
POPULATION

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Philippe Fargues Protracted national conflict and fertility change among Palestinians and Israelis

Cynthia B. Lloyd, Carol E. Kaufman, and Paul Hewett Implications for fertility change of the spread of primary schooling in sub-Saharan Africa

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Gender Equity in Theories of Fertility Transition

PETER McDONALD

THE 1994 INTERNATIONAL Conference on Population and Development placed issues of gender at the center of discussion of population and development (United Nations 1995). A leading theme of the conference was that, in less developed countries, higher levels of gender equity are a necessary component in the achievement of lower fertility. In apparent contradiction to this tenet, I have postulated that very low fertility in advanced countries today is the outcome of a conflict or inconsistency between high levels of gender equity in individual-oriented social institutions and sustained gender inequity in family-oriented social institutions (McDonald 2000a). The implication is that higher levels of gender equity in family-oriented social institutions are necessary to avoid very low fertility. Thus, on the one hand, a higher level of gender equity in social institutions is claimed to lead to lower fertility while, on the other hand, a reorientation of social institutions toward a higher level of gender equity is claimed to prevent very low fertility. Chesnais (1996: 733; 1998: 83) has described this circumstance variously as “the essence of a future feminist paradox” and, more recently, as “the present feminist paradox.” In what follows I address this apparent contradiction or paradox through consideration of a more generalized theory of gender equity in fertility transition.

What is gender equity?

Mason has employed the concept of the gender system, which she defines as “the socially constructed expectations for male and female behaviour that are found (in variable form) in every known human society. A gender system’s expectations prescribe a division of labour and responsibilities between women and men and grant different rights and obligations to them” (Mason 1997: 158). Mason observes that “studies explicitly concerned with gender systems and their impact on demographic change are relatively new”

(ibid.). That this is the case with respect to studies of fertility is lamentable. Indeed, it is almost inconceivable that fertility transition can be studied without considering socially constructed expectations for female behavior.

Mason (1997: 159) subdivides the gender system into gender stratification (“institutionalized inequality between male and female members of society”) and gender roles (the division of labor between men and women). Gender equity derives from both of these elements of the gender system. Inequality between men and women and the division of labor between them in a particular gender system can be evaluated from the perspective of rights—social, political, and reproductive. Levels of equity in such an evaluation of rights determine the level of gender equity (Fraser 1994). Thus, gender equity is a value-laden concept that begs the question of whose values should be applied.

In consideration of fertility transition, the obvious answer is that the values of the women and men who are making fertility decisions are important. Do women (or, at least, some significantly sizable proportion of women) in a particular society consider that existing gender inequality or the existing division of labor is unfair and inequitable? Do the views of men and women coincide? Of course, women and men are unlikely to express themselves in the rarefied language of sociology. Even in the United States, Betty Friedan (1963) could refer to gender inequity only as *The Problem That Has No Name*. In high-fertility contexts, gender inequity within the family may be experienced by women as, *inter alia*, a generalized dissatisfaction with the rigors and dangers of a constant round of childbearing and childrearing imposed by spousal, familial, and societal expectations.

The use of the word *system* to describe gender stratification and gender roles may be misleading in that it implies consistency between different social institutions as conceptualized in the classic structural-functional anthropological approach. Essential to my argument is the notion that, in societies undergoing fertility transition, gender stratification and gender roles in different social institutions within a given society can become inconsistent with each other.

Studies of gender and fertility

Mason (1997: 163–172) provides a review of the methodologies that would be required in studies of fertility and the gender system and reports upon the few studies that approximate her standards of evidence. As she points out, the complexity involved in proper studies of the gender system and fertility is challenging. Indeed, it may be argued that despite the logical importance of the gender system to fertility, its lack of centrality in transition theory (until recently) results in no small measure from the poor design of quantitative analyses. To test the relationship between gender equity and fertility, demographers conventionally have studied a sample of women in

which there were measures of each woman's "status" and a measure of her fertility. Typically, a multivariate, cross-sectional analysis is then applied to examine whether a statistically significant relationship exists between women's status and fertility at the individual level. A more sophisticated analysis may add community-level measures of the status of women to the model.

This approach could be described as based on a unidirectional, dichotomous model. As commonly hypothesized, low women's status leads to high fertility; high women's status leads to low fertility. With regard to the fertility transition, this is just one example of several unidirectional, dichotomous models that have been employed in the literature. Some other hypotheses tested by such models are: high education leads to low fertility; higher economic status leads to lower fertility; higher levels of social inclusion lead to lower fertility; lower infant and child mortality leads to lower fertility; higher costs of children lead to lower fertility; lower fertility accompanies lower religiosity; lower fertility is associated with a transition from extended to nuclear families; urbanization leads to lower fertility; and a lower point on the low fertility-ideation scale leads to lower fertility. One also finds "testing" of the tautology that, other things equal, higher or better use of birth control leads to lower fertility.

In general, the logic of unidirectional, dichotomous models has been criticized because they imply a simple, evolutionary process of social change, universal across all societies, in which progression along the path of the model is always toward a state assessed as superior to the status quo ante (Derrida 1976; McDonald 1994). These models have been criticized for not situating fertility within its cultural and institutional context (McNicol 1980; Greenhalgh 1995). The unidirectional, dichotomous model is applied irrespective of, or is only superficially modified by, the social context.¹

Quantitative studies of the relationship between gender equity and fertility require measures of gender equity. As defined here, gender equity would be evaluated for each social institution on the basis of the assessments of women and, perhaps, men in the society under study. This definition has inherent difficulties with respect to historical studies. In such studies, we would need to rely upon diaries, letters, and published statements of women. On the other hand, much historical research uses these types of sources. An excellent example of such an historical study that provides conclusions supporting the arguments advanced here is Catherine Scholten's (1985) study of childbearing in American society.² If gender inequity in contemporary societies is a problem that has no name, it is difficult to obtain measures of the perceptions of gender equity from individual women. Depending upon the social context, social-psychological scales may be useful. Inevitably, however, the degree of gender equity will be measured by the researcher's own assessment of the levels of equity applying in different social institutions, based upon quantitative measures of those institutions. Such measurement will require a sophisticated anthropological knowledge

of the society. This is the approach used in the small number of recent quantitative studies cited by Mason (1997: 169–172). The argument that complexity requires the use of qualitative methods is also apposite.

The level of gender equity did not emerge from the influential European Fertility Project as an important determinant of the onset of fertility transition. In this study, a 10 percent fall in fertility was taken as evidence for the onset of fertility transition (Coale and Watkins 1986). The focus was on the onset of the decline because the authors concluded that once a fall of 10 percent had been observed, continuation of the decline was inevitable. The study found that few generalizations could be made across districts of Europe as to the conditions that were contemporaneous with this 10 percent fall. Given the extent of institutional variation across cultures at the onset of decline, it is not surprising that generalization proved difficult. If consideration is extended to a much larger range of world cultures, this lack of generalization is even more likely to be found. I argue here that the emphasis on the period surrounding the onset of decline may be misplaced. More value may be obtained from studying why fertility continues to decline to low levels after it has commenced to fall. In other words, the scope for theoretical generalization is probably greater in study of the sustained fall of fertility than in study of the commencement of fertility decline. The influence of changes in the level of gender equity may be more evident in this later phase.

Some propositions regarding the relationship between gender equity and fertility

The place of gender equity in fertility transition theory can be approached by considering the following two propositions:

1. Fertility in a society falls as a result of the cumulative actions of individual women and men to prevent births.³
2. Sustained lower fertility in any society will lead to fundamental changes in the nature of women's lives.

The first proposition underlies most theories of fertility transition. The implication is that fertility change in a society must be capable of being explained in individual terms. The dimension I highlight here, gender equity, is not an individual characteristic. It is a characteristic of the institutions of society. The first proposition, a truism, says that people, not institutions, change fertility levels. Thus, in proposing a place in fertility transition theory for gender equity, a theory must elaborate upon how the levels of gender equity in social institutions manifest themselves in individual-level decisionmaking. Folbre (1997) has argued that in contemporary market-based economies, the rewards for market production far exceed the rewards for social reproduction, a theme that I have also taken up specifically in relation to low fertility (McDonald 2000b). It is this imbalance in the reward

structure that brings gender inequities in social institutions into the consciousness of individual men and women.

The first proposition also implies that individuals have the knowledge and the social permission necessary to control their births. As I hinted earlier, the notion that the spread of the practice of birth control is a component of fertility transition is tautological. The way in which the idea of birth control is spread, however, is a highly relevant consideration (Watkins 1986).

The second proposition states that if fertility in a society falls from high to low levels then, inevitably, this will change the nature of the society. In particular, it will change the nature of women's lives. Implicit in the gender system of a high-fertility society is that women devote a great deal of their time and energy to childbearing and childrearing. If fertility falls to lower and lower levels, this in itself is an indication that society no longer places the same emphasis upon this division of labor. Mason (1997: 173–175) mentions the small number of studies that have considered the impact of lower fertility on the gender system, but none of these studies considered the impact of fertility change on women's lives as a component of fertility transition theory. Demographic investigation, as mentioned above, conventionally considers the reverse causal direction of this proposition—that fundamental changes in the nature of women's lives lead to sustained fertility decline. Thus, in the conventional approach, changes in women's lives occur first and then fertility falls. The aim of expressing the proposition in the reverse is to argue that women may elect to have a smaller number of children in order to change the nature of the rest of their lives, not necessarily because those changes have already occurred. A birth is not an event that simply occurs at a moment in time and is explained by circumstances before and about that point in time. In Levinson's (1980) terms, fundamental life events are constructed as part of a transition in people's lives. The decision to have a child (or to avoid having a child) is not independent of the effects upon lives that ensue from that decision. That is, women have a birth or avoid a birth in an effort to shape their futures, not because the decision was preordained by a set of characteristics that they had accumulated prior to the decision (McDonald 1996). This provides a much more active conception of the role of gender equity in fertility transition. Women in high-fertility societies may choose to have fewer children in the expectation (or vague hope) that to do so will change their futures for the better.⁴

The expectation, of course, may not be realized and this complicates the quantitative study of the issue. A smaller number of children might not mean that a family is economically better off or that a woman is able to pursue paid employment outside the family circle. At an early point in the transition, the statistical evidence may be weak. However, as long as women are able to maintain the expectation that restriction of their fertility will lead to an improvement in their lives, eventually, through successive age cohorts, the expectation will be more often realized.

