxy indicator

of economic status an attempt is made to investigate the relationship between living condition and fertility behaviour in Addis Ababa.

As can be seen from the data shown in Table 6.1, there is a clear inverse association between 'economic status' and lifetime fertility. In all age groups and both censuses, with the exception of those aged 35 years or over, women who live in relatively affluent households show consistently lower fertility than women who live in less well-off households. The age-standardised parities presented in the table show that compared to women living in households without a television set women living in households with a television set had an average parity of 0.25 births fewer in 1994 and 0.29 children fewer in 1984. A similar inverse association between fertility and economic status is also evident in the two youngest age groups.

However, despite the existence of fertility differentials, both economically well-off and less well-off households have had a fertility decline during the intercensal period. Irrespective of economic status, both groups show a decline in average parity in the two younger age groups, 15-24 and 25-34 years. However, in these age groups the magnitude of the decline was somewhat larger for economically well-off than less well-off women. As was the case in the other variables, both groups also show an increase in lifetime fertility among women aged 35 years or older in 1994. However, in this age group, the observed increase was larger for economically better-off than less well-off women. In general, the foregoing analysis, therefore, suggests that high level of economic status is associated with both low fertility behavior and greater intensity of fertility change in the area.

6.1.4 Child mortality and fertility

A good deal of previous work has also been directed toward investigating the relationship between mortality and fertility behavior. On the whole, there is enormous evidence to show that countries with relatively low fertility have a correspondingly low mortality rate, while countries with exceptionally high mortality rates maintain high levels of fertility. The same is true at the individual level (International Statistical Institute, 1984: 239). In this case, women who have high levels of child death experience are expected to respond by having more children than women or groups

that did not have child loss experience. This observation is corroborated by a number of studies in sub-Saharan Africa which show the existence of a strong link between child loss experience and lifetime fertility, independent of other factors (Toga and Chaudhury, 1992 and Kinfu, 1994 for Ethiopia; Maglad, 1994 for Sudan; Mturi and Hinde, 1994 for Tanzania; Ann and Shariff, 1994 for Togo and Uganda; Udjo, 1997 for Zimbabwe). Generally, child death inflates desired family size and often acts as a barrier to contraceptive use (Preston, 1978; Bulatao, 1984). However, as the likelihood of infant and child survival improves at the societal level, the strength of influence of child death on such behaviours is expected to diminish (Bulatao, 1984). Table 6.1 presents the bivariate relationship between fertility and child loss experience in Addis Ababa.

As can be seen, there is a general inverse association between number of children ever born and child loss experience. The age-standardised parities shown for 1984 declines from 5.8 children per women for those who had two or more deaths to 3.7 and 2.75 children per woman for women who had experienced one and no child death, respectively. This represents a difference of 0.97 births per woman between 'no dead child' and 'one dead child' categories, a difference of about three children per mother between 'none' and 'two or more dead children' categories and a difference of about two children per woman between 'one' and 'two or more' dead children categories. Similar relationships are evident for the 1994 census except that in this case the differences were somewhat smaller.

However, despite the differentials in fertility performance observed in the data, each group displays a similar pattern of fertility change. As can be seen, for all women the observed fertility change was concentrated among those aged 34 years or younger and generally large in the youngest age group. However, the magnitude of fertility decline observed in these age groups was relatively large for women with no child death experience, followed by women who had lost only one child. On the other hand, in the oldest age group all women have had an increase in cohort fertility but the magnitude of the increase was inversely related to child death experience.

6.1.5 Migration status and fertility

Migration status is another factor whose effect on fertility behaviour has received attention in demographic research. Several studies conducted in both developed and developing countries show that migrants often exhibit fertility behaviour which is distinct from that of the host population (Andorka, 1978; Goldstein and Goldstein, 1983; Oberoi and Singh, 1983). This difference partly emanates from the 'opportunities' and 'disruption' that are often associated with change of residence and the subsequent behavioural adjustment that migrants make to adapt themselves to their new environment. For instance, most migrants into urban areas may experience difficulties in finding employment and suitable accommodation. For this reason, they may tend to marry and start building families somewhat later than native urbanites. In this respect, migration status may be expected to have a negative effect on fertility. On the other hand, migrants may actually bring completed or partially completed families with them. In this case, migration may have only weak disruption or adjustment related effects on fertility. In some instances, migrant women may also have higher fertility than the host population but such relationships are often found in societies where most migrants originate from high fertility areas. The bivariate relationship between fertility and migration status in Addis Ababa is explored below.

As can be seen from results shown in Table 6.1, respondents born in Addis Ababa generally have lower fertility, followed by migrants from urban areas. In all age groups and both censuses, rural migrants had the highest average parity per woman in the city. For instance, the reported mean parities presented in the table indicate that in 1994 rural migrants had, on average, about 1.5 and 0.7 more births than respondents born in Addis Ababa and other urban areas, respectively. Similar observations also emerge from the evidence shown in the two youngest age groups, 15-24 and 25-34, where respondents born in Addis Ababa continue to exhibit significantly lower fertility, followed by migrants from other urban areas.

However, despite the existence of fertility differentials, the results presented in Table 6.1 show a decline in cohort fertility among both migrant and non-migrant women. As can be seen, for each migration category the rate of decline was much higher in the youngest age group, where a decline to the tune of 46 to 65 per cent was

observed. Significant fertility decline covering all migration categories was also evident in the 25-34 years age group. In this age range, the decline in fertility which was in the range of 21 to 42 per cent was relatively rapid among non-migrant women (42 per cent), followed by migrants born in other urban (39 per cent) and rural areas (21 per cent). However, consistent with earlier observations there was an overall increase in cohort fertility for women aged 35 years or over in the 1994 census. In this age range, the data for both censuses also show no substantial difference in lifetime fertility between rural and urban migrants on the one hand, and migrants and natives on the other, an observation which may suggest that in the long run migrants may eventually adapt themselves to the norms of the host community.

6.1.6 Cultural factors and fertility

The influence of cultural factors on fertility behavior has long been recognized in demographic research (Davis, 1961; Hanna, 1971; United Nations, 1973; Andorka, 1978; Lesthaeghe and Jolly, 1995; Leete, 1996; Khlat, Deeb and Courbage, 1997). In many societies fertility differences have been observed among population groups differentiated on the basis of religion, ethnic identity, linguistic affiliation or national heritage (Sohail,1980; Jansen and Hauser, 1981; Mosher, 1991; Isiugo-Abanihe, Adegbola and Adewuyi, 1993; Khlat *et. al.* 1997). Theoretically, these differentials are often explained in terms of three alternative hypotheses: the 'characteristics hypothesis', the 'norm hypothesis' and the 'minority status hypothesis' (Mosher, Williams and Johnson, 1992). The 'characteristics hypothesis' posits that differences in fertility behavior between members of different ethnic and religious groups generally arise from differences in socio-economic status between the groups. The expectation is, therefore, that once these socio-economic differences are adequately accounted for the variations in fertility behavior between ethnic and religious groups should be minimal. By contrast, the second approach, the 'norm hypothesis', regards ethnic and religious differentials in fertility as essentially 'normative' rather than socio-economic in nature (Goldscheider, 1971). On the other hand, the 'minority status' hypothesis views such differentials in the context of the social position held by the different ethnic and religious groups in a given society (Goldscheider and Uhlenberg, 1969).

The data shown in Table 6.1 reveal that religious differentials in fertility are generally insubstantial in the early stages of the reproductive career of respondents. However, as age increases the differentials in fertility behavior between religious groups become apparent. As can be seen from the entries showing results for the age groups 25-34 and 35 and over, the highest fertility in the city was observed among Muslims, followed by Coptic women and women belonging to 'Other' religion. The 'Other Christians' group, of whom the majority are Protestants, with a mean parity of 1.9 births per woman in 1984 and 1.4 births per woman in 1994 in age group 25-34 years and 3.9 children per woman in 1984 and 4.3 children per woman in 1994 in age group 35-49 years had the lowest fertility in the city.

A similar pattern of relationship was also evident from the age-standardised values presented in the same table. The results shown for 1984 indicate that, after differences in age composition are controlled for, 'Other Christians' had about one child fewer than Muslim women and about half a child less than Coptic women. The figures shown in the same column also reveal a lower fertility among Coptic than Muslim women. However, these differences have declined substantially in recent years.

The fertility differentials shown by ethnic origin indicate that in all age groups and during both census years lifetime fertility in the city was generally higher among Gurage and Oromo women than Amhara and Tigrawi women. However, as observed for religion, ethnic differentials in fertility were generally insubstantial in the early stages of the reproductive career of women. The largest fertility differentials between ethnic groups were observed in the 35-49 age group, in which differences in lifetime fertility between most ethnic groups have also increased further between the two census periods. In this age group, with a mean parity of 6.5 births per woman in 1994 and 6.2 births per woman in 1984, Gurage women show substantially higher fertility than women belonging to other ethnic groups. By contrast, in the 25-34 age range, inter-ethnic differentials in fertility generally show a decline between the two census periods.

However, despite the existence of fertility differential, the entries presented in Table 6.1 show evidence of fertility decline for all ethnic groups in the city. In the

youngest age group where a fertility decline was observed among all ethnic groups, the magnitude of the decline was somewhat higher for the two ethnic groups, Oromo and Gurage, which have had the highest fertility rate in Addis Ababa. The intensity of fertility change witnessed among Gurage and Oromo women in the age group 25-34 years was also fairly comparable to the rates observed for the two ethnic groups, Amhara and Tigrawai, which had the lowest fertility in the city in 1994. These observations are clearly consistent with the much faster increase in contraceptive use recorded among Oromo and Gurage women in the previous chapter.

The data for religion also reveal notable similarity in the pattern of fertility change across the different religious groups in the city. As can be seen from the entries presented in Table 6.1, for all groups the observed decline is concentrated in the two younger age groups and each religious group also show an increase in average parity among those aged 35 years or older in the latest census. It may be noted that this similarity in the pattern of fertility change observed among followers of different religious groups in Addis Ababa is somewhat in contrast with that of the experience observed in Western Europe, where fertility decline was recorded to be much earlier for some religious groups than others (Leete, 1996). However, within the similarities observed at a general level, the evidence presented in Table 6.1 reveal the existence of some modest variations in the intensity of fertility decline between the different religions and age groups. As can be seen from the table, the magnitude of the fertility decline was generally larger in the age group 15-24 years and, within that age group for Muslims, a group which have had higher fertility than any other religious group in the city. Such a rapid fertility decline among groups which have had higher fertility rates in the past is a manifestation of an advanced state of fertility transition (Rodríguez and Aravena, 1991: 61). The much faster rate of fertility decline observed among Muslim women is also clearly consistent with the rapid rate of increase in contraceptive use observed for these women in the previous chapter.

6.1.7 Marital status and fertility

To most societies and individuals around the world some form of stable and, to some degree, formalised union is still regarded as the appropriate social institution for bearing and rearing children. In both the works of Davis and Blake (1956) and

Bongaarts (1978, 1982), the two well known frameworks for the analysis of the proximate determinants of fertility, marriage represents one of the key intermediate variables that measures a woman's exposure to the risk of childbearing. To determine the extent to which childbearing in Addis Ababa is confined to the institution of marriage, Table 6.1 presents the bivariate relationship between marital status and fertility in Addis Ababa.

As may be expected, data presented in Table 6.1 show a higher fertility among currently-married women, followed by widowed and divorced women. Throughout all ages and for both censuses, never-married women have the lowest fertility in the city. The inter-group differentials in age-standardised parities shown for 1984 indicate that average parity per woman among currently-married women was 2.3 children higher than never-married women, 1.9 children higher than those of divorced or separated women and 0.4 children higher than that for widowed women.

Similar patterns of fertility differentials are also evident from the entries presented by age group. For instance, the results shown for 1984 indicate that average parity per woman at age 35-49 years was 5.3 children among currently-married women, 4.7 children among widowed women and 2.8 children among divorced and separated women. By contrast, for respondents in the never-married category, the corresponding value on the same age was about 1.3 births in 1984 and much lower still, about half a child per woman, for the cohort which attained the same age in the following decade, in 1994.

The current fertility data reported in the latest survey, 1995 (results not presented here), reflect virtually the same pattern. Despite their numerical dominance, accounting for about 54 per cent of women of reproductive age group in Addis Ababa, never-married women had contributed less than four per cent of the births recorded in the survey. This result demonstrates not only the low prevalence of premarital fertility in the area, but also, given the high proportion of women in the never-married category, the role that non-marriage has in keeping the fertility level in the city much below its potential level (see Section 5.5).

The low level of fertility observed among never-married women in the present analysis is consistent with earlier observations made for the area (Tesfaghiorghis, 1990: 200) and other parts of Ethiopia (Rädda Barnen, 1984: 41; Blacker, 1986: 33; OPHCC, 1987: 183; Halefom, 1990: 37). The finding is, however, in sharp contrast with that reported in some other sub-Saharan African countries, particularly in the Southern Africa sub-region (Gaisie, 1998; Gage, 1998; Sibanda and Zuberi, 1999). For instance, Gaisie (1998: 285) for Botswana, and Gage (1998: 25) for Namibia, show that as many as 51 and 37 per cent of the total births recorded in the respective countries in the early to mid-1990s had occurred to never married women or outside unions. A similar study on South Africa (Sibanda and Zuberi, 1999: 89-94) reveals an even higher rate of non-marital fertility; nearly 60 per cent of the births recorded in South Africa's 1996 census had taken place outside marriage. Such a high prevalence of non-marital childbearing in these countries is attributed to the 'remarkably high' social tolerance for childbearing outside of marriage, a cultural practice that significantly contrasts with the situation in Addis Ababa (Preston-Whyte and Zondi, 1992; Preston-Whyte and Allen, 1992; Rubinsztein, 1992).

The evidence from the qualitative study (and, of my own knowledge of the study community for I was born and brought up in the research area) suggests that premarital pregnancy in Addis Ababa is socially intolerable and highly stigmatised. Indeed, the society attributes such an event to poor parental guidance and when it happens it usually leads to immense social and psychological tension both for the individuals concerned and their close relatives, particularly parents who regard it as a disgrace to the family's social standing. For a girl, when such a pregnancy occurs, the reaction of parents may extend as far as ostracising their daughter from the family home. On the community level, the girl also loses 'respect', and is often regarded as someone with little hope and unpromising future, both in terms of marital life and her career options. It is this chain of parental and community level reactions and the related consequences of pre-marital pregnancy that explains the low level of fertility observed among never-married women in Addis Ababa.

Concerning fertility change, the results presented in the table shows that cohort fertility had declined among all women. However, as is evident from the table, the

timing and intensity of the decline vary markedly by marital-status. Generally, the decline was much higher for never-married than ever-married women. Again, going by the entries shown in the table, it also appears that the change toward low fertility in the city seems to have begun among never-married women, who had witnessed a decline in cohort fertility in all age groups, and later expanded to currently-married and divorced women, for whom the observed change was restricted in the two younger age groups. For widowed women, the observed decline seems to be even much recent as it was solely restricted to the youngest members of the group.

6.2. Determinants of lifetime fertility: A multivariate analysis

The bivariate analyses undertaken in the preceding section have demonstrated the existence of fertility differentials according to various socio-economic and cultural variables. This analysis has confirmed the inverse association often observed between fertility and such variables as educational attainment, household economic status, and child loss experience. The analysis has also revealed a higher fertility among migrant than non-migrant women, among employed and inactive than unemployed women, and among Muslim than Christian women. However, the question is to what extent are the effects of these variables maintained when the differing background characteristics of respondents are controlled? This is particularly important because several of the relationships observed previously could in fact reflect not only the impact of the variable under investigation but also the combined influence of other factors not controlled for in the bivariate analysis. This is an issue that is best explored through a multivariate based analysis.

In the past, several studies have described and made use of various such approaches in fertility analysis, the most common of which being the Ordinary Least Squares (OLS) regression technique (Bulatao, 1983: 605; Raftery *et al.*, 1996: 130; Rodríguez and Aravena, 1991: 43). However, as a statistical procedure, the OLS method is less than ideal for such a task, given the fact that children ever born, the dependent variable used in most of these investigations, is a count rather than a continuous variable as assumed in OLS-based regressions (Rodríguez and Aravena, 1991: 43). The assumption of a constant error variance and of normal distribution inherent in the OLS

procedure also makes the OLS model less efficient for studying events like lifetime fertility for which such assumptions are rarely met (Rodríguez and Aravena, 1991: 43; Raftery *et al.*, 1996: 132). A genuine model for a count dependent variable, such as that of children ever born, is a Poisson regression model (Rodríguez and Cleland, 1988; Rodríguez and Aravena, 1991; Winkelmann and Zimmermann, 1995; Agresti, 1996; Allison, 1999).

However, one concern with the Poisson regression procedure is the equi-dispersion assumption—that is, the assumption regarding the equality of the expected mean and variance (conditional on covariates)—inherent in the model (Winkelmann and Zimmermann, 1995: 2; Wang and Famooye, 1997: 274; Al-Qudsi, 1998: 442; Allison, 1999: 218). The violation of this assumption, particularly the case of a larger variance than that of the expected mean, which is an indication of over-dispersion in the data at hand and is a common observation in most demographic applications of the model, leads to an underestimation of the standard errors of the Poisson regression parameters and an over-estimation of the chi-squared statistics. Both of these statistical features in turn imply that, although the parameters of the Poisson regression model still remain consistent, they are statistically inefficient, meaning that they have more sampling variability than necessary (Wang and Famoye, 1997: 204; Allison, 1999: 223 - 226). In such circumstance, a negative binomial regression procedure, another family of count data models that is particularly designed to handle cases of such extra Poisson variations produces efficient estimators (Winkelmann and Zimmermann, 1995: 6; Allison, 1999: 226; Stata Corp, 1999: 423). Both the negative binomial regression and the Poisson model are now increasingly used in the analyses of fertility data in various parts of the world (Rodríguez and Cleland, 1988; Moreno, 1991; Rodríguez and Aravena, 1991; Nguyen-Dinh, 1997: 251 – 271; Wang and Famoye, 1997: 273 - 283; Al-Qudsi, 1998: 435 - 452). The multivariate analysis undertaken in this section is also carried out using count data models.

However, the availability of a range of count data models also mean that one needs to follow certain principles to select the most suitable model for a given data condition. One, and perhaps the most common, criterion is to conduct a Wald test on the 'dispersion parameter', a regression coefficient that measures the degree of

dispersion in the data under study, estimated from these models (Agresti, 1996; Winkelmann and Zimmermann, 1991; Wang and Famoye, 1997). In principle, this parameter, denoted by α, takes a positive or a negative or a zero value. A positive value indicates the existence of over-dispersion, and a negative value under-dispersion, a value of zero implies a condition of equal variance and mean in the data. Hence, a dispersion parameter that is statistically indistinguishable from zero suggests the appropriateness of a Poisson model for the data. A generalised Poisson model and a negative binomial regression model are the appropriate choice when the dispersion parameter respectively shows a negative and a positive significant value. In the present study, I used a similar criteria to chose the most suitable model for the data at hand.

The independent variables employed in the present analysis are similar to those used at the bivariate level, with two exceptions: age and migration status. In this analysis, migration status was redefined so as to capture, in addition to place of origin, the duration of time (in years) that migrants had spent in the area under study. One category is for non-migrants (resided since birth), while the other six are combinations of two origins: urban and rural, and three durations of residence in Addis Ababa: 0-4 years, 5-9 years and 10 years or more. This re-classification permits the examination of both the effects of behavioural adjustment that migrants often make with time as a result of influences of longer exposure to groups and institutions in their new destination and the effects of social and physical 'disruptions' on the fertility performance of recent migrants into the city.

Moreover, with regard to age, because of the suspected non-linear relationship between the variable and fertility, in the present analysis, in addition to age itself, the quadratic form of age, age squared, was included in the model as an additional variable. An attempt was also made to consider age cubed, instead of the quadratic form of the variable but the result was found to be insignificant, and hence dropped from the analysis. Given that all the independent variables used in the present analysis, with the exception of age and age squared were categorical or nominal scale in nature, the analysis was carried out through the use of dummy or indicator variables. As is conventional, when dummy variables were formed, the number of categories constructed was one less than the original number of categories with the one left over

being used as the reference group or category (Hosmer and Lemeshow, 1989: 48). Since, as shown in the previous section, childbearing in Addis Ababa is largely confined to marriage, the analyses that follows as well as those undertaken in the subsequent sections were also restricted to only currently-married women.

Table 6.2 Parameter estimates for Poisson and negative Binomial regression models of lifetime fertility among currently-married women, Addis Ababa, 1984 and 1994

Background characteristics	Beta (β) coefficients					
	All ages		15 - 34		35 - 49	
	1984	1994	1984	1994	1984	1994
Two dead children	®	®	®	®	®	®
One dead child	-.313 [a]	-.204 [a]	-.285 [a]	-.189 [b]	-.328 [a]	-.244 [a]
No dead child	-.677 [a]	-.550 [a]	-.673 [a]	-.668 [a]	-.678 [a]	-.513 [a]
Inactive	®	®	®	®	®	®
Unemployed	-.067	-.169 [a]	-.131 [c]	-.145 [b]	-.005	-.199 [b]
Working	-.093 [a]	-.128 [a]	-.090 [b]	-.133 [a]	-.116 [b]	-.151 [a]
No formal education	®	®	®	®	®	®
1 - 6 years	.025	.022	.022	-.028	.034	.045
7 - 8 years	.033	-.043	.041	-.160 [b]	-.019	.040
9 or more years	-.195 [a]	-.254 [a]	-.254 [a]	-.370 [a]	-.042	-.128 [b]
Born in Addis Ababa	®	®	®	®	®	®
Urban migrant resided 10 or more years	.004	.009	-.038	-.012	.060	.015
Rural migrant resided 10 or more years	-.005	-.036	-.057	-.061	.050	-.028
Urban migrant resided 5- 9 years	.037	-.314 [a]	-.038	-.367 [a]	.155 [c]	-.233
Rural migrant resided 5 - 9 years	-.085 [b]	-.173 [b]	-.141 [a]	-.188 [b]	-.044	-.522 [b]
Urban migrant resided 0 - 4 years	-.036	-.180 [a]	-.049	-.254 [a]	.004	-.088
Rural migrant resided 0 - 4 years	-.158 [b]	-.221 [a]	-.172 [b]	-.360 [a]	-.157	-.113
Muslim	®	®	®	®	®	®
Coptic	-.052	-.010	.021	-.027	-.112	-.009
Other Christians	-.028	-.068	.100	.137	-.125	-.077
Other religion	-.110	-.091	-.067	.054	-.131	-.109
Amhara	®	®	®	®	®	®
Oromo	.013	.022	.041	-.005	-.015	.021
Gurage	.133 [a]	.146 [a]	.107 [b]	.055	.157 [b]	.189 [a]
Tigrawai	-.049	.063	-.084	.093	-.009	.017
Others	-.039	-.042	-.077	-.063	.008	-.050
Has no television	®	®	®	®	®	®
Has television	-.048	-.088 [c]	-.038	-.090 [a]	-.060	-.060
Age	.221 [a]	.223 [a]	.368 [a]	.402 [a]	.026	.154 [b]
Age Square	-.003 [a]	-.003 [a]	-.005 [a]	-.006 [a]	-.0003	-.002 [c]
Constant	-2.3 [a]	-2.7 [a]	-4.3 [a]	-5.0 [a]	-1.5	-1.5
Dispersion parameter (α)	.063 [a]	Poisson	Poisson	Poisson	.086 [a]	Poisson
Log likelihood χ^2	1276 [a]	2286 [a]	1009 [a]	838 [a]	274 [a]	414 [a]

Notes: ® refers to reference group; a — refers to $p \leq .01$; b — refers to $p \leq .05$; c — refers to $p \leq .10$.
Source: Computed by author from the 1984 and 1994 census data, using STATA version 6 software.

Table 6.2 presents the beta (standardised regression) coefficients and their associated level of statistical significance obtained from the appropriate count data models fitted on the 1984 and 1994 censuses. In this analysis, as in the bivariate approach, the models were estimated for younger and older women separately, to see if the impact of socio-economic variables on fertility vary with age of women. The classification of the data into these two groups (older and younger) was also made partly on consideration of the age-related differentials in fertility change observed at the bivariate level analysis. For the two data sets, 1994 and 1984, this approach produces a total of six regression models. Of these, as revealed by the positive and statistically significant dispersion parameters shown in columns 1 and 5, the models for all women and that for those aged 35-49 years estimated from the 1984 census exhibit some evidence of over-dispersion. Hence, in these two cases a negative binomial regression model which is appropriate for such data feature was fitted. For the remaining four, a Poisson regression model was estimated, since the null hypothesis that the data is Poisson could not be rejected at the one per cent level of significance. For these models, the dispersion parameter is, therefore, by definition, indistinguishable from zero, and hence not reported in the table. None of the data combinations used in the present analysis showed evidence of under-dispersion. Under-dispersion is a statistical phenomenon commonly observed in data sets where the majority of women have two or fewer children (Winkelmann and Zimmermann, 1994 cited in Wang and Famoye, 1997: 274).

In general, the regression coefficients presented in Table 6.2 show that being economically active, having 9 or more years of education and the experience of few or no child deaths are significantly associated with lower marital fertility performance. High economic status and shorter duration of residence, particularly among younger women, are also significantly related to lower fertility. The evidence of a positive beta coefficient for age and a negative value for its quadratic term observed in all the six models is consistent with the notion of a monotonic decline in the rate of childbearing as age increases. However, as can be seen from the table, when these coefficients are compared across censuses and the two broad age groups used in the analysis, only in the younger age group do these values exhibit a consistently significant effect for both data sets, while in the older age group the relationships were significant only for the

later census. The fact that the coefficients for age are generally larger for the 15-34 than the 35-49 years age group also suggests that an extra year of exposure is more likely to produce higher fertility among younger than older women.

Consistent with the results reported in the bivariate level analysis, child loss experience continues to exert a significant ($p \leq 0.01$) imapct on lifetime fertility performance. The regression coefficients estimated from the 1984 census using all ages reveal that, even after controlling for differences in socio-economic status, lifetime fertility among currently-married women who have experienced two or more child deaths is about (100 (exp(-.313) - 1)) = 27 per cent and (100 (exp(-.677) - 1)) = 49 per cent higher than for those who had lost one and none, respectively. A similar relationship is also evident from the 1994 census data, where results for all ages show that, compared to having two or more dead children, the experience of only one child death reduces lifetime fertility by about a fifth, while the experience of no child death reduces fertility by as much as 42 per cent. The inverse association between child loss experience and fertility observed in the present study are consistent with results of similar studies conducted in Ethiopia and elsewhere (Toga and Chowdhury, 1992 for Ethiopia; Mturi and Hinde, 1994 for Tanzania; Chowdhury *et al.*, 1978 for Pakistan and Bangladesh).

On the other hand, a comparison of the beta coefficients shown for the same variable across censuses and age groups depict that in both younger and older age groups the magnitude of the coefficients was smaller for the 1994 than the 1984 census. This result reflects the relatively fast fertility decline among the reference group, namely women with high mortality experience. It may also be interpreted as a reflection of the declining importance of child loss experience in predicting marital fertility in the study area, a finding generally observed when the overall level of mortality declines at a societal level (Bulatao, 1984).

Regarding work status, the beta coefficients presented in Table 6.2 indicate significantly higher fertility among economically inactive women than among those working and unemployed. The finding of a lower fertility among not only working women but also the unemployed may indicate that the effect of employment status on

fertility in the study area may be operating through both a change in attitude toward paid employment and the aspirations associated with involvement in such activities, rather than through actual engagement and the supposed 'opportunity cost' often associated with employment. On the other hand, the larger regression coefficients for the 1994 than 1984 census observed in the table may indicate the increasing impact of labour force participation on the fertility performance of married women in Addis Ababa.

With regard to schooling, the results presented in Table 6.2 show that educational attainment at a higher level is generally associated with low fertility, a finding which is consistent with the observation made in the bivariate analysis and with results of similar studies conducted in sub-Saharan Africa and other developing countries (Cleland and Rodríguez, 1988; Chiemer-Dan, 1993; Cohen, 1993; Mturi and Hinde, 1994; Lesthaeghe and Jolly, 1995; Jeffrey and Basu, 1996; Shapiro, 1996; Kirk and Pillet, 1998). A comparison of the magnitude and level of significance of the beta coefficients across period and age group suggests that the effect of education on fertility is generally larger and more consistent for the 1994 census than in 1984 and for younger rather than older women. This finding is consistent with Bulatao's (1983: 613) observation that the cross-sectional effect of education on fertility is more negative at later than at earlier points in time, at least until fertility levels become very low.