Fertility transition, gender equity, and the institution of the family

Childbearing is inherent to family reproduction and, as such, it should be impossible to theorize about fertility transition without considering family reproduction and family organization (Seccombe 1993). Folbre (1983: 267), in addressing conventional theories of fertility transition, has said that “the failure to incorporate any consideration of changing power relations within the family constitutes what many feminists might consider a fatal error of omission.”

Family organization varies from society to society, and the place of women in that organization is also highly variable. Thus, in this important respect, the starting point of each fertility transition is different. This complicates the use of standard variables across cultures as the social meaning of particular measures will differ. Nevertheless, the following additional propositions can be made:

3. In pretransition societies, high fertility was (is) socially determined, not naturally determined.

4. The transition from high fertility to fertility around replacement level is accompanied by an increase in gender equity within the institution of the family.

There is a large literature on the social supports to high fertility. Typically, social-structural arguments are offered to demonstrate the benefits of high fertility. These principally pertain to the value of children to the family, whatever its structure. (Some studies, of course, also highlight the fact that a degree of control over fertility was exercised in all pretransition societies, that is, the valued number of children was high but below the biological potential.) However, the supports for high fertility in pretransition societies are more than social-structural. High fertility becomes a part of the established family ethos and is supported by the institutions of morality, principally religion.

To argue the point just made would require a long detour; just one evocative example should suffice here:

“A mother with a train of children after her is one of the most admirable and lovely Sights in the visible Creation of God,” declared Benjamin Colman as he introduced the text of his sermon “Fruitful Mothers in Israel” to his Boston congregation. In 1715 the Old Testament injunction “Be fruitful and multiply,” which Colman proceeded to discuss, was familiar to his listeners, and his interpretation of the text was representative of American thought on the purpose of marriage and on women’s ordained part as childbearer. (Scholten 1985: 8)

Fertility transition requires changes not only to the social-structural supports but also to the moral supports. Here, we would be looking for changes in the morality governing the nature both of the relationship between spouses and of women's ordained role as childrearer. In the West, the assertion of the rights of the individual originating in the Enlightenment may have gradually filtered down to the rights of women within marriage. In the past half-century in developing countries, Westernization has been an increasingly powerful force with which traditional moralities have had to contend. For example, formal education inculcates ideas that empower the individual, allowing for a questioning of traditional morality.

In Western Europe, the decline of parentally arranged marriages and the shift of power over the means of production from the parental generation to the generation of the young couple are indicators of changing rights for women within a modified family organization. These changes extend back into the eighteenth century, predating or contemporaneous with the onset of fertility decline. Seccombe (1993: Chapter 5) argues that women in late-nineteenth-century and early-twentieth-century Europe had a far stronger desire to end the constant cycle of births than men did. The fact that their wishes began to be deferred to by most husbands represented a shift away from patriarchy and toward gender equity in the couple relationship. Prior to the transition, Folbre (1983: 270) says, "women's freedom of reproductive choice is often constrained by forms of patriarchal oppression which are coercively pronatal." At the same time, throughout the fertility transition in Western Europe, women remained in a subordinate status because of their role within the male-breadwinner model of the family. Only in the past few decades have women in general, but especially married women, been able to assert an independent status outside the family.

Family organization is a vital aspect of cultural identity. Because of this, the family is a conservative institution that normally changes only very slowly. In all societies, family organization is protected from radical change by an idealized family morality, a moral conservatism that is often enshrined in the prevailing religion. Most often, idealized family morality confines women to the hegemony of men. Radical change usually occurs only through changes in political power or through changes in the attitudes of those in power. Otherwise, change is gradual (McDonald 1992, 1994). Increased gender equity within the family can be a gradual process that does not portend radical family change. Thus, social norms may allow women increased control over their own fertility within what is, in most respects, a male-dominated family system so long as their increased independence does not threaten the prevailing family system.

The contemporary example of the remarkable fall in fertility in Iran may be a case in point. The total fertility rate in Iran fell from 6.2 children per woman in 1986 to 2.5 in 1996 (Abbasi-Shavazi 2000). During this pe-

riod, there was no significant change in women's position outside the family. Labor force participation rates for women remain very low and women have a very restricted role in public life. It is arguable, however, that increased levels of education for women provided them with a higher level of equity within the family. Once social permission to practice family planning was provided by the religious leadership in the late 1980s, the country's highly developed public health system was able to provide family planning services to both men and women. More particularly, women were freely able to gain access to these services, providing them with a greater level of reproductive rights and, hence, of gender equity within the family.

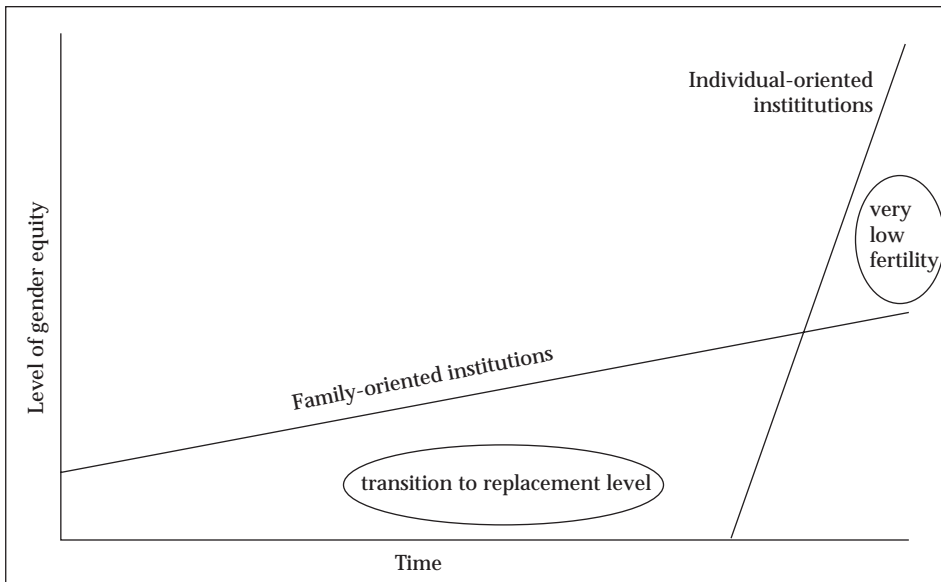
Depending upon the cultural or economic setting, various factors may enhance gender equity within the family and hasten the adoption of lower levels of fertility. Where limited fertility control has been practiced before the onset of sustained fertility decline, decline may proceed more rapidly because the idea and practice of control is already present in the society. Advances in education for women will attune them to be receptive to non-traditional learning and provide them with the confidence to adopt new ideas. Husbands also may more often defer to the wishes of the educated wife. As more children survive, measures to limit family size may be implemented. Changing cost structures such as generated by compulsory education of children or urban residence may induce changes in fertility. Political regimes that are more socially inclusive may provide access to contraceptive devices and the freedom to use them to a wider range of people. The free movement of information among women in a society and between societies is another factor. The medical profession may become increasingly involved in natal care and warn of the dangers to a woman of having another birth. Advances in contraceptive technology enhance the ease of control over fertility. Finally, government-sponsored family planning programs may provide social permission and access to contraceptive services. I make no claim here that increased gender equity within families is a sufficient condition for fertility transition; however, it is a necessary condition.

Government-sponsored family planning programs in the past 30 years have succeeded in part because they addressed their campaigns directly to women, although always within their family context. Conservatism surrounding family organization clearly provided no other option, but the effect has been to raise the levels of gender equity within the family. It has been argued that, in Bangladesh for example, the family planning program itself has been an agent in improving the status of women within the family. The program exposes women to the modern outside world, it encourages them to take their own actions with regard to their fertility, it brings them in contact with other women who are not members of their family, and, since the program's change to a clinic-based delivery system, it allows women to leave their houses unaccompanied by a male family member.

This, together with a gradual shift in the power regime within families from the extended to the conjugal unit, has increased gender equity within the family (Simmons 1996).

In summary, there is a strong case that, where women are provided with greater decisionmaking power within the family, especially with respect to the right to determine the number of children they have, fertility can fall to low levels without major changes in women’s lives outside the family. Fertility in the West fell to replacement level by the 1930s even as the male-breadwinner model of the family was rising to its zenith. That is, fertility can fall to low levels while most institutions outside the family are marked by considerable gender inequity. Folbre (1983: 276) even argues that the early advance of capitalism may have worsened gender equity in market employment while improving it within the family. Yet as proposed earlier, low fertility will change the nature of women’s lives. In time, this will lead to rising demand for greater levels of equity for women in institutions outside the family. Recognition of this outcome lies at the heart of conservative, usually religious, opposition to birth control.⁵ In terms of the Cairo agenda, just as women in developing countries have been the beneficiaries of more advanced contraceptive technology than was available during the fertility transition in the West, they are also likely to benefit from a

FIGURE 1 Conceptual representation of changes in the level of gender equity over time in family-oriented and in individual-oriented institutions in the West and their interaction with the transition from high to very low fertility



more rapid shift toward a higher level of gender equity in individual-oriented institutions than was the case in the West. Thus, compared to the schematic view of change in the West, depicted in Figure 1, gender equity in individual-oriented institutions may be increasing earlier in the fertility transition of contemporary developing countries.

Gender equity in individual-oriented institutions

The increasing demand for individual rights and freedoms in the West in the past 200 years has led to the development of strongly individual-oriented institutions. The institutions of democracy, for example, provide individual voting rights, not family voting rights. However, the progress to this situation has passed through a period in which rights and freedoms were extended to individual men, but not to individual women. Effectively, prior to the twentieth century, men exercised the democratic rights of women. Women were educated to the level that would fit them to be suitable wives to the husbands whom they were expected to marry. Education for women was not directed toward future employment in the paid labor force. By the late nineteenth century, a woman was expected to eschew paid employment unless she was single or could not rely upon the earnings of her husband.⁶ Thus, individual-oriented institutions were male institutions and, as such, they promoted and protected the male-breadwinner model of the family. A relatively high level of gender equity was a characteristic of women in their family role only.