However, as can be seen from the table, irrespective of census year and age group, the association between fertility and a low level of education, particularly at primary level (1-6 years), is generally weak. In neither census and neither age group is the fertility of women educated up to primary level significantly different from those of illiterate women. The same was also the case for junior secondary education (7-8 years). Except in the age group 15-34 years in 1994, women with junior secondary education show no evidence of statistically significant fertility difference from uneducated women. By contrast, in all age groups and at both censuses, women with 9 or more years of education(i.e., secondary or higher) show significantly lower fertility than women without formal schooling. For instance, as can be seen from the coefficients presented for all ages, net of the effect of other confounding variables, the fertility of women with secondary or higher education was lower by 18 per cent in 1984

and 22 per cent in 1994 than women with no formal education. This result points to the increasing influence of higher education on fertility behaviour in the study area.

The regression parameters shown in Table 6.2 also illustrate the significant influence of migration status on lifetime fertility. In general, with the exception of results for women aged 35-49 years, for whom the pattern is mixed in both censuses, rural and urban in-migrants exhibit significantly lower fertility than women born in the city. It may be noted that this observation is in contrast with the findings reported in the bivariate analysis in which, at all ages and in both censuses, women born in the city showed a consistently lower fertility than migrants. The change in the nature of the relationship in the present analysis may suggest that the differentials observed in the bivariate analysis could partly have resulted from differences in socio-economic characteristics between the two populations that are now controlled for in the multivariate analysis. For instance, according to the two censuses, most non-migrant women were unmarried, and also had higher educational status than migrants, which partly explains the low level of fertility observed among these women in the bivariate analysis, where, due to the nature of the analysis, the confounding effects of such variables have not be taken into account.

As can be seen from the beta values shown in the table, the effect of migration status on fertility was generally larger and more significant in the younger age group and in the 1994 census. The larger negative coefficients observed for 1994 than for 1984 may reflect increasing 'disruption' associated with change of residence in the more recent period, a phenomenon that could be linked to the growing problem of accommodation in the city that has probably made physical adjustment among in-migrants more difficult over time. A comparison of the regression coefficients for rural and urban in-migrants, which at any given duration generally show higher values for rural migrants than those from urban areas may also reflect the greater 'disruption' and relative difficulty of adjustment associated with change of residence among rural migrants. The insignificant association between fertility and migration status observed in the older age group, 35-49 years, which suggests the limited role of migration on the fertility performance of older women, indicates that by that age most women may have been well through the greater part of their reproductive career, and for these women,

therefore, change of residence would cause limited, if any, 'disruption' to their reproductive career. On the other hand, the insignificant difference in fertility behaviour between non-migrants and long-duration migrants (migrants with 10 or more years of residence) may reflect the latter's adaptation to the norms of the host community arising from their long exposure to the physical and social environment in their area of current residence. In general, the result, therefore, suggests that duration of residence, rather than migration status *per se*, is the most important predictor of lifetime fertility in Addis Ababa.

Another interesting result from the multivariate analysis is that once the confounding effects of socio-economic and demographic factors have been controlled, religion and ethnicity generally have little, or no role in determining marital fertility behaviour in Addis Ababa. This finding is, therefore, consistent with the 'characteristics hypothesis', discussed in the previous section. The only statistically significant coefficient for these variables was that of women belonging to the Gurage ethnic group.

Compared to other ethnic groups in the country, particularly the Amhara, the Gurage are known for retaining greater contact with their place of origin as well as for maintaining an elaborate extended-family structure, both of which may have placed Gurage couples under the constant influence of the extended family, thereby helping to sustain traditional norms of childbearing. This may have contributed to the high fertility rate observed among Gurage women in the present analysis. Another factor that may also have contributed to the high fertility level of the Gurage is the high economic value of children in this group. Given the dominance of the Gurage in the commercial and related informal sector activities in most of the country's urban areas, children born to a Gurage family are often expected to involve themselves in such activities at quite an early age. These children, therefore, not only are sources of additional labour input for the family business but also help generate additional income for the household, both of which may enhance the value of children to their parents. This may have served as an added incentive for high fertility among the Gurage. However, given the lack of a statistically significant effect for membership of the Gurage ethnic group in the 15-34 age group for the 1994 census, it may be argued that

current young members of the Gurage ethnic group may no more be different from other women in the city in terms of their fertility behaviour.

Table 6.3: Parameter estimates for Poisson and negative binomial regression models of lifetime fertility among currently married women, Addis Ababa, pooled data from 1984 and 1994 censuses

Background characteristics	Beta (β) coefficients		
	All ages	15 – 34	35 - 49
Two dead children	®	®	®
One dead child	-.262 [a]	-.249 [a]	-.288 [a]
No dead child	-.620 [a]	-.669 [a]	-.596 [a]
Inactive	®	®	®
Unemployed	-.176 [a]	-.179 [a]	-.142 [b]
Working	-.111 [a]	-.107 [a]	-.135 [a]
No formal education	®	®	®
Junior secondary	.025	-.006	.047
Primary education	-.013	-.059	.027
Senior secondary or above	-.233 [a]	-.319 [a]	-.105 [b]
Born in Addis Ababa	®	®	®
Urban migrant resided 10 or more years	.007	-.025	.033
Rural migrant resided 10 or more years	-.024	-.053	.007
Urban migrant resided 5- 9 years	-.031	-.117 [b]	.069
Rural migrant resided 5 - 9 years	-.104 [a]	-.165 [a]	-.077
Urban migrant resided 0 - 4 years	-.135 [a]	-.172 [a]	-.067
Rural migrant resided 0 - 4 years	-.195 [a]	-.245 [a]	-.119
Muslim	®	®	®
Coptic	-.030	-.001	-.068
Other Christians	-.062	-.050	-.118
Other religion	-.176	-.067	-.219
Amhara	®	®	®
Oromo	.013	.019	.008
Gurage	.139 [a]	.086 [b]	.182 [a]
Tigrawai	.010	.020	.005
Others	-.033	-.067	-.017
Has no television	®	®	®
Has television	-.073 [a]	-.064 [b]	-.066 [b]
Census year			
1984	®	®	®
1994	.010	-.056 [b]	.064 [b]
Age	.219 [a]	.388 [a]	.094
Age square	-.003 [a]	-.006 [a]	-.001
Constant	-2.4 [a]	-4.6 [a]	-0.1
Dispersion parameter (α)	.044 [a]	Poisson	.053 [a]
Log likelihood χ^2	2642 [a]	1335 [a]	542 [a]

Notes: ® refers to reference group; a — refers to $p \leq .01$; b — refers to $p \leq .05$; c — refers to $p \leq .10$.
Source: Computed by author from the 1984 and 1994 census data, using STATA version 6 software.

As shown in the table, in both censuses and age groups, ownership of a television set, net of other factors, produces lower fertility performance. However, the inverse associations between ownership of a television set and fertility behaviour were statistically significant only for women aged 15-34 years in 1994 and for all ages estimated from the same census.

To explore further the impact of background factors on lifetime fertility performance, net of period effect, a similar analysis was undertaken by pooling the data from the two censuses together. In this analysis, year of census was used as a measure of period effect and was entered into the model as an additional independent variable. As in the analysis undertaken for the individual censuses, two separate models, one for younger and another for older age group, were estimated. Table 6.3 presents the beta coefficients and their associated statistical significance obtained from the models.

The regression parameters presented in the table reveal similar patterns to those observed in the individual censuses. Even after period effects are controlled for, child loss experience and labour force participation continue to exhibit an inverse and statistically significant influence on lifetime fertility. Once again, as observed for the individual census data, economic status and educational attainment at a secondary or higher level also continue to exert an adverse and statistically significant impact on marital fertility in the area.

Migration status, particularly short duration of residence, also continues to influence lifetime fertility performance in the study area. As can be seen from the regression coefficients shown in the table, the influence of this variable was still exclusively limited to the younger age group and, in this age range, was much stronger for rural than urban migrants of the same duration. In general, as observed in the previous analysis, both for rural and urban migrants, the effect of migration status also appears to be less important for long duration migrants (duration of residence of 10 or more years) and older women. As observed in the multivariate analysis for the individual census data, religion and ethnicity also continue to show no significant effect on lifetime fertility. Once again, for these variables, the only significant effect was the higher fertility of Gurage women.

As can be seen from the indicator variable for year of enumeration, cohort fertility among currently married women aged 15-34 years seems to have dropped by about (100 (Exp(-.056) - 1) = 5.5 per cent between 1984 and 1994. By contrast, the positive coefficient for age group 35-49 years suggests an increase in lifetime fertility for women who attained the indicted age range during the same period. Both coefficients are statistically significant at below 5 per cent level and the trends in both age groups are also consistent with the results observed at the bivariate level. It may be recalled that the analysis at the bivariate level revealed an increase in lifetime fertility for women aged 35-49 years and an overall decline in the two youngest age groups, 15-24 and 25-34.

6.3. Socio-economic factors and intermediate variables: Establishing the relationship using the 'Synthesis' framework

In the previous two sections, the major aim was to explore the relationship between fertility and socio-economic and cultural factors, from both a multivariate and bivariate perspective. However, most of the background variables investigated in these analyses, can hardly be seen as having a direct and independent influence on fertility behaviour. Hence, in this section an attempt will be made to establish the mechanisms through which socio-economic and cultural factors operate to influence lifetime fertility performance in the study area. This analysis is guided by the Easterlin framework and is based on data drawn from the 1990 NFFS—the only source of data with the relevant information for the intended analysis.

The focus, in this section, is on currently-married women who have been married once and who are still living with their spouse. The restriction of the sample to only continuously married women minimises the conceptual and measurement problem associated with marital dissolution (Easterlin and Crimmins, 1985: 43). The analysis also considers only those background factors that showed a significant impact on fertility behaviour in the previous section. Such variables include economic status (measured by ownership of television set), ethnic affiliation, migration status, level of education and condition of employment. The following section provides a description of the framework used in the analysis.

6.3.1 The model: A brief description of the 'Synthesis' framework

The Easterlin model, also known as the 'Synthesis' framework, is a framework that attempts to identify the factors influencing lifetime fertility by looking at both its proximate and background determinants. According to the framework, lifetime fertility is assumed to be directly governed by the interplay of three intermediate variables, namely the demand for children, the supply of births and the cost of fertility regulation. Hence, in this approach, background variables such as socio-economic and cultural factors must operate through one or more of these proximate factors to exert their influence on lifetime fertility (Easterlin and Crimmins, 1982, 1985). Of the three proximate determinants identified by Easterlin, the supply of births, which represents the number of surviving children that a woman would have in the absence of deliberate fertility control, is not directly observable. It is, however, estimated as a product of a couple's natural fertility times its child survival rate.

There are two ways to estimate the natural fertility rate at an individual level. One way is to adopt the average number of births of those women who never used contraception as an estimate of the natural fertility level of the entire population. This approach has a major limitation. The limitation is that in socities where deliberate fertility control is not uncommon, a good number of those women who have never practised any method of birth control throughout their reproductive career are likely to be women with some biological or fecundity problems. This implies that any estimate of natural fertility rate from such data is likely to be much lower than the actual level.

This limitation led Easterlin and Crimmins (1985) to develop an alternative method of estimation. The method they suggest involves the derivation of natural fertility from a series of proximate determinants through a two-stage estimation procedure. In the first stage, using a system of equation defined in a form shown below (see equation 6.1), the number of children ever born to a woman is regressed on a set of proximate variables (Easterlin and Crimmins, 1985: 36). The proximate determinant variables included in the models are taken directly from Bongaarts's (1978) original formulation.

$$B = \lambda_0 + \sum_{i=1}^{7} \lambda_i X_i + \lambda_8 U + \varepsilon \quad \text{..... [6.1]}$$

where B = Number of children born alive (parity);

X_1 Marriage duration in years;

X_2 First birth interval in months;

X_3 Second birth interval in months;

X_4 Not secondarily sterile;

X_5 Months of breastfeeding in last closed interval;

X_6 Proportion of spontaneous pregnancy loss;

X_7 Proportion of child mortality;

U Use of contraception;

λ_i are unknown parameters to be estimated from the model, and

ε The random disturbance term.

Once the above equation is fitted, the estimated parameters are then used as a basis for predicting the natural fertility rate for each woman. Specifically, the procedure involves multiplying the regression coefficients estimated from the equation with the actual values of the respective proximate variables observed for each woman from the data. The output obtained following this exercise, after being summed up with the constant term of the model, thus yields the predicted number of births a woman would have in the absence of family planning or her natural fertility rate. However, in computing these values, we need to note that, the coefficient for contraceptive use has to be set to zero, since the focus is on natural fertility, that is the level of fertility a woman would have in the absence of contraception. This approach of estimating natural fertility is superior to the first method for reasons outlined in the previous page, and is the one used in the present analysis.

The second intermediate variable in the Synthesis framework is the demand for children. In practice, this variable is measured through a response to survey question on desired family size. However, doubts have been raised concerning the use of such a question, and many critics argue that respondents often give hypothetical rather than

actual reproductive intentions. Fortunately, empirical data are more reassuring than the skeptics suggest. Cross-sectional data from rural Thailand, for example, suggest that 'responses on desired number of children are far from being simply random' (Knodel and Prahuabmoh, 1973: 632). Longtiudinal data from Taiwan and the U.S also show that responses on desired family size given by women from the former group predict their subsequent fertility as accurately as that observed among American women (Freedman, Hermalin and Chang, 1973: 407-416). In a more recent study than those cited, covering wide range of countries, Pritchett (1994) showed that data on desired fertility correctly predicts what women actually want in terms of their reproductive goals.

Another problem with cross-sectional data on desired number of children is the *post facto* rationalisation problem in that the number given in response to the question may simply be a justification of the existing family size. In this sense, desired or ideal family size becomes biased by actual parity, so that women report as desired those births, which at the time of their occurrences, were in fact undesired. In other words, the desired number of children, instead of being a determinant of fertility, is determined by the number of children already born. However, studies that specifically addressed this issue demonstrate that the concern is perhaps exaggerated (Westoff, Misher and Lowell, 1967; Knodel and Prahuabmoh, 1973; Pritchett, 1994). While some respondents might give a 'rationalised' desired number or have difficulties in comprehending the question, Easterlin and Crimmins (1985: 49), argue that it is not entirely unreasonable to use the responses to desired family size to measure the demand for children. Following their observation, the demand for children in the present analysis was also approximated by the response to the question on desired family size obtained from the 1990 NFFS.

Still another important element of the synthesis framework is the motivation for fertility control, a variable approximated by the difference between desired and potential number of children, and largely determined by the cost associated with the practice of fertility control. There are two kinds of costs related to the regulation of fertility. One is the psychic costs involving attitudes and feelings toward fertility regulation, and the other, market costs, that is, the time and the money needed to learn

and effectively use some form of fertility control. Given that the decision to use a method of control tends to induce a positive change in attitude about contraception and knowledge of an effective method, a measure of the costs of fertility regulation should ideally reflect the situation prior to that decision. However, in practice this has rarely been the case, as most household surveys provide only current status data on contraceptive use. After a thorough investigation of alternative measures, Easterlin and Crimmins (1985: 51-52) suggest number of birth control methods known to a respondent as a useful surrogate indicator of the measured cost of fertility regulation of a woman. In this study, I also used a similar indicator to measure the cost of fertility regulation in the study area. However, it should be noted that this measure, just like most other similar indicators derived from household surveys, fall short of the ideal. Easterlin and Crimmins (1985: 51-52) acknowledge that the method though is the best that could be extracted from survey data, is subject to a conceptual bias, particularly that results from the problem of reciprocal causation. Another point of concern with respect to the concept of the supply of children and its relation with the cost of regulation is the issue raised by some researchers that the cost of fertility regulation, in whatever form it is measured, can hardly be considered as a determinant of fertility. Proponents of this view argue that under most circumstances the short run cost of acquiring fertility control devices is hardly comparable to that of the much larger long run cost of raising children (Pritchett, 1994). As the validity of this assertion is difficult to gauge from the available data, the reader is reminded to keep the possible effects of such limitations in mind while looking at the results presented in the following section. Table 6.4 summarises the definition and measurement of variables used in the analysis.

Table 6.4: Definition and measurement of variables used in the synthesis framework

Variable	Definition and measurement
A. Determinants of natural fertility	
Duration of marriage (X_1)	*This variable is used as a measure of the duration of exposure to the risk of pregnancy. In the analysis, it is measured by the difference between date of marriage and date of interview. The variable represents a non-negative discrete quantity.*
Early child birth momentum	*This variable represents a combination of two variables: first (X_2) and second (X_3) birth intervals. Second birth interval represent the difference in months between the date of birth of the second child and the date of birth of the first child. On the other hand, the first birth interval was obtained as the difference in months between the date of birth of the first child and the reported date of marriage of the respondent. Just as in the case of duration of marriage, both first and second birth intervals are non-negative discrete variables.*

Sterility (X_4)	*This variable, a dichotomous quantity (1= fertile, and 0 = sterile), is used to measure the probability of conception. The expectation is that women with biological or physiological problems have a lower probability of conception and tend to bear fewer number of children than an average woman, even if they do not contracept. In the present analysis, the fecundity status of a woman is determined on the basis of responses to series of relevant question asked of respondents in the 1990 NFSS. If a respondent reported fertility impairment (either on her part or of her partner's), she was regarded as infecund or sterile. Also, if a woman used no contraceptives nor was pregnant during the previous five years, she was classified as sterile. All other women, were considered as fertile.*
Duration of breastfeeding (X_5)	*Breastfeeding lengthens the post-partum amenorrhoea and is therefore inversely related to the number of children a woman might have. In the present analysis, duration of breastfeeding is measured in terms of number of months breastfed in last closed birth interval. It is a non-negative discrete variable.*
Pregnancy wastage (X_6)	*A high pregnancy wastage reflects physiological problem and reduces the ultimate number of live births a woman might have. The proportion of pregnancy wastage is calculated as a ratio of the number of wasted pregnancies to the sum of total pregnancies, which includes the number of wasted pregnancies plus the number of live births a woman have had up to the time of interview. This variable only assumes a value ranging between 0 and 1.*
Proportion of child mortality (X_7)	*Generally, child mortality relates to fertility, or the potential number of children a woman can have through its effect on post-partum behaviour. In the analysis undertaken in this section, the variable measuring the proportion of child mortality is obtained as a ratio of the total number of dead children to the total number of children ever born. The theoretical range of this variable is also between 0 and 1.*

B. Motivation variables

Supply, potential surviving children (Cn)	*The supply of births or the potential number of births that would survive to adulthood is an instrumental variable obtained through a two stage estimation procedure. Following the procedure discussed in the text, I first estimated the natural fertility level (N) for each woman and the result was then multiplied by a quantity, s, representing the survival rate of a woman's offspring. In other words, for each woman, Cn, the potential number of surviving children, was estimated as N x s, where $N = \lambda_0 + \Sigma \lambda_i X_i$ as in equation 6.1, and $s = 1 - X_7$. The potential number of surviving children, is a non-negative discrete variable.*
Demand for children (Cd)	*Similar to Easterlin's operationalisation, the study uses the response to the question on desired family size to approximate the demand for children. The particular question used in the 1990 NFFS to elicit the required information on desired family size was: 'If you could choose exactly the number of children to have in your life, how many would that be? This variable is a non-negative discrete quantity.*

C. Cost of fertility regulation

Use of contraception (U)	*Although, as discussed in the text, there exist a number of alternative measures of the costs associated with fertility regulation, in this study the relevant variable is defined in terms of number of methods of fertility control known to the respondent and reported without special prompting. In other words, it represented the sum of 'Yes' responses to the question on knowledge of specific methods of birth control. This variable is a non-negative discrete variable.*

D. Background variables

As stated earlier, a total of four background variables which showed a significant impact on fertility behaviour in the previous section have been used in the present analysis. Such variables include economic status (measured by ownership of television set), ethnic affiliation, place of origin and duration of residence in Addis Ababa, level of education and employment status. The definition and measurement of these variables was the same as that used in the previous sections.

6.3.2 Links between socio-economic and cultural factors with the supply of births (Cn), the cost of birth control (CR) and the demand for children (Cd) : A 'Synthesis' framework based analysis

The results of the application of the 'Synthesis' framework are presented in Table 6.5. The coefficients shown in the table were estimated using a variety of statistical methods. The equations for the demand for children, C_d, the supply of births, C_n, as well as the determinants of the individual proximate factors, with the exception of fecundity status, X_4, were estimated using OLS procedure. The equation for fecundity status, X_4, and the cost of fertility regulation, RC, were fitted respectively using a logit model and maximum likelihhod Tobit regression technique.

The choice of the methods used in the analysis was guided by three considerations: the nature of the dependent variable under investigation, the need to maintain comparable units of measurement across coefficients of the different regression equations required for the analysis, and an interest to maintain methodological comparability with the original work of Easterlin and Crimmins. The models used in the present analysis are identical to that proposed and employed by Easterlin and Crimmins, except for the equation on fecundity status (Easterlin and Crimmins, 1985: 35-57). Easterlin and Crimmins use OLS procedure for fitting the data on fecundity status. However, given the dichotomus nature of the variable the appropriate regression technique is either a logistic or logit model. In the present analysis, a logit model is used because it provides the regression parameters in a form of coefficients rather than odds ratio as the case is in a logistic model. The fact that the parameters of the logit model are in a form of regression coefficients mean that the units of measurement will be comparable with the output of the other regression equations estimated in the analysis, which are also in a form of regression coefficients.

Although the equations used in the analysis for the rest of the variables are similar to that used by Easterlin and Crimmins, mainly due to the interest in maintaining methodological comparability with their work, simplicity of result was also another additional factor considered in the choice of techniques used in the

Table 6.5: Multiple regression result of supply (Cn) and demand for children (Cd) and cost of regulation (RC) on socio-economic and cultural variables, Addis Ababa, 1990 NFFS.

Socio-economic variables	C_d	RC	C_n	Components of the supply of children						
				X1	X2	X3	X4	X5	X6	X7
Inactive (Reference)										
Unemployed	-.153*	-.248*	-.316	-8.153**	-4.123	5.136	-.306	-.415	-.011	-.041
Working	.120	-.197*	-.205	-1.121	6.905**	4.412	.120	-1.800	-.030	.003
No formal education (Reference)										
1 - 6 years	-.699	2.206	-.446	-4.844***	-5.264	-1.154	-.679	-.881	-.137	-.059***
7 – 8 years	-1.172***	4.225*	-.373	-8.153***	-17.720***	-11.172	-.893	-6.466**	-.018	-.093***
9 or more years	-1.388 ***	4.900***	-1.598***	-11.798***	-19.757***	-7.499	-.959	-7.514***	-.149	-.098***
Non migrant (Reference)										
Urban migrant 10 or more years	-.112	.242	-.081	.862	-1.263	8.437	.243	-1.280	-.017	.014
Rural migrant 10 or more years	.115	-2.792*	.458**	1.313	5.310	0.499	-1.669*	1.494	-.004	-.022
Urban migrant 5-9 years	-.168	-2.577	-.672	-1.717	3.532	1.244	-.268	-4.072	.048	-.047
Rural migrant 5-9 years	.069	-3.218	-.374	-2.158	0.694	2.143	-1.120*	.129	.300	.043
Urban migrant 0-4 years	-.234	4.136	-1.409**	-4.355*	-3.569	2.837	-.275	-7.506	.519	-.143**
Rural migrant	-.208	-1.049	-1.261**	-8.537***	-1.852	4.492	-.975*	-1.213	-.140	-.091**
Has no television (Reference)										
Has television	-.746**	1.049	-1.243***	-5.256***	-1.777	-11.423	.707***	-.716	-.118	-.022
Amhara (Reference)										
Oromo	.054	-.175	-.343	-.423	-.898	-1.451	.605	-.287	-.118	-.004
Gurage	.816 **	-1.018	-.152	-.505	-.661	2.498	.707	-3.248	.003	.001
Tigrawai	.223	1.414	.218	.589	4.413	-7.399	-.190	4.072	.064	.033
Others	1.120 *	0.984	.287	.636	1.528	6.562	-.849	-3.115	-.096	.010

Source: Computed by author from the 1990 NFFS; note: X1 = Marriage duration; X2 = First birth interval in months; X3 = Second birth interval in months; X4 = Fecundity status ; X5 = Duration of breastfeeding in the last birth interval; X6 = proportion of spontaneous pregnancy losses; X7 = proportion of child mortality. ** Significant at 5 per cent; * Significant at 10 per cent level..

analysis. In their extensive discussion on the methodological aspect of the Synthesis framework, Eatserlin and Crimmins (1985: 35-57) show that, although the non-negative non-continous nature of most of the variables included in the analysis require use of techniques such as a tobit model, the results obtained through this relatively complex technique were almost always identical, in terms of sign and significance level, to that estimated through the much simpler OLS procedure (Eatserlin and Crimmins, 1985: 42). The only exception to this generalisation was the equation for the cost of fertility regulation for which the result from the tobit model was found to be most appropriate. The adoption of the OLS method in the present analysis is, therefore, partly based on the simplistic nature of the OLS procedure and its adequacy for the purpose as demonstrated by the works of Easterlin and Crimmins (1985) and others (do Valle Silva, 1990).

At this stage it is also appropriate to note that an equally useful regression procedure for the type of variables included in the present analysis is a count data model, the kind described and used in the previous section. In the software used for analysis, the coefficients of such models are outputted in a form of standardised regression coefficients. However, these standardised coefficients pose a problem of cross comparison with the coefficients of the other equations in the analysis which are unstandardised. It is with the intention of avoiding the problem of inconsistency in the unit of measurement for the different regression equations that we opted not to use count data models in the analysis.

In general, the results of the analysis show that the effects of a given socio-economic and demographic factor operate through a number of routes to influence lifetime fertility. For instance, with respect to education it can be seen that increased level of schooling has an inverse and significant association with the demand for children, C_d, a positive and significant association with the cost of fertility regulation, RC, and a negative relationship with the supply of children, C_n. These observations, therefore, suggest that the low fertility observed among highly educated women in the previous sections is likely to have been caused by their higher use of contraception, and a reduced demand for children. Given that education is also inversely and significantly related to child mortality, X_7, the lower fertility rate observed among educated women may also partly be explained

through this effect. Education also shows a significant and inverse association with duration of marriage, first birth interval and length of brestfeeding. These results also indicate that part of the differentials in fertility behaviour observed among better and less educated women in the previous section could be a result of differences in marriage pattern, inter birth interval and duration of breastfeeding between these women.

A similar mechanism of influence appears to be evident for employment status. Compared to women in the reference group, unemployed women show significantly lower demand for children, shorter marital duration and greater knowledge and use of contraception. These factors are likely to be behind the low fertility performance observed among unemployed women in the previous section. The differentials in fertility behaviour between the different migration status categories, on the other hand, appear to be largely a result of differences in the supply of children, particularly the difference in fecundity status and duration of marriage between these women. The regression coefficients presented in the table show that migrant women, particularly those of rural origin, tend to have shorter marital duration and are more likely to have fecundity problems than non-migrant women.

Economic status, as measured by possession of a television set show an inverse association with the demand for children and duration of marriage. It is thus likely that the inverse relationship between economic status and fertility observed in the previous section may have resulted from delayed marriage and preference for small family size among women living in economically well off households. However, economic status has no significant effect on the cost of fertility regulation and the other proximate determinants included in the model. The coefficients shown in the table also suggest that the high fertility level observed among Gurage women in the previous section is a result of their higher demand for children and limited knowledge and use of contraception compared with the reference group.

6.4. Concluding remarks

This chapter has examined the socio-economic differentials in lifetime fertility and their association, at individual level, with proximate determinants, using both bivariate and multivariate approaches. The results of the analyses reveal significant variations in fertility performance by factors such as migration and activity status, child loss experience, educational attainment and economic condition of respondents. Generally, the findings at the bivariate level show that women who were better educated, born in the city and lived in households which owned a television set were more likely to have lower average lifetime fertility. Similarly, concerning employment status, the analysis indicates lower fertility among economically active than inactive women.

There were also large fertility differences between marital groups. Married and widowed women had a high level of fertility, while divorcees and never-married women had a low level. Average parity among single women, even in the age range where most women are expected to have achieved a greater part of their reproductive career, 35-49 years, was barely in excess of one child per woman in 1984 and much lower still, about half a birth per woman, for the cohort which attained the same age in 1994. As discussed in detail in the main body of the chapter, the low level of fertility observed among never-married women in Addis Ababa appears to be in sharp contrast with the situation in some other parts of Africa, particularly Southern Africa, where the practice of childbearing outside of marriage is relatively high and attracts little, if any, social stigma (Gaisie, 1998; Gage, 1998; Sibanda and Zuberi, 1999).