Women in the West have gradually gained rights also within individual-oriented institutions. The early successes were in the domains of property rights and voting rights. Rights in education grew gradually over a long period of time to the point of broad equality with men today. Rights of women in market employment have risen dramatically in the past few decades. Generally women's remuneration now tends to be guided by the principle of equal pay for equal work and, at least at the nonmanagerial level, women are now able to compete equitably with men in the labor market. Cumulatively, these changes represent radical or revolutionary change.

At the same time, progress toward gender equity within the family and hence in family-oriented institutions has continued to advance very slowly. While, as argued in the previous section, the change within the family has been sufficient to allow women to have extensive control over their fertility, it has not provided other forms of equity within the family. Full gender equity would be achieved only if gender were not a determinant of which member of the couple undertook the three forms of family work: income generation, caring and nurturing, and household maintenance. In marriages, women remain the predominant providers of care and continue to carry most of the burden of household maintenance. Gender stratifica-

tion continues to prevail within the contemporary Western family. The same is true in the East Asian developed economies that also now experience low fertility.

Gender equity and very low fertility

In advanced economies today, women are able to compete in the labor market as equals so long as they are not constrained by their family roles. Women who value their involvement in individual-oriented institutions are therefore faced with a dilemma if they perceive a potential future family role as inconsistent with their aspirations as individuals. Some women in this circumstance will opt to eschew the family role rather than the individual role, that is, they will not form a permanent relationship or they will elect to have no children or fewer children than they otherwise would have intended (McDonald 2000a). Most young women today have been educated and socialized to expect that they will have a role as an individual beyond any family role they may have. Thus, a fifth proposition can be advanced:

5. When gender equity rises to high levels in individual-oriented institutions while remaining low in family-oriented institutions, fertility will fall to very low levels.⁷

Cross-national comparisons of contemporary advanced countries provide evidence to support this proposition (Chesnais 1998; McDonald 2000a).

Conclusion

The apparent contradiction stated at the beginning of this article has been addressed through distinguishing two broad forms of gender equity: gender equity in family-oriented institutions and gender equity in individual-oriented institutions. I have argued that the fertility transition from high to low levels has been associated mainly with improving gender equity within family-oriented social institutions, indeed almost exclusively within the family itself. The fall in fertility is associated with women acquiring rights within the family that enable them to reduce the number of their births to more desirable levels. However, change in the institution of the family proceeds slowly because the family system is strongly linked to conservative institutions such as religion. The link is the reification of family as defined by an idealized family morality.

During the twentieth century, a revolution took place in levels of gender equity in individual-oriented institutions in advanced countries. Starting from a point where women had a subordinate status in individual institutions such as formal education and market employment, the century ended with very high levels of gender equity prevailing in these institutions. High

levels of equity enjoyed by women as individuals in combination with continuing low levels of equity for women in their roles as wives or mothers mean that many women will end up bearing fewer children than they aspired to when they were younger. The outcome for the society is a very low fertility rate.

The achievement of gender equity in individual-oriented institutions will not be reversed. But in a context of persistent relatively low gender equity in family-oriented institutions, high gender equity in individual-oriented institutions results in very low fertility. The idea is conceptualized in Figure 1. Very low fertility rates will persist unless gender equity within family-oriented institutions rises to much higher levels than prevail today. In a context of high gender equity in individual-oriented institutions, higher gender equity in family-oriented institutions will tend to raise fertility.

Notes

The author benefited from discussions about this article with Hera Cook and Rebecca Kippen.

1 On the other hand, at the opposite extreme, there is a recent fashion to attribute unexplained variation to "context," adding little or nothing to theory.

2 Other examples are Quiggin (1988) and Seccombe (1993).

3 Maybe including nonmarriage or delay of marriage, although, in an early paper, I have argued against this possibility (McDonald 1981).

4 And, possibly, the futures of their children and of other women. Some altruism may be involved in assuming the role of an innovator.

5 The papal encyclical *Humanae Vitae*, issued in 1968, is a prime example.

6 For some, this idea is still valid, it seems. Mead (1999) argues that in the United States today, mothers in two-parent families should not engage in paid employment while single mothers should.

7 Very low means a total fertility rate below 1.5 births per woman on average.

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Protracted National Conflict and Fertility Change: Palestinians and Israelis in the Twentieth Century

PHILIPPE FARGUES

THE COURSE OF fertility change in Palestine and Israel over the second half of the twentieth century might seem of negligible interest for the history of the demographic transition, since their combined 8.9 million inhabitants represent only one-sixth of one percent of the world population. Yet the exceptional political history of these populations, in which demography played a major role for both sides in nation-building, sheds a particular light on the political dimension of fertility change, a matter of interest beyond the limits of this small piece of land. Nowhere else in the world are populations at the two extremes of fertility transition found side by side in such a small territory (26,351 km²), with total fertility rates ranging from barely above the replacement level among Jews born in Europe and among Christian Arab Israelis (2.13 and 2.10 respectively in 1992–96), to the highest level recorded in today's world among Palestinians of the Gaza Strip (7.73 in 1991–95). In this article, I argue that these extreme contrasts of fertility are a corollary of the long-lasting state of belligerence between Arab Palestinians and Jews that began in the wake of the Balfour Declaration of 1917.

Most demographic research is conducted at the national level, both for practical reasons (the state has taken the lead in the collection of statistics and the construction of statistical categories applied to population) and for reasons of ideology (population is fundamentally conceived as a national body). Accordingly, most studies of demographic differentials are made within the frame of international boundaries. This circumstance applies to the demographic literature on Israelis and Palestinians. Usual comparisons in this literature are between populations found within the same national entity, whether Israel proper (Ashkenazi Jews vs. Sephardic Jews; native Jews vs. immigrant Jews; Jews vs. non-Jews—by default: Arabs; Muslims vs. Christians), or within the Palestinian territories (West Bank vs. Gaza Strip; refugees vs. nonrefugees).¹ Territory and borders are fundamental ref-

erences. In the case of Israelis and Palestinians, however, national feeling and migration across borders are intimately tied together. Place of residence or place of origin on the one hand and claimed identity on the other do not refer to the same territory for every individual. Jews of various geographic origins recognize a common Jewish Israeli identity—a national identity they do not share with their Arab fellow citizens—while Palestinians dispersed in various countries of the world recognize a common Palestinian identity.

Plurality of origin is easily taken into consideration for Jews regrouped under Israeli jurisdiction, because they are all covered by the same statistical system, which distinguishes between Jews and non-Jews. But the symmetric plurality of residential destination is not easily dealt with for Palestinians—whether for political or for practical reasons—because their national identity has long been denied or because statistical reconstruction of a population dispersed over the globe, with no internationally recognized nationality, would be a hopeless endeavor. Existing literature gives priority to the territory of residence and thus captures the effects of immigration or ancestral origin on demographic patterns, but ignores the effects of out-migration and dispersion. In order to treat place of origin and place of destination symmetrically, we focus on the territory of former (pre-1948) Palestine and compare fertility trends for the following subpopulations: immigrants vs. natives for Israeli Jews and residents of Israel; and the West Bank vs. the Gaza Strip for Arabs.² Since belligerence and migration are inextricably bound together in the history of Jewish–Arab relations in Palestine and Israel, this approach is necessary to shed light on the relationship between belligerence and fertility.

By “state of belligerence” or “conflict” we mean, not only the military and political struggle opposing Israel to Arab states and Palestinian movements, but also the ordinary mistrust between the populations, including, within Israel, between Jewish and Arab fellow citizens. The relation between conflict and fertility is a complex one. Conflict can affect the quantity and quality of resources and the way they are made available to individuals, thus affecting the socioeconomic factors critical to fertility change. It can also shape ideational change related to fertility, sharpening identities and the vision of the nation as a quasi-biological body whose vitality is closely linked to reproduction, and thus make natalism a corollary of nationalism (McNicoll 1998). Finally, the relation between conflict and fertility can be mediated by migration. Fertility is associated with migration and migration is associated with conflict, but each of these two associations is susceptible to modification in both directions. If fertility differs between migrants and nonmigrants, it can be either because the two groups experience conditions that vary with place of residence or, on the contrary, because migration is selective along lines associated with fertility, actual or intended. Similarly, migration can be a cause of conflict or a result of it.

Data and categories

Except where otherwise stated, data on the Jews are those published by the State of Israel, currently providing fertility differentials according to place of origin. Palestinians present a more complicated statistical situation. Over the twentieth century, statistics on the Palestinians came from various administrative sources: Ottoman (until 1918); British (up to 1948); Israeli (since 1948 for the Arab Israelis, since 1967 for East Jerusalem, and between 1967 and 1992 for the West Bank and the Gaza Strip); Egyptian (for the Gaza Strip 1949–67); Jordanian (for the West Bank 1949–67); and Palestinian (since 1993 for the West Bank—East Jerusalem not included—and the Gaza Strip).

A major inconsistency appears for the West Bank and the Gaza Strip between Israeli figures (up to 1992) and Palestinian figures. The latter (from a 1995 survey and from the 1997 census) can be considered reliable while the Israeli data cannot. Numbers of Palestinian residents were underestimated by Israeli sources, in an initial misrecording in 1967, and their age distribution was estimated using models, not actual records. On the other hand, vital events were apparently better covered than the population *per se*, although some sources state that births were underregistered (World Bank 1993). Accordingly, age-specific fertility rates for the West Bank and the Gaza Strip under Israeli occupation (State of Israel 1987b, 1996) are possibly overestimated. Trends are probably consistent from 1967 to 1992 (the last Israeli statistics), but are not necessarily consistent with 1995 rates provided by the Palestinian survey (Khawaja et al. 1996).