Differentials in fertility performance were also noted according to child loss experience of respondents. However, the relative effects of child mortality on fertility behaviour were noted to be smaller in the recent than in the earlier period, a result that suggests the declining importance of the role of child loss experience as a determinant of fertility performance in the study area. This pattern of relationship also indicates the disproportionately higher rate of fertility decline taking place in recent years among women with high mortality experience in the area. By contrast, the findings with respect

to education, particularly with 9 or more year of schooling, labour force participation, and migration status showed that the effects of these factors were much stronger in the recent than in the earlier period.

With respect to migration status, its influence on fertility was generally strong among recent migrants, larger for migrants from rural areas and exclusively limited to women aged 34 years or younger. However, the fertility of migrants who had spent 10 or more years of residence in the city and older migrants (those who were aged 35 years or over) of any duration, was statistically indistinguishable from their non-migrant counterparts. In sum, the result with respect to migration status showed that it is duration since migration rather than migration status *per se* which is an important determinant of fertility in Addis Ababa.

With respect to education, the analysis showed that once the effects of other confounding factors are controlled, only 9 or more years of education exert a significant influence on fertility performance. School attendance below that level had only limited influence on cohort fertility performance compared with 0 years. Moreover, the effect of schooling on fertility was generally larger and more consistent for younger rather than older age groups and for the more recent than for the earlier census. Both these observations indicate the increasing importance of high education as a determinant of fertility performance in the recent years. The results obtained from the application of the Easterlin framework showed that the low fertility observed among highly educated women in the area emerges from their late marriage pattern (as reflected by shorter duration of marriage) higher use of contraception, and a reduced demand for children. Given that education is also significantly related to child mortality, the lower fertility among these women may also partly explained through this effect.

The findings with respect to activity status show that not only actual employment but also the aspiration for involvement in paid employment could lead to lower fertility performance. In both bivariate and multivariate analyses, currently working as well as unemployed women had significantly lower fertility than economically inactive women.

As with education and migration status, the effect of labour force participation on fertility was also generally larger in the recent than in the earlier period, a finding that again indicates the increasing importance of labour force participation as a determinant of marital fertility in the city. The result of the analysis obtained from Synthesis framework show that compared to economically inactive women, women in the labour force show significantly lower demand for children, shorter marital duration, and greater knowledge and use of contraception. These factors are thought to be behind the low fertility rate observed among economically active women in the city

The results also showed that economic status, measured in terms of ownership of a television, has an independent and significant effect on fertility performance. Both the multivariate and bivariate results showed that women who lived in households who owned a television set had significantly lower fertility than women without such an item. Even after period effects were controlled for, through an analysis carried out on the data pooled from the two censuses, economically well-off women continued to show significantly lower fertility than economically less well-off women. As demonstrated by the analysis carried out using the Synthesis framework, the inverse association between economic status and fertility observed in the city results from delayed marriage and preference for small family size among women living in economically well off households.

However, despite the differentials in fertility behaviour observed in the city, changes in fertility behaviour were apparent in all sectors of the population. As shown in the bivariate analysis presented in the earlier part of the chapter, for the majority of the group, the observed reduction in cohort fertility was restricted to women under the age of 35 years. In the age group 25-34, for almost all socio-economic factors, with the exception of religion and ethnicity, differentials in fertility were much wider in 1994 than in 1984. By contrast, in the youngest age group these differences were generally minimal, which is an indication of the increasing homogeneity in fertility behaviour in the city over time.

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Chapter 7

SUMMARY OF RESULTS AND SOME THOUGHTS ON THE CAUSES OF FERTILITY DECLINE

7.1 Introduction

Reading about the demography of the Third World, or recent theories on fertility transition in general, it is quite common to observe the repeated assertion that Africa is different. It is argued that the region's cultural norms, beliefs and value systems regarding childbearing are uniquely pronatalist and highly resistant to factors which have lowered fertility levels elsewhere. The African reproductive regime has also been characterized as one in which almost all women get married and marry at an early stage. Indeed, like many African countries, Ethiopia has so far shown very little sign of a nationwide decline in fertility: in 1990 total fertility stood well over six children per woman. By contrast, reported fertility in Addis Ababa by the mid-1990s was barely 1.8 children per woman, declining from a reported level of around 3.2 in 1984 and about four in the second half of the 1970s. Considering the low level of fertility in Addis Ababa and the much cited 'pronatalist' behaviour of African women, this study begins by asking four questions that are central to the present study: Is the decline shown by the reported total fertility rates for Addis Ababa is real or is it an illusion created by faulty reporting? And if it is real, what are its demographic components? What impact did socio-economic and cultural factors have on the dynamics of fertility variation and the rate of fertility change over time in the area ? And what are the fundamental causes of the decline in fertility and its recent convergence to below-replacement level?

In an attempt to address these questions the study has been structured into seven chapters and employed a variety of data sources. The objectives of the research and its theoretical background, together with the approach followed in the present study, were set out in Chapter One. The latter consists of the Easterlin framework for marital fertility analysis (identifying the factors influencing the supply of births, the cost of birth control, and the demand for children) and the application of the proximate

determinants model to identify the demographic routes to low fertility in Addis Ababa. However, given that both analyses fall short of providing adequate answers to the questions of 'why' and under what conditions the proximate determinants and the three components of the Easterlin framework change, the approach followed by the institutionlists 'school' which attempts to link demographic processes to broad societal level changes has also been proposed as an additional guide for the present research.

A study of levels and trends in fertility behaviour naturally requires reasonably good quality data spanning a reasonably long period of time. A discussion of the sources, nature and quality of data used in the present analysis was thus the subject of Chapter Two. In this chapter, four major sources of data, the 1984 and 1994 censuses and the 1990 and 1995 fertility surveys, and a number of other secondary sources, collected in the 1960s and 1970s, which form the basis for the subsequent analyses were introduced. All the major as well as the supplementary sources provide data on children ever born and births in the 12 months preceding enumeration, while the 1990 and 1995 fertility surveys provide, respectively, full and partial birth histories, which make these sources particularly suitable for this study of reproductive change in Addis Ababa. However, it has long been suggested that results of censuses and surveys collected in developing countries, because of low literacy rate and inadequacies in the data collection process, may suffer from serious errors and biases. With this view in mind, and a firm belief that a formal evaluation of the data for possible errors would help in making sound judgements on the demographic process of interest in the study area, the quality of the various aspects of the major data sources of the study was examined.

Bearing in mind the intended analyses, the data evaluation focused mainly on birth and age reporting and on the four major sources of data. For this purpose a number of demographic procedures were used. The quality of age data for women in the reproductive ages was examined using measures of digit- preference, while the quality of fertility data was analysed using a variety of procedures that help to detect birth displacement, and sex-selective omission of children. These analyses showed that generally the age data for women are of reasonably good quality and, besides, there has also been a general improvement over the years. In the recent data, in 1995, fewer than

10 per cent of women had reported their ages on incorrect terminal digits. The smallness of this value, and the fact that most subsequent analyses are based on groups of ages leads one to conclude that, the effect of age mis-reporting on the results of the present study is minimal.

The evaluation of fertility data, on the other hand, examined the following aspects: omission of children among older women, sex ratios of children ever-born and proportion of dead children, and age and sex ratios by year of birth of children. These assessments revealed that the fertility data, both those obtained from the birth history and those collected in a from of children ever-born and surviving, do not indicate any evidence of sex specific omission of either dead or living children, and in the case of birth history data any systematic displacement of births. The evidence from the analyses also did not support the commonly held hypotheses that older women tend to omit some of their children. On account of these considerations, I reached the conclusion that the quality of the fertility data, particularly the lifetime fertility data, was reasonably dependable. Similarly, with regard to period fertility data it was argued that both due to the favourable educational composition of the study population and the timing of most of the surveys and censuses toward dates closer to events of social and national significance, reference period error was deemed to be insignificant. Having ascertained the quality of both the flow and stock elements of the fertility data, the study then proceeded to examine the four key questions of the research.

7.2. Are the decline in fertility and its recent convergence to below-replacement level genuine?

The application of various methods of fertility estimation in Chapter Four showed that the decline in fertility in Addis Ababa and its eventual convergence to low fertility are indeed genuine and not an artefact of errors in the data. The evidence from these analyses revealed that, although it may be difficult to identify precisely the year in which the decisive move toward controlled and low fertility began, there is clear evidence from the results presented in Chapter Four that the fall in fertility in Addis Ababa has occurred since the late 1970s.

The study has shown that total fertility in Addis Ababa has declined from more than five children per woman in the mid-1970s to below four in the first half of the 1980s, and to about three children by the second half of the 1980s. Expressed in annual rates of change, the decline represents a drop of 0.10 births per woman per year for 1978-84, 0.14 for the period 1984–94, and 0.15 for the recent period, 1990–95. By the early 1990s, total fertility had already fallen below two children per woman, that is well below replacement level. Although such a low level of fertility is now perhaps no more unique in developing countries (as there are a number of places in East and Southeast Asia), in Africa, both north and south of the Sahara, the level observed in Addis Ababa may only be paralleled by levels found in the most affluent urban areas and segments of the population in the republic of South Africa and Tunisia (Chimere-Dan, 1998: 3; Das Gupta, 1999: 5; UNDP, 1999: 198-199).

7.3. How was it attained and what are its demographic components ?

Consistent with these changes is a general move towards delayed marriage and a decline in rates of fertility within marriage. Between 1984 and 1994, marital fertility in the city, as measured by I_g, fell by about 20 per cent, a margin which is substantially higher than the 10 per cent fall that has come to be conventionally regarded as signifying the onset of irreversible fertility transition (Andorka, 1978: 21; Caldwell *et al.*, 1992: 211). As shown by the analysis of censored parity progression ratios, this was achieved through reduction across all birth orders and among women of all age groups. Between 1975 and 1990 progression to higher parities dropped by 28 to 45 per cent, the highest decline being observed in the lowest and highest birth-orders.

However, further analysis showed that the transition to low fertility observed in Addis Ababa was mainly a 'Malthusian transition', led by both non-marriage and delayed marriage rather than by high contraceptive use. The proportion of married women in the reproductive ages has dropped from about 63 per cent in 1967 to 46 and 32 per cent in 1984 and 1994, respectively. In 1994, only one in four of the females aged 20-24 years and fewer than one fifth of the males aged 25-29 years had been married. Accordingly, the singulate mean age at marriage in Addis Ababa increased from 26 years in 1967 to 34 years in 1995 for males, while for females it rose from 19 years in 1967

to 27 years in 1994. The dramatic nature of these changes can be seen in the fact that the corresponding value for females in rural Ethiopia in 1994 was 19.4 years: a difference that roughly amounts to a quarter of a century of change.

The late marriage pattern found in Addis Ababa is atypical of patterns in less developed countries. For instance, in Sri Lanka, a country known to have a late marriage pattern, and regarded by some scholars as the 'Ireland of Asia', the SMAM in 1981 was 27.9 years for males and 24.4 years for females (Leete and Alam, 1993: 89; De Silva, 1997: 7). The corresponding values for Addis Ababa in 1984 were 29.5 for males and 23.2 for females. In sub-Saharan Africa, levels matching that of Addis Ababa are probably found only in southern African nations, such as Botswana (Gaisie, 1998: 288). However, unlike Addis Ababa, a substantial proportion of births in Botswana occur outside of a formal union. Thus marriage in that country does not exert the impact it has in Addis Ababa. Less than four per cent of births in Addis Ababa in 1995 occurred among never-married women, compared to one half of the births (51 per cent) in Botswana in 1991 (Gaisie, 1998: 285). Similarly, mean parity among never-married women aged 45-49 years in Addis Ababa was barely 0.5 children per woman in 1994. The low level of premarital fertility in Addis Ababa is thus distinct from the pattern found in most sub-Saharan African countries, where a significant proportion of births occur outside of marriage (Jolly and Gribble, 1993: 68-116).

The decomposition of period fertility into components of marriage and other proximate determinants showed that the former is the most important component of the decline in period fertility observed in Addis Ababa, accounting for well over half the decline. This evidence is in contrast to the findings for most countries of sub-Saharan Africa where fertility declines have largely been linked to increased contraceptive use (Cleland *et al.*, 1991; Kizito *et al.*, 1991; Robinson, 1992; Blanc and Poukouta, 1997; Kirk and Pillet, 1998). The increase in the proportion of never-married women and the corresponding pattern of late marriage observed in Addis Ababa are also entirely unrelated to changes in the sex composition of the marriageable-age population. Nor do the trend and level of fertility in the city result from abnormally high levels of sterility: only 3.3 per cent of women aged 45-49 had had no live birth in 1995.

7.4 What roles did socio-economic and cultural factors play?

The results of the analyses show that lifetime fertility in Addis Ababa is significantly related to migration and activity status, child loss experience, educational attainment and the economic status of respondents. Generally, the findings at the bivariate level show that women who were better educated, born in the city and who lived in households which owned a television set were more likely to have lower than average lifetime fertility. Similarly, concerning employment condition, the analysis also indicates lower fertility among economically active than inactive women.

A positive and statistically significant association with mean number of children ever born was also noted for child loss experience. After controlling for the effect of age composition, the bivariate result obtained from the 1994 census revealed that women who have lost two or more of their children had about two children more than those who have lost only one, while the latter in turn had one child more than those who had no child loss experience. This result has also been confirmed by the findings from the multivariate analyses, although the magnitude of the difference tends to become smaller once the effects of other confounding factors were taken into account. The multivariate results also revealed that the relative effects of child mortality on fertility behaviour were lower in the 1994 than in the 1984 census, a finding that indicates a disproportionately higher fertility decline among women with high mortality experience in recent years.

The results of the bivariate analyses also showed significant fertility variations by religious and ethnic affiliation of respondents, although the observed differentials were less marked in the younger age groups, women aged 24 years or less. Generally, fertility was observed to be much higher among Muslims followed by Coptic women and women belonging to Other religions. The lowest fertility in the city was observed among Other Christians, the majority of whom were Protestants. With regard to ethnicity, Gurage and Oromo women tended to experience higher fertility than Amhara and Tigrawai women. However, as the results from the multivariate analysis showed, once the effects of confounding factors are controlled, ethnicity and religion had no independent effect on fertility in Addis Ababa. The only significant result was that

observed for the Gurage ethnic group, which recorded a statistically significant fertility difference from that of Amhara. The results of this analysis are, therefore, in broad agreement with the *Characteristics hypothesis*. The *Characteristics hypothesis* states that differences in fertility behaviour between members of different ethnic and religious groups generally arise from differences in their socio-economic status, and once the latter is controlled the variation in fertility behaviour should be minimal.