Statistics on Arab Israelis pose another kind of problem. This population is not identified as “Arab” in Israeli statistics, but labeled “Others” or “Non-Jews.” Some tabular material is broken down by religion, and figures on non-Jews can be obtained by assembling “Christians,” “Muslims,” and “Others” (or “Druzes,” according to year and table). We shall not discuss here the fact that treating the Arabs as a residuum (non-Jews) or as a collection of religious communities denies the identity they themselves claim, either as Palestinians or as Arabs, and, by emphasizing a religious distinction, gives a public status to a criterion that has tended to be relegated to the private realm since the Ottoman reforms (*Tanzimat*) of the first half of the nineteenth century. We shall only note that the dichotomy “Jews/Others” does not identify unambiguously the Arab Israelis for the most recent years, since an unknown proportion of “Others” are non-Jewish family members of Jewish immigrants, that is, potential candidates for conversion to Judaism. Almost nonexistent before the mass immigration following the collapse of the Soviet Union, this category comprised some 128,700 persons at the end of 1998, or 10.2 percent of the non-Jewish population of Israel (State of Israel, *Statistical Abstract* 1999: Table 2.1).

Demography in the struggle

In the Balfour Declaration of 1917, Great Britain supported the goal of establishing a Jewish national homeland in Palestine. This paved the way for Jewish immigration to Palestine under the British Mandate.³ In the ensuing Palestinian–Jewish conflict, demography was always a central factor. The conflict, triggered by the settlement of immigrants nourishing the goal of nation-building, eventually produced a radical substitution of one population for another in the major portion of this territory. Immigration of Jews and displacement of Palestinians continuously rekindled the struggle for land and national recognition. In this context, fertility and migration—two alternative means of populating, hence claiming, territory—became intimately linked. The impact of political and military developments on migration, displacement, and settlement has been extensively documented in a rich literature. Although scholars disagree on the actions and motives of the two sides, they all acknowledge the political nature of these spatial population movements. The same is not true for fertility. The prevailing demographic approach considers each population separately and views fertility as the product of individual determinants—the quantity and quality of resources to which persons or families have access, such as education, economic activity, health, autonomy in the household, exposure to information, and the like. Yet such factors are far from exhibiting a one-to-one relationship with fertility that would transcend the political links between populations in conflict. Considering the state of belligerence between Israel and the Palestinians sheds light on the atypical trends and contrasts in their fertility.

The Zionist movement was born in the late nineteenth century and soon adopted the objective of settling the largest possible part of Jewry in Palestine. Two waves of Jewish immigration to Palestine had already taken place before World War I. Because many of these immigrants were former subjects of Russia—the arch-enemy of the Ottoman Empire—and because, after the first Zionist congress in Basle (1897), they were all suspected of advocating the political separation of Palestine, the Ottoman authorities opposed their settlement. Nor did the local population welcome Jewish immigrants, because, as citizens of European countries, they enjoyed the protection of Great Powers in accordance with the Capitulations treaties,⁴ because they lacked knowledge of Arabic, and because they avoided contact with Arabs except in paid labor. Although the Jewish immigrants initially were economically dependent upon the generous support of wealthy coreligionists, most notably of the French Baron Edmond de Rothschild, they soon formed an independent economy that was considered a foundation for an independent Jewish society. Such a situation impeded from the outset any integration in their newly adopted environment.

As early as 1905, Arab intellectuals warned about the threat the Zionist project in Palestine represented for the awakening Arab nation.⁵ The anti-

Zionism of the early Arab nationalists eventually turned into a popular uprising against Jewish settlements. The Jaffa riots of 1921, in which 47 Jews and a smaller number of Arabs were killed, and after which Tel Aviv was granted the status of a town separated from Jaffa, were caused by a “feeling among the Arabs of discontent with, and hostility to, the Jews, due to political and economic causes, and connected with Jewish immigration” (Haycraft Commission of Inquiry into the 1920–21 Arab Riots—<http://www.us-israel.org/jsource/History/haycraft.html>). From the outset of its Mandate over Palestine (1922–48), Great Britain, which during World War I had made conflicting promises of supporting the creation of an independent Arab kingdom and promoting a Jewish homeland in Palestine, was caught in a contradiction. It had to open the gates to large-scale immigration of Jews while preventing an Arab upheaval. The British policy was to adapt numbers of immigration permits issued to Jews to Palestine’s economic capacity to absorb new entrants (Reichman, Katz, and Paz 1997). This capacity was at first assessed by the level of employment among recent immigrants. Facing a rising protest from the Arab side, Great Britain decided in 1930 to take into account Arab unemployment, but this disposition was cancelled the following year under pressure from the Zionists. With the advent of the Nazis in Germany and the rise of anti-Semitism in Europe, the numbers of Jewish immigrants to Palestine increased, reaching more than 60,000 for the year 1935 (McCarthy 1990). Communal tension was becoming extreme.

What some historians refer to as the Great Arab Revolt of 1936–39 was triggered by the assassination of two Jews and the immediate retaliatory killing of two Arabs, but behind this incident lay an accumulation of grievances on the Arab side, including those against increased Jewish immigration. The revolt was followed by the White Paper of 1939, which formulated restrictions on Jewish immigration for five years, together with the rejection of Arab political claims on Palestine, by stating that Palestine would be neither a Jewish state nor an Arab one, but a binational state to be established within ten years. After World War II, Great Britain maintained restrictions on immigration, with 20,602 Jewish immigrants recorded in 1945–46, excluding illegal entries (United Nations Special Committee on Palestine 1946). Between the end of World War I and the creation of Israel in 1948, Jewish migrants to Palestine totaled 483,000, of whom 456,000 entered during the British Mandate (State of Israel, *Statistical Abstract* 1999: Table 5.1). This demographic outcome of the Mandate is variously considered decisive or limited: in the former view, the creation of Israel was fostered by the British colonization; according to the latter Britain mattered very little.⁶ Whatever the interpretation, the proportion of Jews in the population of Palestine rose from 12.9 percent at the beginning of the British Mandate to 34.5 at its end. As the Jewish acquisitions of Arab lands gained momentum, the conflict in Palestine decisively turned into a struggle of two peoples for the same territory. From then until the present, population

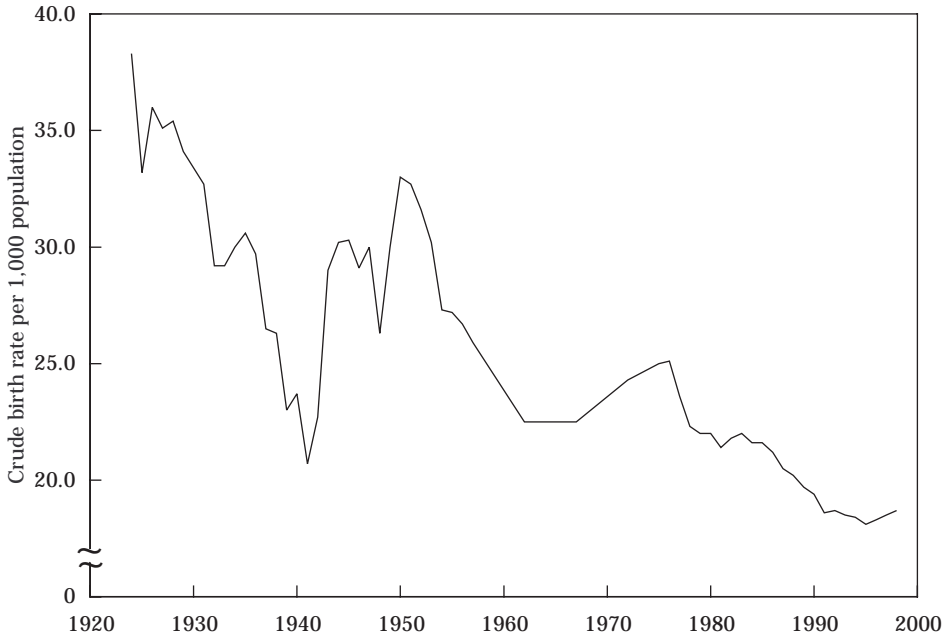
has been central in the struggle: for one side, settling the highest possible proportion of world Jewry in the region; for the other side, maintaining the status quo or regaining a status quo ante.

During the 1948–49 war, in which the Israeli army expelled Arabs from hundreds of villages and towns (Morris 1987), a further stage was reached. Contrary to most colonial projects, the Israeli one was intended to substitute one people for the other; it was not a will to dominate the Arab peoples as much as to dominate the territory (Rodinson 1967).⁷ Relative sizes of the two populations were at stake.⁸ Furthermore, the protracted conflict affected the whole demographic system prevailing in the contested territory. Because the communal frontier separating the Jews from the Palestinians—Muslims as well as Christians—remained sealed to any kind of mixing,⁹ the two populations developed separate reproductive systems. These two systems are opposed: on the Jewish side, a moderate and declining rate of natural growth replenished by immigration and, on the Arab Palestinian side, a high and rising rate of natural growth offset in part by emigration. Both the communal frontier between Jews and Arabs and the political border between Israel and its neighbors remained closed. After the Palestinian exodus of 1948–49 and the subsequent immigration of Jews from Egypt and Syria to Israel, these borders were never crossed again by migrants.¹⁰ Instead, all immigrants accommodated by Israel came from distant areas; populations with different levels of fertility were mixed together. On the Arab side, the closing of the Israeli border and, later, the restrictions on movement imposed on the inhabitants of the territories occupied by Israel in 1967—the West Bank and Gaza Strip—produced the opposite effect: the population was split into two subpopulations that no longer had direct contact with each other. The regrouping of the Jews and the dispersion of the Palestinians affected the courses of their respective fertility transitions.