With regard to migration status, the results of bivariate analyses showed a higher fertility among migrants born in rural and other urban areas than women born in the city. However, as was shown in the multivariate analysis, once the effects of socio-economic and demographic factors have been controlled, the lowest fertility in the city was observed among recent migrants from both rural and other urban areas. It was also seen that the influence of recent migration on fertility was generally significant among younger women and larger for 1994 than 1984 census, and for migrants from rural than urban areas. The low fertility rate observed among recent migrants may be attributed to the disruption related to change of residence, particularly that of the problem associated with shortage of housing that makes physical adjustment in the short-run difficult for new migrants in to the city. However, the fertility of migrants who had spent 10 or more years of residence in the city and older migrants (those who were aged 35 years or over) of any duration, was statistically indistinguishable from their non-migrant counterparts.

The inverse association between fertility and education that has long been recognised in demographic literature has also been confirmed in the present analysis. After controlling for the effect of age composition, the bivariate result obtained from the 1984 census revealed that as compared to having 'no education', the attainment of 9 or more years of education depresses fertility by more than one child per woman, while 7 to 8 and 1 to 6 years of education could reduce fertility by about 0.8 and 0.3 births per woman, respectively. However, these relationships, which were all statistically significant, could not be confirmed in the multivariate analysis. The results from the latter investigation showed that, once the effects of other confounding factors are controlled, 9 or more years of education only exerted a significant influence on fertility performance compared with 0 years. The results of the multivariate analysis also

showed that the effect of schooling on fertility in the city was generally large and more consistent for the recent than the earlier census and in the younger than in the older age groups, both of which indicate the increasing importance of high education as a predicator of fertility performance in recent years.

The findings with respect to activity status were even more interesting. Both the multivariate and bivariate results had shown that not only actual employment but also the aspiration for involvement in paid employment could lead to lower fertility performance. In both analysis, currently working as well as unemployed women had significantly lower fertility than economically inactive women. The results of the multivariate analysis also showed that, just as for education, the effect of labour force participation on fertility was generally larger in the 1994 than 1984 census, a finding that indicates the increasing importance of labour force participation as a predictor of marital fertility in the city.

The results for economic status, measured in terms of ownership of a television, showed the expected inverse association with fertility performance. Both the multivariate and bivariate results showed that women who lived in households who owned a television set had significantly lower fertility than women without such an item. Even after period effects were controlled through an analysis carried out on the data pooled from the two censuses, economically well-off women continued to show significantly lower fertility than economically less well-off women. A control for a similar period effect for the other variables also did not alter the nature of relationships obtained from the individual censuses for each factor.

Despite the difference in fertility behaviour by socio-economic characteristics of respondents, the analysis of fertility change showed that all women in the city seem to have modified their reproductive behaviour. For the majority of the group, the observed reduction in cohort fertility was restricted to women aged 35 years or younger. In the age group 25-34, for almost all socio-economic factors, with the exception of religion and ethnicity, differentials in fertility were much wider in 1994 than in 1984. By contrast, in the youngest age group the differences were minimal, suggesting a pattern of increasing homogeneity in fertility behaviour over time. These

observations, therefore, suggest a general trend of a widening of fertility differentials before a convergence takes place.

The concentration of the fertility decline among women younger than 35 years indicates that the transition to low fertility for a significant proportion of the society may have begun during the period in which the oldest of these women began their reproductive career: a period that roughly corresponds to the second half of the 1970s. As was shown in Chapter Four, this was also the time scale which the analysis of fertility trends, derived through a variety of techniques and measures of fertility, has marked as the period in which fertility (both current and lifetime) had began to decline in Addis Ababa. Before that period, as it may be recalled from the analysis, was a brief period of a pre-decline fertility increase, which is now also confirmed through the increase in fertility recorded in the age group 35-49 in all the analysis throughout this chapter. The present analysis also showed that the pre-decline increase, noted in Chapter Four and confirmed in Chapter Six, was probably shared by almost all socio-economic groups. The only two groups that showed a major decline in this age range, and indeed across all ages, were women who were single and those who were unemployed.

7.5 What are the causes of fertility decline?

The decomposition of fertility into its various components provides insights into whether changes in marriage patterns or the control of fertility within marriage were the main mechanisms through which the decline was achieved. However, it offers no explanation of why marriage or marital fertility have undergone such remarkable changes nor why they did so at a given historical period: in this case since the mid-1970s. And the analysis of differential fertility, as useful as it is in disentangling the relative effects of changes in population composition and of intensity of fertility control on fertility, needs to be supplemented when reproductive behaviour changes across socio-economic groups, as it did in Addis Ababa. In other words, neither of these analyses gives a coherent narrative of the course of change—ecnompassing individual motivation, family context, economic pressures and opportunity and the broader political and cultural setting. Nor do they link the demographic outcome to the major

institutional transformation in the society that followed since the mid 1970s. Although it necessarily takes us beyond the analyses undertaken in the previous chapters in some respects, the outlines of such a narrative can readily be discerned in the material presented below.

It is proposed that the underlying causes of the dramatic change in reproductive behaviour in Addis Ababa lie generally in cultural practices and institutional changes observed during the period of transition. The origin of these institutional changes is to be found in Ethiopia's 1974 revolution. As shown in Chapter Three, the revolution instituted a wide range of measures that fundamentally altered the organisation of society and the country's economy, including the rights and limits to property ownership, the structure of opportunity and of access to services particularly where relevant to reproduction (such as education, employment and housing), ideas on gender equality and the role and relevance of traditional forms of power relations and social control in the area. These changes by modifying the composition of the study population and the general environment within which the society had to actualise its reproductive potential, are believed to have been instrumental in bringing about the low-fertility/low-prevalence-of-marriage regime later attained in the city.

One sphere where substantial compositional change has taken place, following the shifts in opportunity structure—change that has possibly contributed to the observed reproductive transition in the city—is that of education, particularly of females. For instance, as documented in Chapter Three, the proportion of literate women in the reproductive age group has increased from 29 per cent in 1967 to about 75 per cent in 1984 and 85 per cent in 1994. The proportion of women attaining higher levels of education also rose substantially. In 1994, about four out of five women in the reproductive age group had at least four years of education, about two-thirds of the women had seven or more years, over 45 per cent had nine or more years and well over one in five had 12 or more. These changes were made possible by the expansion of both informal and formal education. Given the mass of evidence in the literature (Caldwell, 1980; Casterline, 1985; Lloyd *et al.*, 1999) on the numerous ways through which schooling apparently influences human reproductive behaviour, the fundamental reproductive change in Addis Ababa, particularly for the most recent periods, may

partly be attributed to the change in the educational status of women. The findings in Section 6.2 clearly show that changes in the educational composition of the study population did indeed contribute to the decline in cohort fertility observed between 1984 and 1994. However, marked changes in reproductive behaviour in the city have been observed in all educational strata. Moreover, some countries in sub-Saharan Africa (Botswana, Kenya, Namibia, South Africa, Zambia, and Zimbabwe, Lloyd *et al*., 1999: 60) have also made substantial strides in education and reached 'mass schooling' but have not yet achieved the same level of reproductive change as Addis Ababa. This clearly suggests that the effect of education needs to be viewed in its specific context. In the case of the study area, this means the changes in ideas and institutions which came along with the revolution and helped in fostering social inclusion in the area.

The labour force participation of women was another area where a compositional transformation has been recorded, and has also possibly contributed to the transition in reproductive behaviour in Addis Ababa. In the past, particularly before the revolution, only two kinds of women involved themselves in work outside of the home: those with very high levels of education, and those who had no alternative sources of income (if single) or whose household income could not meet the family's needs (if married). This has changed significantly following the revolution, as evidenced in the rising proportion of women in the labour force shown in Section 3.5. The evidence from the qualitative survey shows that, unlike in the past, for the majority, employment is now seen not just as a way to make up shortfalls in household income, but as a normal way of life expected to be performed after years of schooling, and is valued for its own sake. Both these views are, no doubt, closely linked to the combined effects of the changing educational composition of women and the associated changes in attitude about gender roles in the society. The explanation for the latter largely lies in the propagation of the idea of gender equity which was one of the preoccupations of the revolutionary government. These changes, operating through the 'opportunity-cost' effect of childbearing among working women and the effect of 'competition for access' among economically active but currently unemployed women, may thus have contributed to the changes in marriage pattern and fertility in Addis Ababa. As shown in Chapter Six, both working and non-working women had significantly lower fertility than inactive women.

Part of the observed change in reproductive behaviour in the city may also have been caused by changes in the perceived and actual costs of children, which have been associated with the changing educational attainment of men and women and the corresponding changes in life style and value systems regarding children, including parental aspirations for their upbringing. Since individuals naturally strive to raise their offspring at least to the level which they themselves have achieved, the fact that most adults are now better educated means that more investment than ever before, in the form of increased goods and services directed to children, is necessary to enable parents to achieve the goal of producing a child or children 'better' than themselves. Changes in lifestyle also involve an increased desire for consumer durables.

The change in the perceived and actual costs of children may also be linked to the new economic arrangements that created state dominance in the urban labour market, and made education the sole determinant of entry as well as the basis of upward mobility. As confirmed in the in-depth interviews, over the years, this has led to a general understanding of the need for children to be educated: poorly educated children not only would be unable to provide for their parents future but also are likely to be dependent on them for a longer period than better-educated children. But achieving the requirements of the labour market and satisfying the changing aspirations for both consumer durables and children's needs involve costs. These costs have increased significantly in the city in real terms because of a decline in purchasing power (CSA, 1996: 6; see also Section 3.8), making the achievement of these objectives increasingly difficult. Together, these economic constraints promoted the substitution of child 'quality' for child 'quantity', thus leading to fertility decline. The other possible strategy would have been, of course, to settle for less costly goods and services, and to maintain earlier levels of reproduction. The fact that the former strategy was the main form of adjustment adopted suggests that the observed transition to low fertility should be viewed as an outcome not only of adjustments to adverse economic circumstances but also of changing values and aspirations.

The behavioural response to the changing costs of childbearing in Addis Ababa may have been sharpened by existing cultural norms regarding 'who pays for children'. Individuals living in a cultural and policy environment conducive to spreading the costs

associated with reproduction can generally be expected to show less response than those for whom such arrangements are either limited or absent. Several scholars link the persistence of high fertility in sub-Saharan Africa partly to the existence of a cultural practice of widespread child fostering that enables parents to distribute the costs of raising children across a larger kinship network (Caldwell and Caldwell, 1987; Lesthaeghe, 1989; Isiugo-Abanihe *et al.*, 1991; Bledsoe, 1994). Such opportunities are relatively limited in Addis Ababa (See Chapter Three). For instance, among the *Amhara*, whose culture for historical and demographic reasons (see Chapter Three) is dominant in the study area, 'kinship has generally a limited role' and 'co-operation is often thin and takes place only at times of grave crisis' (Levine, 1965: 247; 1974: 120). 'There are no obligations with respect to corporate lineage' (Levine, 1965: 257). 'The kinship system in its formal structure is such as to make members of the nuclear family relatively independent of extended relationships' (Levine, 1965: 259), stressing its prime responsibility for its needs (Levine, 1965: 247). Thus, unlike many sub-Saharan African settings, children in this culture belong to the nuclear family, hence the benefits and costs associated with them rest primarily on parents. This type of family organization implies a relatively limited opportunity for spreading the costs of children over a larger kinship structure, which in turn may have made parents conscious of the burden of an additional child, particularly when the costs are rising.

On the other hand, since parents are naturally concerned about not just the number but also the welfare of their offspring, it is likely that periods of increased insecurity and declining 'entitlements' that have been characteristic of the study area have also had an adverse effect on the fertility rate of the city. For instance, the 1978 and 1984 data showed P/F ratio values that were above unity and fairly constant across most age groups. This pattern of P/F ratio indicates temporarily reduced fertility, and could be viewed as evidence of a period-linked response to an adverse political and economic environment. As noted in Chapter Three, 1977-78 was a time of high political violence in the city, while 1983-84 was a period of exceptionally severe food shortage in Addis Ababa following a famine in Ethiopia in the same year (Human Rights Watch, 1991). It is therefore possible that women of all reproductive age and parity groups responded to these adverse events by avoiding births in those periods. Besides, since 1983 the government had introduced military conscription for its war needs in various

parts of the country. The introduction of this policy, through instigating insecurity, may have also contributed to the change in reproductive behaviour in the area.

The general adverse economic and political environment, particularly the decline in real income, the high and rising unemployment rate, and the severe shortages of accommodation (see Chapter Four) may have also influenced the marriage pattern in the city. As shown in Section 3.8, the unemployment rate among men aged 20-24 increased from 8.7 per cent in 1978 to 16 per cent in 1984 and 50 per cent in 1994. By 1994, unemployment was as high as one in three among those aged 25-29, and about one in five among those aged 30-34 years. Given the implicit cultural taboo against marriage if a prospective couple do not have their own physically separate house and the reasonable expectation of an income sufficient to maintain economic independence (Levine, 1965: 124), such a high level of unemployment among men of marriageable age, and the associated fall in real income of working adults, means that males have had to wait a number of years to achieve financial stability and acquire reasonable property so as to become culturally as well as economically eligible for the marriage market. The taboo is so rigorously observed that not only does marriage occur at a late age, but as many as 54 per cent of the women in reproductive ages in 1994 were never-married.

Continuation of support to parents was also pointed out by some respondents in the qualitative study, both males and females, as one of the reasons which made them delay their marriage. This was mainly because of the cultural anticipation that, once children are married, the assistance they give to their parents reduces substantially, becomes more occasional, or even stops altogether. The effect of these changes on marital behaviour have also been strengthened by the decline in the role of parents in the decisions involving the timing and choice of partner for their children (see chapter Five) and the general lack of pressure on unmarried adults in the society. These societal level changes, which contrast with the situation in rural parts of Ethiopia, and are the outcome of changes in gender role and age stratification associated with the revolution, may well have also contributed to the observed late marriage pattern in Addis Ababa.