The Jewish pattern of fertility convergence

At the end of World War I, a small Jewish nucleus lived in Palestine. This community of some 60,000 in 1918¹¹ was composed of two subpopulations: an Ottoman Jewish community, in part descendants of the Jews who had fled Spain at the time of the Inquisition to find shelter in the Ottoman Empire, representing around two-thirds of the total Jewish population; and the rest, immigrants of European origin, recently arrived in Palestine under the banner of Zionism. Together, they had lower fertility than the Arabs. In 1924 (the first available record), the crude birth rate was 38.3 births per thousand population for the Jews, as against 55.3, 59.0, and 40.4, for the Muslim, Druze, and Christian Arab populations, respectively (McCarthy 1990). Although data are not available on fertility differentials by place of origin, it is probable that Ottoman Jews, a mostly urban and Arabic-speaking population, administered by its own *Millet*¹² for religious and personal

FIGURE 1 Crude birth rate of the Jewish population in Palestine 1924–47 and the Jewish population of Israel 1948–98



SOURCE: State of Israel, *Statistical Abstract* 1999: Table 3.1.

affairs, but well integrated into the Muslim and Christian Arab environment in other respects,¹³ had the high fertility of the towns of the region at that time (with birth rates of around 40–45 per thousand). By contrast, the recent immigrants, who remained foreigners benefiting from the Capitulations system,¹⁴ many of whom settled in coastal agricultural areas culturally distinct from the local Arab peasants, probably brought European patterns of relatively low fertility to Palestine.

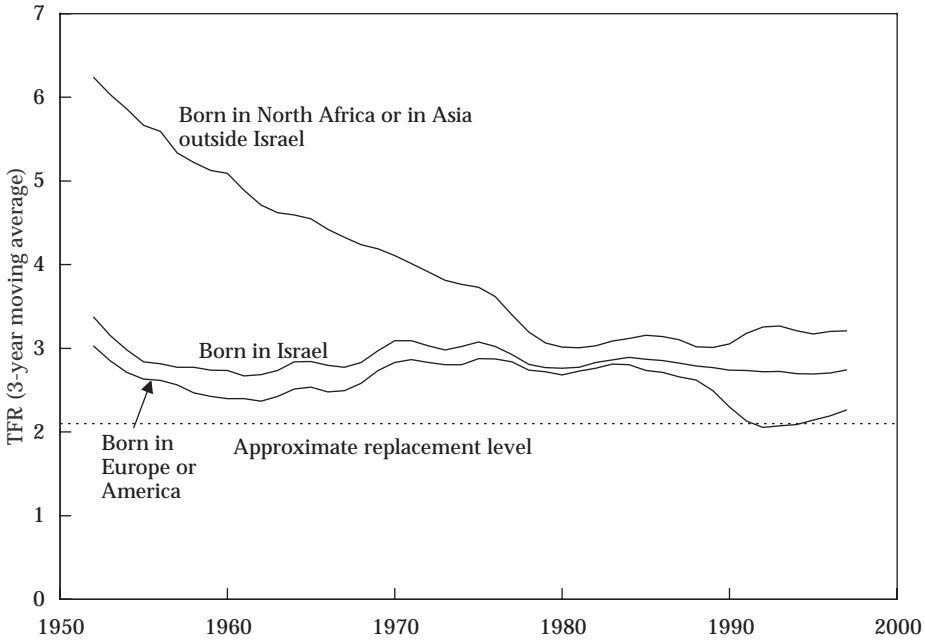
During the following 30 years (1918–48), the Jewish population grew largely because of migrations from Europe, a region of low fertility.¹⁵ As a result, average Jewish fertility in Palestine dropped at a sharper rate than would have occurred in the absence of migration (see Figure 1). The extremely high rate of overall population growth (averaging 7.94 percent per year in 1918–48), because of the decisive migratory component, paradoxically brought about the rapid decline in the rate of natural increase. By 1939, the crude birth rate of the Jewish population in Palestine had dropped to 23 per thousand per year, a level similar to the rate prevailing in Europe at the same period. World War II brought about similar effects as those experienced in Europe, but at an earlier stage: first a drop in the birth rate (1940–42), then a short baby boom that began in 1944 and ended in 1948. The Jewish population numbered some 650,000 at the proclamation of the State of Israel on 14 May 1948.

The hostilities that accompanied the creation of Israel extended beyond the military conflict itself into a hostility between Jews and Arabs in the majority of Arab countries. Jewish communities that had existed in these countries for millennia suddenly left. These “Arab Jews”¹⁶ did not differ greatly from the Arab or Berber populations among whom they lived. In particular, they probably had similarly high fertility.¹⁷ In Israel their fertility remained a high 6.5–7 children per woman among Jews originating from Asian and Arab countries, and 7.5 among those originating from North Africa, as against 2–2.5 among Jews coming from Europe (Friedlander and Goldscheider 1978). The mass influx of Jews from the Middle East and the Maghreb thus increased, starting from 1950, the rate of natural population growth of Jews in Israel.¹⁸ As a result, although they represented only one-third of the total immigration over 1918–98, they and their descendants amount today to some 50 percent of the Jewish population of Israel.¹⁹

The State of Israel and the populations themselves aimed to merge Ashkenazi and Sephardi, the Jews of European and of Asian/North African origin respectively, into a new Israeli society. The fertility of the Sephardi did not remain high for long after they settled in Israel, despite a pronatalist normative context and Zionism (Goldscheider 1996). On the contrary, it dropped rapidly to converge with that of immigrants of European origin (see Figure 2). Migration to Israel accelerated the demographic transition among Jews originating from the Arab world—beginning with mortality reduction (since immigrants encountered a better health institutional environment in Israel than the one they had left behind in Arab countries), followed by fertility reduction. The convergence of Sephardis’ mortality and fertility toward Ashkenazis’ rates was a response to several developments.

First, a gradual equalization of social conditions between the various Jewish communities spread the factors conducive to fertility decline among the Sephardi, although even now the Jewish lower class comprises more persons of Asian/North African than European ancestry (Goldscheider 1996). At their arrival in Israel, Jewish immigrants from Arab countries were viewed by an all-Ashkenazi administration as “bad human material” or “very wild people” (Segev 1986: 155). Official efforts were aimed at upgrading their living conditions and transforming their habits, in particular regarding education and health. For example, David Ben-Gurion, Prime Minister and Minister of Defense of the new state, was concerned about the conditions of public health among Jews arriving from Yemen, including the care of children. “The Yemenite father...is not accustomed to feed his child properly before eating himself.... We must understand the soul of the Yemenite and treat his customs with respect, but it must be changed by gentle means and by setting an example” (cited in Segev 1986: 187). Not only did social conditions change but also family roles and status were transformed for Jews of Middle Eastern and North African origin following immigration to Israel. In their countries of origin these Jews lived close to their Arab neighbors,

FIGURE 2 The convergence of Jewish fertility 1952-97: Total fertility rates by place of birth



SOURCE: State of Israel, *Statistical Abstract* 1999: Table 3.15.

sharing many cultural features with them. In particular, women were largely confined to the positions of mother and spouse. In Israel the predominantly Ashkenazi society held a Western conception of the role of women and had political institutions that included women in the military. Thus, for example, in the birth cohort of 1954, the proportion of women having served in the army was 57 percent among women of European origin as compared to 33 percent among those of Middle Eastern origin.²⁰

The second reason for a convergence of Sephardi and Ashkenazi demographic patterns was a progressive mixing of the communities. Inter-marriages increased from 8.4 percent in the marriage cohorts of 1949-53 to 22.2 percent in the cohorts of 1979-83. Marriages between Jews of European and Asian/North African ancestry were encouraged by the absence of communal barriers within the Jewish population in places where potential mates can meet, such as schools, places of work or entertainment, and the military. In addition, a marriage-market effect may have played a role in specific local contexts. Because they initially had higher fertility, the Jews coming from Arab countries and Turkey were to produce, a generation later, larger numbers of candidates in the marriageable population. Inter-marriage, “an important component of the integration process,” brought about a convergence in the fertility of both communities toward the national pattern by the 1980s (Eisenbach 1992).

With a total fertility slightly above replacement level, this national pattern resembles that of the Ashkenazi before the immigration of the Sephardi in the 1950s. Neither the direct initiatives of the state to minimize behavioral differences inherited from a variety of geographic origins nor the will of the population to build a unified society would alone provoke this particular convergence. The imposition of Hebrew as a new common language may have contributed as a third factor. In another context, that of Europe during its fertility transition, linguistic borders more often delimited distinct patterns of nuptiality and fertility than did any other frontier. As a fact of communication, cultural models, in particular those related to family-building, are more easily shared by people speaking a common language.²¹ The ways in which the development and the systematic diffusion of the modern Hebrew language in all places of public life, as a vehicle for national integration, might have influenced fertility are still unresearched, but such influence seems at least plausible.

Contemporary fertility remains slightly higher among Jewish women born in North Africa or in Asia outside Israel than among those born in Europe (Figure 2). After three decades of convergence, a temporary reversal occurred in the early 1990s, followed by a resumption of convergence as of 1995. Differences according to region of origin suddenly and temporarily increased as an unexpected result of remote political developments: the collapse of communism in two countries containing large Jewish communities, namely Ethiopia and the Soviet Union. Political negotiations that unlocked the doors for migration brought to Israel two communities with contrasting fertility patterns: the entire Falasha community of Ethiopia, with a traditional high fertility level, and a large part of the Jews of the former Soviet Union, a community of low fertility. Thus the break in the trend of convergence was not the result of any sociological change in Israel; instead, it was a byproduct of a major political change on the international scene, a change the government of Israel welcomed as a means to enhance the flow of Jewish immigration. The long-term trend lies elsewhere: the fertility of the Jews born in Israel, who form an increasing majority at childbearing ages, exhibits an intermediate level between those of the various populations born outside Israel, with almost no change since the mid-1970s. Several characteristics of this average call for comment.

First, as with any average, it masks differentials. Diversity of ancestry has been replaced by religiosity, a criterion closely linked with political attitudes, as the main cause of variation in fertility. An inherited factor has given way to a characteristic affected by choice. As early as the 1970s, fertility patterns were no longer differentiated by geographic origin from the second generation onward: Jewish women born in Israel to European emigrants exhibited slightly higher fertility rates than their mothers; those born to emigrants from Arab countries exhibited significantly lower fertility than their mothers. In short, the emergence of a new fertility behavior was a

response to changes to which Jews, whatever their origin, were gradually exposed (Friedlander and Goldscheider 1978; Goldscheider 1996). The sharp fertility contrasts that still exist in Israel are now due to the gradation of religious values, and the still high average fertility of Israeli Jews by international standards (2.67 children per woman in 1998) is in part the result of a pronounced religious heterogeneity. It was the close correlation between the proportion of votes gained by the Ultra-Orthodox in the 1984 Parliamentary elections and the TFR that first revealed the probable role of religiosity in fertility differentials (Schmelz 1986; Friedlander and Feldmann 1993). A survey conducted in 1987 to capture factors not collected in official statistics showed that it is not education or income, nor ethnicity or working status, but religiosity that produces the largest differentials in fertility. Fertility, actual or wanted, is perfectly ordered by religiosity;²² religious compliance is a strong predictor of family-building patterns (Kupinsky 1992; Goldscheider 1996; Adler and Peritz 1997).