Addressing another theme of recent scholarly interest, can the changes in the marriage pattern and the overall fertility decline in Addis Ababa be regarded as 'poverty driven'? (National Research Council–US, 1993; Lesthaeghe and Jolly, 1995; Linderstrom and Berhanu, 1999). This hypothesis needs to be assessed against experience elsewhere. If the transition is 'poverty driven', was Addis Ababa particularly disadvantaged compared to other urban centres in Ethiopia or other urban areas in other countries? As shown in Table 3.10 in Section 3.8, among the Ethiopian urban centres compared in the table, Addis Ababa had the highest annual real household income in both 1978 and 1994, and experienced the lowest decline in income, about 4.9 per cent between these two dates. The decline in real income was as much as 32 per cent in the two urban centres in the traditionally drought prone northern provinces, Tigrai and Wello. According to preliminary unpublished results of the 1994 census, the total fertility level for urban centres with a population of 10,000 or more in Tigrai was 3.9. This indicates that factors other than economic deprivation must also be in operation.

This conclusion is also supported by a similar comparison of data from seven sub-Saharan African countries: Botswana, Ghana, Kenya, Nigeria, Senegal, Togo and Uganda) (National Academy of Science, 1993: 16). In these countries, except for Botswana which had an increase, per capita GDP declined between 1975 and 1988 by varying amounts: 12 per cent in Ghana, 3 per cent in Kenya, 29 per cent in Nigeria, 3 per cent in Senegal, 8 per cent in Togo and 21 per cent in Uganda. The decline in real income recorded in most of these countries such as Nigeria, Ghana and Uganda was much higher than the 4.9 per cent level recorded in Addis Ababa in Chapter Three, but in none of the urban centres of these countries the total fertility had declined to a level attained in Addis Ababa. This suggests that a simple view that the reproductive change taking place in Addis Ababa is a result of mere adjustment to adverse economic conditions may not be a satisfactory explanation. Actually, a look at Table 7.1, which provides some socio-economic indicators for selected urban centres in Africa, strengthens the argument further. As can be seen from the table, by most proxy indicators of economic status Addis Ababa, or urban parts of Ethiopia of which Addis Ababa makes up one third, is not that exceptionally disadvantaged. In sum, the above

piece of data do not seem to support the hypothesis of any simple, 'poverty-driven' transition.

Table 7.1: Economic and demographic indicators for Addis Ababa and urban areas of selected African countries, 1990 -1995

	Economic and demographic indicators								
	Year	TFR	$_1q_0$	$_5q_0$	Has radio	Has telephone	Has electricity	Has TV	Females Illiterate 6+(%)
Addis Ababa	1990 [a]	1.74	77	108	79.0	24.9	97.5	22.4	23.1
Ethiopia	1990 [b]	3.5	93.6	131.2	64.9	12.4	73.6	10.9	39.2
Egypt	1995 [c]	3.01	51.1	64.5	73.4	–	99.0	88.5	20.8
Ghana	1993 [d]	3.99	89.9	54.9	54.3	–	74.6	30.3	22.3
Mozambique	1997 [e]	5.12	101.0	150.0	58.7	5.4	25.8	14.5	21.3
Tanzania	1996 [f]	4.11	83.1	122.2	65.4		35.5	6.0	24.7
Uganda	1995 [g]	4.97	74.4	87.6	67.2	2.4	40.2	17.3	15.2
Zambia	1996 [h]	5.08	91.9	173.3	64.9		44.1	43.4	12.7
Zimbabwe	1994 [I]	3.09	44.3	63.0	65.4		80.4	39.0	5.3

Sources: [a] All values except literacy status and demographic indicators are for 1990 and obtained from CSA (1993). The statistics on infant and childhood mortality are indirect estimates from 1995 AFS and obtained from CSA (1997). The fertility estimate is for 1995 and is from the present study. The date on literacy are for 1994 and from OPHCC (1995). [b] CSA (1993). The data for literacy were for 1994 and obtained from OPHCC (1998); [c] El-Zanaty et al. (1996); [d] GSS and MI (1994); [e] Gaspar et al. (1998); [f] Bureau of Statistics [Tanzania] and Macro International (1997); [g] Statistics Department [Uganda] and Macro International (1996); [h] CSO [Zambia] and Ministry of Health and Macro International (1997); CSO [Zimbabwe] and Macro International (1995).

Certainly the fertility decline observed in Addis Ababa did not take place under conditions of economic expansion; but looking at the above evidence, it is also unlikely to be a result of simple adjustment to adverse economic circumstances. Nor was it assisted by strong family planning program. As shown in Section 3.7, on an international scale Ethiopia's family planning program effort was in the category of 'weak'. Furthermore, not only was the level of infant mortality, 77 per thousand in 1995, higher than the threshold level proposed by Caldwell *et al.* (1992) for the *onset* of fertility decline in sub-Saharan Africa, but also no other society has ever had such a high mortality in combination with the very low fertility as observed in Addis Ababa.

As I have argued throughout this section, this unique demographic profile was achieved by a combination of factors. Among the significant elements are cultural values regarding family formation and kinship structure that favour nuclear-family arrangements, adverse economic circumstances that strongly influenced the housing sector and employment, and institutional changes relating to the revolutionary experience of the society. The last of these has led to increased female autonomy, in part operating through increased educational opportunities for women and enhanced aspirations for involvement in economically gainful activities. It may also have reduced people's fatalistic attitudes to life, leading to changes in attitudes towards birth control, and creating conditions for its use. The revolutionary changes also helped society to internalize the importance of education and personal development as the sole route to upward mobility; both of which in turn modified values regarding childbearing and marriage; and led to a breakdown of traditional age, sex and social stratification.

If the change in reproductive behaviour in Addis Ababa is institutionally linked, as argued above, it then raises the question: why did the institutional changes only have an effect in Addis Ababa? Why did they not affect the rest of the country, as the revolution was presumably nationwide? The answer to these questions lie on the differences in the depth of institutional changes, access to educational opportunities, mortality conditions and availability of effective methods of birth control; and on the differing effects of some of the socio-economic policy reforms of the revolutionary period in different parts of the country. One example is the policy on ownership of property, particularly of land in rural areas and housing in urban areas. This clearly had different effects on the population of the two areas. The urban housing policy, as discussed in Chapter Three, restricted ownership to a single dwelling unit, and brought all urban land and houses not occupied by the owner under the control of the state. By destabilizing the housing market, this led to severe shortages of accommodation. This, as discussed earlier, was one of the factors that contributed to the late marriage pattern and thereby to the decline in fertility. The equivalent policy change regarding property ownership in rural areas was a land reform measure that ensured individual peasants access to farmland solely on the basis of family size. The reform also brought with it legal restrictions on the employment of labor outside of the family, while ensuring fairly easy access to farmland for new married couples. The fact that marriage and

childbearing are rewarded with resources in the rural areas may partly explain why fertility remains high in these areas. Besides, in the rural areas much of the revolutionary changes such as those with respect to gender and age stratification and access to social services also lack depth, which no doubt contributed to the huge urban-rural fertility differential in Ethiopia, perhaps the largest ever recorded in history.

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Annex I

A TECHNICAL NOTE ON INTEGGRATING MIGRATION IN THE 'OWN-CHILDREN' METHOD OF FERTILITY ESTIMATION AND ITS APPLICATION TO DATA FROM ADDIS ABABA

General Introduction

The 'own-children' method, originally developed by Grabill and Cho (1965) and subsequently refined and elaborated by Cho and his colleagues (Cho, 1971, 1973; Cho and Feeney, 1978; Retherford and Benett, 1977; Cho, Retherford and Choe, 1986), is an indirect technique of reconstructing levels and trends of fertility for a given population from information obtained in a census or household survey with respect to age and sex of respondents, relationship among members of households and, if available, on marital status and number of living and surviving children at time of enumeration.

The 'own-children' method has several advantages. First, it makes possible the estimation of both the level and trends of fertility without any direct and detailed information on birth statistics. Only a set of simple tabulations of young children by age of mother is required. The fertility estimates from the 'own-children' are also robust because unlike most 'indirect' estimates, they require no prior assumption on past levels and patterns of vital rates.

The Matching procedure

In the application of the procedure to the available data, surviving children enumerated in each household were first computer matched to mothers within households employing, in the case of the 1995 survey, both the special code on *Mothers Line Number* and responses to questions on age, sex, relationship to head of household and marital status collected in the survey. The former type of matching procedure is commonly known as mother's personal number (MPN) matching while the latter referred to as relationship to head of household type (RHH) matching. Survey responses to a similar set of questions to that of 1995 were used in the 1990 RHH type matching,

while an MPN type matching could not be applied on these data for lack of information on mother's personal number in that survey. The matching algorithm in the two censuses, namely 1984 and 1994 censuses, followed a similar procedure as that of the 1990 and 1995 RHH type matching, except in these two cases the question on number of children living at home available from the data was used as an additional criterion in the matching procedure. However, for a reason similar to that of the 1990 survey, an MPN type of matching procedure could not be performed on these data sets. The proportions of matched children by own age obtained from the respective surveys and census data are given below.

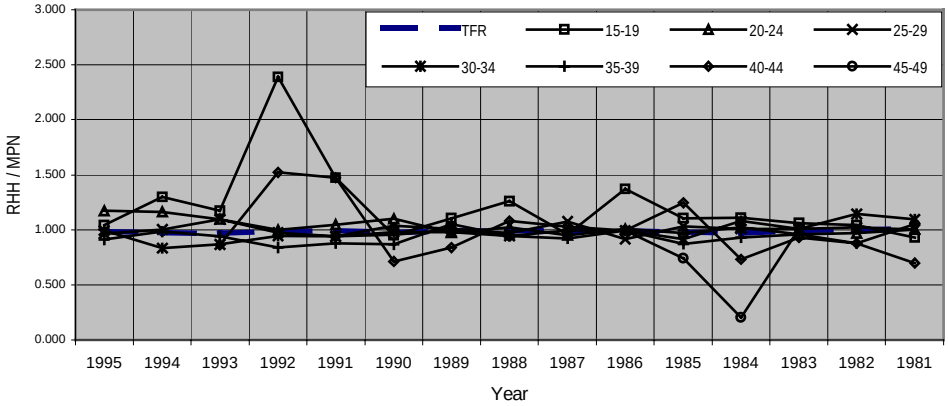
Table A.1.1: Proportions of matched children in the 1984 and 1994 censuses and the 1990 and 1995 fertility surveys, Addis Ababa.

Age of children	Proportion of matched children				
	1984 CENSUS	1990 NFFS	1994 CENSUS	1995 AFS	
				RHH	MPN
0	91.2	87.4	78.3	74.3	94.7
1	86.9	90.8	79.7	78.3	85.5
2	84.6	83.5	79.0	70.3	83.3
3	85.8	89.9	80.0	71.4	78.2
4	87.1	81.0	78.8	71.5	83.1
5	88.1	81.3	79.1	74.2	80.5
6	89.4	83.1	80.0	77.1	79.1
7	86.3	82.6	79.3	71.0	75.1
8	85.5	80.5	80.0	76.4	78.0
9	86.5	78.8	79.3	76.1	78.3
10	86.5	75.5	80.3	76.2	75.3
11	80.1	76.0	80.1	67.5	77.2
12	82.5	76.4	80.4	72.1	72.5
13	76.8	75.5	80.2	64.3	74.3
14	74.3	70.9	79.0	63.5	76.1
Total children	9300	3040	544676	2832	2832

Source: *Computed by Author from the computer record of the respective data sources.*

As can be seen from the table, the overall proportion of matched children in the various data sources is fairly high; it stood at 84.9 per cent for 1984, 79.4 for 1990, 79.6 for 1994 and 75.2 per cent for the 1995 survey. The MPN matching procedure used in the latter survey shows a higher proportion than the output from an RHH type matching obtained from the same data. However, as suggested in the literature (United Nations, 1983: 184-188; Cho, Retherford and Choe, 1986:44), those children who were not matched through the algorithm were later distributed according to the distribution of children whose mothers were identified in the matching process. This procedure presupposes an implicit assumption that the age distribution of unmatched children, according to age of mother, is identical to that observed among children whose mothers were identified. The effect of matching error arising from misclassification of own-children is often reflected in the age pattern of fertility, but its overall effect on the total fertility, even when high proportion of children remain unmatched and have to be distributed under the above assumption, is quite small (Cho, Retherford and Choe, 1986:44). A comparison of age-specific and total fertility rates generated through the two different types of matching, namely RHH and MPN procedures employed on the 1995 survey show results that are quite consistent with this expected pattern (see Figure A1.1 below).

Figure A1.1: Deviation in total and age-specific fertility rates estimated alternativelyfrom MPN and RHH matching, 1995 AFS



Adjustment for mortality of children and women

As the 'own-children' method is essentially a reverse-survival technique, it requires information on survival ratios to enable us estimate the number of births the surviving children represent and also obtain the 'mid-year' female population who are expected to be at risk of giving birth to these children. Normally, the survival probabilities are to be obtained from life tables constructed for the area under study. However, as there are no adequate data permitting such an exercise for Addis Ababa, the procedure I have followed to obtain the required survival ratios for the area was to estimate first l_5 values (probability of surviving from birth to exact age 5) from information on child survivorship collected in the respective data sources (United Nations, 1983: 73-80). These values, for both sexes, were 892 per thousand for 1994 and 1995, 884 for 1990 and 880 for 1984. Using these estimates as entry parameters to the assumed model life table system I then determined the level of mortality to which these values correspond. For this purpose, I employed the Coale-Demeny model life table system and, again for lack of data, further assumed that the age pattern of mortality in the city follows the pattern represented by 'West' family of the Coale-Demeny model life table system. Once the level of mortality corresponding to the l_5 estimate is determined, the single year survival ratios were subsequently obtained by the use of a logit life table system as described in United Nations (1983: 184-190).

The choice of l_5 estimates out of the various l_x values that could be generated from child survivorship data (and, hence be equally used as entry parameters) is based on certain advantages that l_5 has over the other mortality estimates. First and foremost, l_5 value is generally less sensitive to the pattern of mortality. In other words, in a model life table system, l_5 estimate does not show much variation from one life table family to the other. Secondly, extensive research on mortality in sub-Saharan Africa has shown that l_5 is the most stable mortality indicator in the region (Venkatacharay and Teklu, 1991). Thirdly, since the l_5 estimate refers to approximately 7.5 years prior to enumeration, this period also corresponds quite well to the mid-period of the fertility estimation period by

the 'own-children' method, which normally goes as far back as 15 years period prior to enumeration.