Variations in religiosity are associated not only with different fertility levels but also with divergence in trends. According to Berman (2000), between 1980–82 and 1995–96 the total fertility rate rose from 6.49 to 7.61 children per woman for Ultra-Orthodox Jews while it declined from 2.61 to 2.27 among the rest of Israeli Jews. We return later to the interpretation offered by Berman and its political aspects. For the moment, we make two observations: (1) the recent increase in the TFR of Israeli Jews is the result of a sharp increase in fertility among the Ultra-Orthodox counterbalancing a decrease for all other groups; and (2) the resulting change in composition of the Jewish population of Israel will raise the proportion Ultra-Orthodox from 5.2 percent in 1995 to 12.4 percent in 2025—22.5 percent among children aged 0 to 17—if current fertility differentials and trends are maintained (Berman 2000). It has been suggested that because, after a generation, the high fertility of the Ultra-Orthodox would increase their weight in the polls, high fertility is implicitly part of their strategy of seizing political power within Israel by democratic means (Courbage 1999b).²³

The second remarkable characteristic is a high level of fertility in Israel compared with countries of similar socioeconomic development. The Jewish population of Israel ranks among the most advanced by economic, social, and even political standards, but its average fertility is now significantly higher than that of Tunisia, Turkey, or Lebanon, to cite North African or Middle Eastern countries that are far behind Israel in standard of living and political participation. This particularity is partially the result of religious heterogeneity. The 1998 total fertility rate of the Jewish population of Israel is some 30 percent higher than the corresponding rate of the population of the United States (TFR=2.05). However, every population is heterogeneous, including those at replacement or below-replacement level of fertility. For example, Hispanics and blacks in the United States have a higher fertility level than the national average. If non-Ultra-Orthodox Jews of Is-

rael, with a total fertility rate of 2.25, are compared with non-Hispanic white Americans (TFR=1.8 according to Pinal and Singer 1997), the fertility of the former is still some 25 percent above the fertility of the latter. Compared to European populations from which a majority of immigrants came, the non-Ultra-Orthodox Jews in Israel have a fertility level some 53 percent higher than Western Europe (TFR=1.48) and some 66 percent higher than Eastern Europe (TFR=1.36). Religious heterogeneity thus cannot fully account for the relatively high fertility of Jewish Israelis.

Immigration to Israel may have selected for those with higher fertility. In a study of two cohorts of immigrants from the former Soviet Union, those who arrived in Israel during a period when the cost of out-migration from the USSR was high (1960–82) and those who arrived in a period of low-cost migration (1989–96), Berman and Rzakhanov (2000) established that, controlling for age of the woman, the first cohort had a much higher fertility (TFR=2.5) than the second (TFR=1.7). Disentangling the effects of the situation prior to emigration and the circumstances encountered after immigration to Israel, the authors found that the effect of the situation prior to emigration was dominant. Their interpretation is that, migration being an investment in human capital in which the welfare of descendants is a critical concern, intergenerationally altruistic families are more likely to migrate and immigrant families self-selected according to altruism are likely either to have more children or to have children of higher quality (as defined in conventional economic terms). The relatively high fertility of Israeli Jews would partly result from a link between the propensity to migrate and parental behavior toward future generations. Complementary explanations can be found in the violent history of the Jews in the course of the twentieth century. The memory of pogroms and the Holocaust in Europe contributed to the pronatalism of Israeli political elites. Among the population, the continuous state of belligerence since the creation of Israel may affect desired family size: an additional child is insurance against the risk of premature death at war, according to one of the hypotheses offered by Goldscheider (1996). But numbers of extra births—some 25 percent above replacement level—by far exceed the number of war-related casualties. To fully understand the relatively high fertility of the Jews in Israel, one has to turn to politics and the particular relation that links immigration, fertility, and the nation-building process.

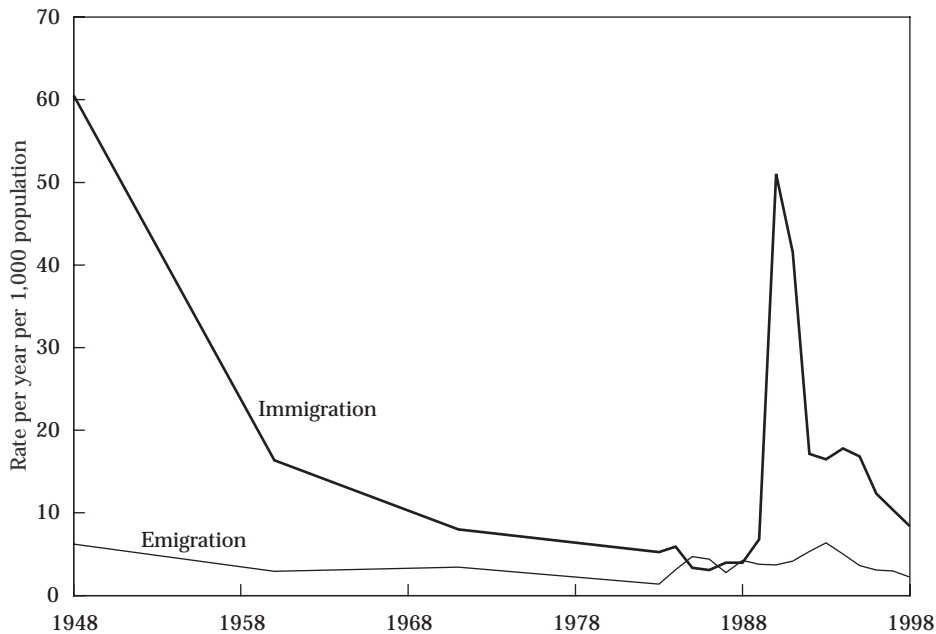
Immigration and the politics of Jewish fertility

Some 95 percent of the Jewish population of Israel originate from an immigration over the last three-quarters of the twentieth century. Without migration, the 60,000 persons constituting the Jewish community residing in Palestine at the end of World War I might have numbered only about 250,000–260,000 survivors and descendants by the year 2000.²⁴ This high-

lights the importance of the external contribution. From 1918 to 1996, some 3 million Jews moved to Israel, 80 percent of whom arrived after the establishment of Israel, in compliance with the Law of Return enacted in 1950, which entitles every Jew to immigrate.²⁵ This sustained mode of demographic growth from abroad may soon run its course for two reasons.

The first is the capacity of the destination to maintain pull factors. A political crisis affected Israeli society in the 1980s, diminishing the country's appeal as a destination for members of the Jewish communities of Europe. In almost continuous decline between the early 1950s and 1985, the balance of migration became negative from 1985 to 1988 (see Figure 3): for the first time, reemigrations—an already widespread practice between the two world wars that turned Israel into a mere stage in the migration from Europe to America for many persons—were no longer compensated by new arrivals. At the same time, Jewish settlements outside the borders of Israel, encouraged by the Israeli state, in the heart of the West Bank and the Gaza Strip under military occupation, gained momentum. Such settlements required higher Jewish population growth in the long term. In the 1990s, as mentioned above, immigration from Ethiopia and the former Soviet Union rose then fell. When the fragmenting communist state allowed the emigration of Jews and almost 200,000 of them arrived in Israel in a single year (1990), a great many believed—and the

FIGURE 3 Immigration and emigration of Israeli Jews: 1948–98



NOTE: Rates are calculated per 1,000 mid-period resident Jewish population.
SOURCE: State of Israel, *Statistical Abstract* 1999: Tables 2.2 and 5.1.

Palestinians feared—that hundreds of thousands would arrive each year and reverse the demographic trend of progressively lower rates of population growth.²⁶ But a few years later, this migration movement had subsided. From 1990 to 1998, 792,009 immigrants and potential immigrants from the former USSR were recorded in Israel. But not all of these immigrants would stay and not all were Jewish. The migration balance for all sending countries combined—765,000 for the decade 1989–98—was lower than immigration from the former Soviet Union alone, and the Jewish balance was even lower—657,700 persons, possibly less if certain immigrants recorded as Jewish were not authentic Jews (State of Israel, *Statistical Abstract* 1999: Table 2.2). The proportion of non-Jewish immigrants, which remained negligible during the first four decades of Israel's existence (0.7 percent in 1948–88), rose during the following decade, with a continuous increase from 3.3 percent in 1990 to 28.4 percent in 1996, 36.1 percent in 1997, and 40.2 percent in 1998.

The second factor limiting new immigration is the size of the Jewish diaspora and the motivations of its members for moving to Israel. The proportion of the world Jewish population who resided in Palestine and subsequently Israel has risen continuously from 1 percent in 1925 to about 36.5 percent in 1998 (see Table 1), with a sharp rise due to recent immigration from the former Soviet Union. Now small in size, the Jewish community of Russia not only has one of the steepest rates of natural demographic decline but also a very high proportion of mixed marriages,²⁷ resulting in demographic erosion reinforced by a dilution of identity. This community is probably no longer able to provide large numbers of migrants to Israel. Apart

TABLE 1 Jewish population in the world and in Israel (thousands): 1882–1998

Year	World	Israel	Percentage in Israel
1882	7,800	24	0.3
1900	10,600	50	0.5
1914	13,500	85	0.6
1925	14,800	136	0.9
1939	16,600	449	2.7
1948	11,500	650	5.7
1955	11,800	1,590	13.5
1970	12,630	2,582	20.4
1975	12,740	2,959	23.2
1980	12,840	3,283	25.6
1985	12,870	3,517	27.3
1990	12,870	3,947	30.7
1995	13,020	4,522	34.7
1998	13,100	4,785	36.5

SOURCE: State of Israel, *Statistical Abstract* 1999: Table 2.3.

from Russia, the large majority of Jews reside in countries with higher income per capita than that of Israel (some 46 percent higher in North America and higher also in Western Europe, albeit to a lesser degree), and thus have low economic motivation to migrate to Israel. Moreover, Jews in Europe and America have experienced earlier and steeper fertility declines than the populations among whom they live²⁸ and rank among the most rapidly aging communities in the world, with 20 percent of persons older than 65 years; they have a low propensity to migrate and, in any case, would be too old to contribute to the natural increase in Israel (Schmelz 1984).

Hence, the traditional engine of Jewish demographic growth in Israel, fueled primarily by immigration, is being increasingly exhausted, while, on the Palestinian side, as will be shown below, growth through fertility sustains rapid population increase. The contrast becomes particularly stark when the Palestinians are considered as a single population, whether living in Israel or in the West Bank and the Gaza Strip. Maintaining a numerical balance between the two populations and addressing the challenge of Palestinian high fertility at a time when Jewish migrations seemed poised to play a diminishing role became an Israeli concern as early as the 1960s. Pronatalism would be the only realistic response (DellaPergola 1992); “birthing the nation” (Kanaaneh, forthcoming) had more and more to rely on women’s fertility.

Pronatalist ideas predated the creation of the state. Friedlander (1974) notes that pronatalism made its first appearance when Britain placed greater restrictions on immigration through application of the aforementioned 1939 White Paper; it became a common concern among the Zionist leaders in Palestine during World War II in response to the Nazi extermination of European Jewry. In 1943, the call for increased fertility was explicitly linked with the Holocaust by the Chief Rabbi of Palestine, urging families to procreate—for the Jews should number not just 11 million but tens of millions and “be fruitful and multiply, and replenish the earth”—and by A. H. Fraenkel, a professor of mathematics at the Hebrew University, Jerusalem, who advocated a merciless fight against physicians performing induced abortion and recalled that “among the many means by which Hitler attempted in 1933 to increase the German birth rate, the one effective measure was the war against abortions.”²⁹ Profamily public policies were also fostered before the creation of the state. Roberto Bachi, a statistician and demographer who frequently advised Ben-Gurion, suggested the adoption of family allowances or the granting of special credit facilities for young couples as early as 1943. The first five years after the creation of Israel were a period of intense Jewish immigration during which pronatalism was accorded lower priority. Only when immigration began to decline did pronatalism regain attention.

Jacqueline Portuguese argues that pronatalism is grounded in three basic forces within Israeli society: Zionism, the religious establishment, and patriarchal familism (Portuguese 1998). An institutional foundation for pronatalism was established in 1962 with the creation of a Committee for Na-

tality Problems, chaired by Bachi, who had been appointed by Ben-Gurion. Mainly concerned with low Jewish fertility,³⁰ the committee prepared a report stating that “if all families bore two children only, a dangerous demographic recession would follow. Families of three contribute just marginally, and only families of four or more children make a real contribution toward the demographic revival of the nation” (cited in Portugese 1998: 77). In 1968, a Demographic Center was established within the Ministry of Labor and Social Welfare with the mandate “to act systematically in carrying out a natality policy intended to create a psychologically favorable climate, such that natality will be encouraged and stimulated, an increase in natality in Israel being crucial for the whole future of the Jewish people” (ibid.). Like many other examples of deliberate policies to raise fertility, the results attributed to the Demographic Center fall short of original expectations (Friedlander 1974).³¹

Whatever the efficacy of the Demographic Center, its mandate was of political significance. Orientations very similar to those of the government—at that time ruled by the Labor Party—could be found in religious discourse, although in a more emphatic tone. A member of the religious Zionist lobby group Ephrat, for example, declared in 1964: “The pseudo-sophisticated woman, who today looks askance and with pity on the mother of the large family, is guilty of sabotaging the life-blood of the nation” (cited in Portugese 1998: 82). The concern with insufficient Jewish fertility was followed by a correlative worry about excessive Arab fertility. In 1976 the report prepared by Israel Koenig, a commissioner for the Ministry of Interior, stressed the political threat represented by the demography of Arab Israelis: “the increase of the Arab population...gives the Arab nationalists a feeling of power and a hope that time is working for them” (ibid.: 83). Finally, the concern with Jewish–Arab fertility imbalances gave way to a concern about the low fertility of non-Israeli Jews. In May 1986, the Government of Israel adopted a Decision on Demographic Trends within the Jewish People, in which “The Government expresses deep concern about the demographic trends in Israel and the Diaspora...as well as in assimilation and outmarriages in the Diaspora. The Government thereby decides to adopt comprehensive, coordinated and long-term demographic policies aimed at securing an adequate level of growth of the Jewish population.” (ibid.: 84–85). Pronatalism was explicitly aimed at the Jewish segment of the population. As stated by Goldscheider and Friedlander (1986: 33), “given the heterogeneity of Israel’s population, a comprehensive fertility policy would have to be differential. By this, we mean that measures directed to reducing fertility levels among some segments of the population (e.g., rural Muslims) would not be applicable to others (e.g., European Jews³²)...pronatalism would be absurd when applied to the Arabs.” It was implicitly acknowledged that extending educational, health, and welfare benefits to all Israeli citizens would tend to promote fertility limitation among the Arabs. The demographer Zvi

Eisenbach (cited in Portugese 1998: 75) asserted that the “continuation of the modernization processes is likely to encourage further reduction in the fertility of the Muslim population of Israel,” a mechanism elsewhere suggested by survey data (Keysar et al. 1992). Very similar arguments had been used for advocating the differentiation of population targets—pronatalism for one group, development as a route to fertility reduction for others—in other multiethnic contexts in which the state was confronted with a latent or open national struggle along with demographic imbalance, for example the former Soviet Union (Petersen 1988) or France toward the end of its colonial rule over Algeria.³³

Pronatalist policies adopted in Israel do not substantially differ from those found in other developed countries. The 1959 law on child allowances accorded a monthly tax-exempt grant to families of four or more children for each child under the age of 14 (raised to age 18 in 1965); and the 1968 law on national insurance provided a birth grant for each child delivered in a recognized hospital. The child allowance and the birth grant, around 10 percent and 50 percent (dropped to 15 percent in 1989) of the average monthly wage, respectively (Portugese 1998)—were significant by comparison with policies in other countries, but low in terms of actual costs of children. Most scholars assessed their impact on fertility as modest at best. Bachi disagreed, considering that “the considerable help extended in Israel to mothers, children and families might have been a contributory factor in sustaining fertility in Israel at a level considerably higher than that found in comparable industrialized countries” (Preface to Peritz and Baras 1992: 8).

Securing the professional position of women during and after pregnancy was the purpose of other laws, among them the law on women’s work (1954) instituting the right to maternity leave, and the law on severance pay (1963) instituting a financial compensation to women leaving work to care for their infant. Given Israel’s periodic involvement in regional conflicts, not only women’s work but also their enrollment in the armed forces competes with maternity. Two priorities on the same political agenda—the highest fertility for securing the future of the country and the largest mobilization of population for the current defense of the territory—are in possible conflict. For this reason, the Women’s Enrollment Act, requiring every woman to join the military, became the object of recurrent attacks in Parliament, notably from representatives of the religious parties who considered enrollment of women a direct cause of fertility decline (Friedlander 1974).

The communal and demographic heterogeneity of the population of Israel is another reason why pronatalist legislation is sometimes of ambiguous value for achieving national goals. Because Israel is by design a nation for the Jews, its government tends to favor Jewish, not Arab fertility. On the other hand, because Israel is anxious to appear as a country of social equity, its social legislation has to apply equally to all citizens. Most child allowances and family grants are public transfers proportionate to the num-

ber of children. By nature, they benefit high-fertility more than low-fertility segments of the population and the former are predominantly Arab. The contradiction between Zionist goals and social goals was made clear by the fate of the Ben-Gurion prize awarded to every woman delivering her tenth child. Created in 1949 to stimulate Jewish natality, the prize was discontinued ten years later, and “one of the reasons was apparently that many Arab women received it” (Friedlander 1974: 57). In order to address this kind of counterproductive outcome, Ben-Gurion later proposed that pronatalist programs be managed by the nongovernmental Jewish Agency instead of the government. However, social equity prevailed, and welfare policies remained under the authority of the state. Some selective procedures nevertheless could be applied. For example, the Law for Families Blessed with Children (1983), providing assistance to large families, was reserved by Parliament for veterans, a category restricted to Jews, since Muslim and Christian Arabs are not admitted in the military. Indirectly, the child allowance can also be viewed as a measure selectively intended for Jews simply because the threshold qualifying for tax exemption is too high for the poor, who are predominantly Arab (Portugese 1998).