At this point, however it may be useful to point out that results of the 'own-children' method are generally less sensitive to errors in assumed levels and patterns of mortality. For instance, Cho's study on Korea using a 1966 census demonstrated that an error of ten years in estimated life expectancy introduced less than a 5 per cent error in the estimated total fertility and a very small difference in the age specific rates (Cho, 1973: 270-271). Similarly, using the 1970 census data for Thailand, Retheford, Chanatrithirong, and Wanglee (1986) showed that even under a situation when there was a maximum difference in life expectancy of about sixteen years, the error introduced in the 'own-children' estimates of total fertility rates varied only within a range of between 2 and 8 per cent. Although experimenting on the effect of errors in mortality estimates onto our fertility estimates is beyond the scope of this study, from the forgoing evidence one would expect that the results of the 'own-children' procedure from the present study will also be affected very little, if at all, by the adoption of a wrong pattern of mortality and an assumption of a constant mortality within the period of analysis.

Adjustment for the effect of migration of children and women into the city

The city of Addis Ababa being a major net-migration receiving area, in almost all the data sets about 40 to 50 per cent of the recorded population represented life time migrants. For the population under 15 years, these proportions also show an increasing trend with age. For instance, for the two censuses the proportion of children born outside of Addis constituted about 3 to 8 percent in the youngest ages and about 25 to 30 per cent in the oldest age groups. This would, therefore mean that the estimated number of births, from the reverse survival procedure, for any period prior to enumeration contains two components, that is a cohort of children who were born outside of the city and those born in the city and who truly form the 'original' births of the period in the area. And, because in the application of the own children procedure, the age structure of children

represents fertility trends in the years before enumeration, the higher proportion of children born outside of the city among older than younger ages may tend to increasingly inflate fertility rates the further one goes back in time.

Similarly, not all the women who were present at time of the respective enquiries also had lived in the city throughout their life time or during the years of their reproductive age. Had migration been negligible or were the population under study to be a 'closed' population, the female population of relevant age group recorded at time of enumeration would have represented the survivors of the original birth cohort. In this context, therefore, the woman-years of exposure for the various years preceding enumeration, which form the denominator in the calculation of the fertility rates, could have been easily obtained by adding the number still living with those 'resurrected' using an appropriate life table. However, in a non-closed population, such as the area under study, the women who were recorded at time of enumeration in the various data sources, just like the case described for children, represent not only the survivors of the original cohort born in the city but also those who migrated into the area. In this situation, the computation of woman-years of exposure is not as straightforward as in a 'closed' population for it depends not only on the prevailing mortality condition but also of the size of the migration cohort and the duration of stay of its individual members in the area under study. For instance, a woman who had moved in to the city some x years ago before enumeration, given surviving to the time of enumeration, would contribute to the city's woman-years of exposure only during her x years of residence in the area. Similarly for a cohort of women with duration of residence of k years at period t, the length of the period to which they are exposed to the risk of childbearing in the city extends only as far back as to $t - k$ years prior to enumeration, during which they would contribute a total woman-years of exposure that equals with the sum of the product of their size, as determined by the prevailing mortality condition and the "original" migration cohort. Generally, such considerations require effective integration of women's residence history in the process of building-up the 'true' woman-years of exposure for the area.

This process is analogous to the way one would successively resurrect and incorporate persons lost due to death from the study universe by way of reverse survival procedure except in this case, as we progress back in time, instead of bringing in individuals into the universe of analysis they are instead successively eliminated once their contribution to the woman-year of exposure in the area under-study, measured by the duration of their residence in the city, is up. Although from theoretical point of view the own-children procedure places no restriction for the incorporation of migration in such a dynamic approach, the author knows of no previous attempt in this direction and, in this sense, the effort in this study stands alone.

Table A.1.2: Comparison of migration adjusted and unadjusted total and age-specific fertility rates: Addis Ababa, 1984 and 1994

	0-4 years		5-9 years		10-14 years	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Panel A						1984 Census
15-19	.0312	.0312	.0929	.0902	.1172	.1114
20-24	.1373	.1320	.2070	.1909	.2748	.2377
25-29	.1891	.1789	.2745	.2425	.3476	.2794
30-34	.1952	.1826	.2266	.1959	.2574	.2029
35-39	.1268	.1182	.1454	.1273	.1875	.1510
40-44	.0661	.0622	.0840	.0756	.1313	.1027
45-49	.0333	.0327	.0540	.0476	.0861	.0719
TFR	**3.8953**	**3.6894**	**5.4224**	**4.8505**	**7.0097**	**5.7848**
Unadjusted/ Adjusted		1.0558		1.1179		1.2117
Prop born outside Addis Ababa						
Panel A						1994 Census
15-19	.0159	.0151	.0371	.0331	.1185	.0945
20-24	.0659	.0622	.1382	.1219	.2219	.1756
25-29	.1269	.1193	.1833	.1604	.2873	.2255
30-34	.1165	.1094	.1854	.1613	.2460	.1933
35-39	.0792	.0741	.1272	.1105	.1582	.1241
40-44	.0362	.0338	.0639	.0556	.0770	.0605
45-49	.0149	.0139	.0239	.0208	.0455	.0360
TFR	**2.2773**	**2.1383**	**3.7950**	**3.3179**	**5.7726**	**4.5784**
Unadjusted/ Adjusted		1.0650		1.1438		1.2692

Source: Computed by author

Thus, using the information on duration of residence available from the 1984 and 1994 censuses, in this analyses I generated migration adjusted and unadjusted estimates for the city. In the former case the relevant estimates were computed from information on all children and all women, irrespective of residence status, while in the later, following the discussion above, only children born and enumerated in the city and woman-years of exposure adjusted for the structure and time trend of in-migration into the city, are used. Table A1.2 shows the results generated from this procedure.

The results shown in the table exhibit generally lower estimates for migration adjusted than unadjusted estimates. In both the 1984 and 1994 censuses, the deviation between migration unadjusted and adjusted estimates tends to increase the further one goes back into the past. These differences for the 1984 census for the periods 0-4, 5-9 and 10-14 years before enumeration, stood at around 6 per cent, 12 per cent and 21 per cent, respectively. The comparable figures for 1994 were 7 per cent, 14 per cent and 27 per cent respectively. In other words, in the present case the analysis shows that estimates obtained without proper adjustment for the effect of migration are likely to produce inflated total fertility estimates.

Annex II:

A METHOD OF ESTIMATING PERIOD AGE-PECIFIC AND TOTAL ABORTION RATES FROM DATA ON LIFETIME ABORTION COLLECTED AT TWO POINTS

As stated in the text, the 1990 and 1995 fertility surveys provide for each woman data on whether or not she has ever had an induced abortion and, if she did, the total number she has had in her lifetime. This information, particularly the information on total number of abortions can be converted into average number of abortions by age, in the same way as one converts children-ever-born data into average parity. This gives a measure of the intensity or quantum or level of abortion for each cohort (cohort in this case is represented by age at survey), containing, however, no information about its timing. It is known that in data separated by a given interval, say five years in the present case, the women in any five-year age group at the second survey represent the survivors, both with respect to mortality and out-migration, of the women in the next younger five-year age group at the first survey. Hence, the difference in the average number of abortions of the cohort between the first and the second surveys reflects its abortion experience between the two surveys, if it is assumed that women who died or migrated between the two surveys, had, on average, lifetime abortion experience that was not systematically different from that of women who survived and were enumerated in the second survey. The resultant inter-survey increments in effect, therefore, represent, for each cohort, the intensity of abortion pertaining to the inter-survey period. This procedure of converting the timeless data on number of abortions at two points of time to a time-specific inter-survey measure of intensity of abortion can be algebraically expressed as follows:

Assuming A (i, 1) and A (i, 2) represent respectively the average abortions obtained from the first and second surveys; and i represents five-year age groups of women (i = 1, 2, 3, ... 7 = where 1=15 - 19, 2=20-24, 3=25-29...7=45-49), then the inter-survey abortion increment for a particular age group i [A (i, m)] can be obtained as:

$$A(i, m) = A(i, 2) - A((i - n), 1) \quad \text{.....(2A.1)}$$

Where, A (i, m) represents the inter-survey abortion increment for women in age group i and n is the number of five-year periods between the two surveys.

These inter-survey increments in average abortions can be calculated for all age ranges, except the youngest age group. Assuming that significant exposure to the risk of pregnancy, and hence the resort to induced abortion, begins only after age 15, the average number of abortions recorded for the youngest age group in the second survey can be taken as the inter-survey abortion experience of women in that age group, since these abortions would have occurred during the 0-5 years period before the second survey.

Once the inter-survey abortion increments are calculated for all women, dividing the value for each age group by the length of the inter-survey duration, which is five years in the present case, provides a set of hypothetical annual age-specific abortion rates referring to the midpoint of the two survey periods. Symbolically, this can be expressed as:

$$a(i, s) = A(i, m) / k \qquad \text{..... (2A.2)}$$

where a (i, s) stands for the hypothetical annual age-specific abortion rate for women in age group i at the midpoint of the two surveys; k represents the length of the inter-survey interval, and A (i, m) represents, as before, the cohort inter-survey abortion increments for women in age group i.

As in the total fertility rate, a weighted sum of these values over all ages would then provide an estimate of the total abortion rate for the period approximately half way to the second survey, or, as just stated, at the midpoint of the two surveys.

$$TAR = x \sum_{i=15-19}^{45-49} a(i, s) \qquad \text{.....(2A.3)}$$

where TAR represents the total abortion rate and x denotes the length of the age interval.

Similarly, the general abortion rate can be calculated by multiplying the age-specific abortion rates with the corresponding estimated female mid-year population in each age group at the mid-point of the two surveys and dividing the sum by the totals of the latter.

ANNEX III:
COMPUTATIONAL PROCEDURES FOR THE ESTIMATION OF THE INDICES OF THE PROXIMATE DETERMINATS

Marriage patterns

The three indices of marriage, namely the index of marriage (Cm), the index of non-marriage or delayed marriage (Cem) and the index of marital dissolution, Cdiss are estimated as follows:

Cm= TFR x / TMFR x;

Cem = TFR x / TEMFR x;

Cdiss = TEMFR x / TMFR x

Where $_x$ represents age group 15-24, 25-34 and 35-49 and TFR, TEMFR and TMFR represent total fertility rate, total fertility rate for ever-married women and total marital fertility, respectively (Bongaarts and Potter ,1983; Gaisie, 1984, Casterline *et al.*, 1984). These rates are calculated for the one-year period preceding the 1990 and 1995 surveys.

Index of contraception

The index of contraception is intended to describe the fertility-inhibiting effects of contraception and is calculated for traditional (C *trad*) and modern (C *mod*) methods separately:

C *mod* = 1 - G * U *mod* * E *mod*, and C *trad* = 1 - G * U *trad* * E *trad*.

Where G is the adjustment factor designed to remove infecund women from the equation. This adjustment factor when applied to all ages is often set at 1.08, but because the age-specific version of the model is used in the present study the equivalent adjustment factors are: 1.02 (for age group 15-19), 1.02 (for age group 20-24), 1.03 (for age

group 25-29), 1.04 (for age group 30-34), 1.12 (for age group 35-39), 1.33 (for age group 40-44), and 2.08 (for age group 45-49) (Stover, 1998: 260). U *mod* and U *trad* are contraceptive prevalence rates for modern and traditional methods in each age group (15-24, 25-34 and 35-39) among currently-married women and E *mod* and E *trad* are the respective use-effectiveness rates for the two methods. The following use effectiveness rates, adopted from Johnston and Hill (1996) have been used:

Table A.1.3 Use effectivness rates for selected methods of contraception

Method	Rate
Oral contraceptives	0.82
Injectable	0.96
Implant	0.99
Tubal sterlisation	0.99
Vasectomy	1.00
IUD	0.90
Condom	0.62
Vaginal methods	0.80
Periodic methods	0.50
Withdrawal	0.38
Other	0.10

Source: Johnston and Hill, 1996: 119.

These effectiveness rates represent the lower limits of available estimates so that the effect of contraception on fertility would not be unnecessarily over-estimated (Johnston and Hill, 1996: 110). For instance, the effectiveness rate for the methods that fall under 'others' which is set here at 0.10 is substantially lower than that used in the original Bongaarts model, 0.70. (Bongaarts and Potter, 1983: 84). The above effectiveness rates are also more detailed than that of Bongarrts's which provides effectiveness rates for only four methods.

Index of induced abortion

The index of abortion is estimated using the following equation.

$$Ca = TFR_x / \{ TFR_x + 0.4 * (1 + U * E) * TAR_x \}$$

Where TFR_x is the total fertility rate at age x (i = 15 - 24, 25 -34 and 35 -49); TAR_x refers to total abortion rate at age i, and U and E are age-specific contraceptive prevalence and

effectiveness of contraception, respectively (Stover, 1998: 258). This formula is slightly different from that proposed by Bongarrts as it includes use-effecivness of contraception, which was not included in the Bongarrts original formulation (Bongarrts and Potter, 1983:

Index of postpartum Infecundability

The index of postpartum infecundability is intended to describe the effects on fertility of extended periods of postpartum amenorrhea (Bongarrts and Potter). The index is calculated as the average birth interval in the absence of breastfeeding, divided by the average length of the interval when breastfeeding takes place:

$$Ci = 20 / (18.5 + i)$$

Where i is the average duration of postpartum amenorrhea and is estimated from all births in the three years period prior to the surveys of 1990 and 1995. This quantity is estimated using the prevalence incidence method. The prevalence-incidence procedure, as described in the text, is less sensitive to errors of timing as it uses no information on dates at all. It is also the most commonly used procedure, hence permitting a comparison of the derived result with data from other populations (Knodel *et al.*, 1987; do valle Silva *et al.*, 1990; Jolly and Gribble, 1993; Cleland *et al.*, 1994).

Index of Sterility

The index of sterility is intended to estimate the fertility-inhibiting effects of primary and secondary sterility due to pathological reasons. Bongaarts used an equation developed by Frank (1983) to estimate the index as a function of primary sterility. The equation is:

$$Cp = (7.63 - 0.11 * S) / 7.3$$

Where S is the proportion of women aged 45-49 who have had no live births. This equation is equal to 1.0 when 3 per cent of women are childless at age 45-49 and a value above the 3 per cent level is assumed to be an indication of the level of pathological sterility in the society under study. Because of lack of an age-specific version, the value of this index was assumed to be the same for all the three broad age groups used in the analysis.