Public transfers aiming to affect fertility are not only those explicitly designed for that purpose. The state manages other kinds of expenditures and transfers among groups of the population that can indirectly, but substantially, modify the economics of fertility (McNicoll 1998). The financial support provided by the state to religious Judaic institutions in Israel may be interpreted as state support to the fertility of Ultra-Orthodox Jews, hence a determinant of the relatively high Jewish fertility at the national level (Berman 1999, 2000). As stated by Berman (2000), Ultra-Orthodox groups defy the price theory: a majority of men remain outside the labor force until the age of 40–45 in order to attend the *Yeshiva*—a time-consuming religious school, offering only prospects of low wages after its completion; their families have low incomes but many children. Indeed, their collectivity is secured by mutual bonds (an effective insurance network), rules (exclusive access to the network), and norms (religious regulations favoring fertility) that make it possible to redistribute internally to members of the network the subsidies received by religious institutions from the state. These, in turn, are secured by the political influence of the Ultra-Orthodox in Parliament.³⁴

The Palestinian pattern of fertility divergence

The creation of Israel and its military supremacy since 1949 prompted the emigration of a majority of Palestinians. Emigration took two distinct forms. The first form arose twice, during the course and the immediate aftermath of two wars—1948–49 and 1967—with the mass and sudden exodus of a population seeking refuge from the Israeli army.³⁵ This exodus was to proxi-

mate territories: the West Bank and Gaza in 1948–49 as well as the East Bank of the Jordan, Lebanon, and Syria during both wars. With no prospect for economic gain in these countries (at least until many years had passed), the displaced populations became refugees in camps where many of the survivors and their descendants still remain. The second form emigration took was a steady flow, beginning from the West Bank in the 1960s and extending after 1967 to the West Bank and Gaza Strip as well—territories occupied by the Israeli army—toward the labor markets of the Arab-Persian Gulf.³⁶ Seeking employment, and sometimes wealth, these migrants did not, however, entirely conform to the model of contemporary economic migration. Migrant workers in this case were accompanied by their wives and children.³⁷

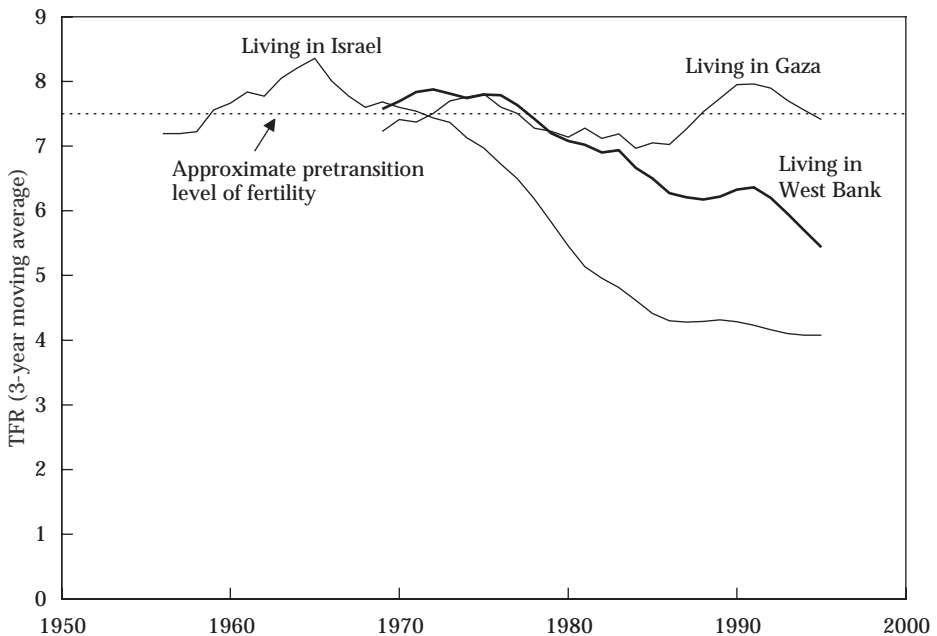
The state of belligerence between Israel and its neighbors manifested itself as well in an encounter far removed from the battlefield, between the labor force of Palestine and the capital of the major oil exporters in the Gulf. The two Arab–Israeli wars of 1948–49 and 1967 had transformed a large proportion of the Palestinian population into refugees; confronted with precarious living conditions, the refugees rapidly became candidates for further migration. A third Arab–Israeli war, in 1973, increased the demand for labor in the Gulf countries and created an outlet for some of the Palestinian refugees. During the 1973 war Saudi Arabia threatened countries friendly to Israel with an embargo on Arab oil and thereby provoked a rapid escalation in prices. By creating a situation of permanent insecurity in the proximity of the world’s largest oilfields, the Arab–Israeli conflict contributed to a massive increase in oil revenues, which in turn generated a major market for international migrant labor. I will argue that a side effect of this economic phenomenon was to foster a high Palestinian fertility. Palestinian households that did not migrate received funds from two external sources that alleviated the costs of childrearing, and this infusion of funds may have inhibited fertility decline. The first source of money was private funds that migrant workers in the Gulf remitted to their families remaining in Palestine. The second source of money, public funds, was transferred by the governments of the Gulf states to Palestinian military or civil institutions in the name of Arab solidarity with the Palestinian cause. The discussion below is limited to those Palestinians who remained within the borders of Israel and the occupied territories and does not deal with the larger fraction of Palestinians now living abroad, where they form a diaspora.

Before the creation of Israel, Palestinians had high fertility, with differentials between various religious communities but apparently not between geographical units.³⁸ Then two wars segmented the population. The conflict in 1948–49 separated those who remained in Israel and would become, in 1952, “Israeli Arabs.” The 1967 conflict isolated the inhabitants of the West Bank and the Gaza Strip from their Arab environment: respec-

tively from Jordan to which the former had been integrated and from Egypt under whose control the latter had been placed after the Arab defeat in 1949. Three subpopulations—persons living in Israel, the West Bank, and the Gaza Strip—became subject to distinct social conditions and political statuses and were largely deprived of communication with each other. The demographic response was the development of strong regional differentials, including differentials with regard to fertility.

Figure 4 plots fertility trends in the three Palestinian subpopulations from the mid-1950s to the mid-1990s. With the usual caveats on weakness in the available data, the following picture emerges. Until the late 1970s, no fertility decline had occurred in any of the three subpopulations, and regional differences were negligible. Then Israeli Arabs experienced the onset of transition; their fertility remains lower than that of Palestinians living in the West Bank and the Gaza Strip. The decline of fertility was never very steep among Arab Israelis as a whole, and its pace slackened from the mid-1980s onward to reach a low of around 4.1 children per woman around 1992. But Arab Israelis are not a homogeneous population. Religious communities among them exhibit substantial differentials, with the total ferti-

FIGURE 4 The divergence of Palestinian fertility 1956–95: Total fertility rates by area of residence among three subpopulations



NOTE: Figure plots 3-year moving averages of the TFRs given in the Appendix.

SOURCE: State of Israel (1996) until 1992; 1993 and 1994: linear interpolation; 1995: <http://www.pCBS2.org/english/populati/table5.htm>

ity rate among Muslims roughly twice that of Christians (see Appendix) over the period 1955–98. Christian Arabs have the lowest fertility in Israel while Muslim Arabs have by far the highest (Goldscheider 1996; Gilbar 1997).

The excess fertility rate of Muslim women relative to Christians—with Druzes standing somewhere in between—emerged among various Middle Eastern societies in the early twentieth century.³⁹ Eastern Christians, by comparison with their Muslim counterparts, experienced earlier diffusion of education, higher socioeconomic position, greater autonomy of women, lower child mortality, higher urbanization, and wider openness to the West, among other factors conducive to fertility decline (Courbage and Fargues 1997). Historically among the Arabs of Palestine, Muslim fertility exceeded Christian fertility by 50 percent during the British Mandate (McCarthy 1990). At first sight, the continuation of these large differentials among Arab Israelis after the creation of Israel does not seem to be directly related to the conflict. However, their persistence during the 1980s and the 1990s, while fertility differentials by religion waned in neighboring Lebanon, is puzzling. As noted by Goldscheider (1996), the high fertility of Muslim Arab Israelis has to be understood in the light of the particular residential segregation and economic integration of their community in Israel. Internal mobility has been limited for the Arab Israelis,⁴⁰ who are still separated from the largest agglomerations where most employment is located, in the Jewish sector of the economy. With Israel's shift from agriculture to industry and services, the Arab community has become increasingly dependent upon the Jewish sector for employment. For many men, labor is far from home. Men's need to commute to work contributes to maintaining women in their traditional position of housekeepers and preserving the extended family as a structure of solidarity, thus inhibiting the reduction of fertility. This situation is more common for Muslims than for Christians. Indeed, the proportion living in localities of fewer than 20,000 inhabitants is 58 percent for Muslims and 38 percent for Christians (22 percent for Jews), while women represent 19 percent of the total civilian Muslim labor force as against 40 percent of the Christian labor force (Jews 44 percent) (State of Israel, *Statistical Abstract* 1999: Tables 2.11 and 12.7).

Demographic differentials that developed after 1948 among the Palestinians according to place of residence, and among Israelis according to Jewish or Arab ethnicity, can be interpreted in two ways. The first is that Arab out-migration during the war of 1948–49 was a selective process. According to this interpretation, those Arabs who emigrated were on average wealthier and more educated than those who remained in the new state of Israel (Goldscheider 1996). In other words, the Palestinians who remained in Israel formed a poorer subpopulation. Their late entry into the demographic transition was the result of an economic and social disadvantage prior to the war, rather than a consequence of the war.⁴¹ Selectivity in migration is usually associated with free choice. In general, those who start a

new life far from their home are more enterprising than those who remain. But what happened in 1948–49 was not the result of free choice. People who left did so because they were living in places from which they were forced to flee.⁴² By the end of the war, some 725,000 Palestinians had left their homes and only 156,000 remained behind. Such a high proportion of emigrants—more than 80 percent—far exceeds the conceivable outcome of any selection process. The second interpretation, according to which rising demographic differentials resulted from differences in the conditions of existence faced by Palestinians after their dispersion and the political treatment they were subjected to, thus seems to be more plausible. According to this interpretation, the gap between Arab and Jewish demographic trends in Israel is attributed not only to conditions prior to the war, but also to the fact that Arabs were transformed by Israel into second-class citizens, in particular by the Defence Regulations of 1945 that limited the free circulation of Arabs in Galilee (Jurays 1969).

Interpreting fertility differentials by religion among Arab Israelis is difficult because Muslims and Christians are not two distinct populations,⁴³ but are linked by a substantial degree of intermarriage. Christian–Muslim marriages, by law, lead to the procreation of Muslim children.⁴⁴ Some fraction of Muslim births are thus to parents one of whom is presently or was formerly Christian.⁴⁵ For this reason, the higher fertility among Muslims than among Christians is subject to two opposing interpretations: one emphasizing the contrast between the two communities, and another highlighting the mixing between them (Fargues 1999). The recent development of places of communal contacts (universities, places of work, associations, etc.), on the one hand, and the small size of the Christian community⁴⁶ and consequently of its marriage market, on the other, could well be playing a role in the contrasting population dynamics of the two communities.

On the other side of the Israeli frontier, in the West Bank and the Gaza Strip, no fertility decline was perceptible before 1975. The slow reduction of fertility that began at that time—both territories having TFRs well above 7 children per woman—halted in 1985–86. Thereafter, the two territories diverged. After a slight increase (possibly not significant), fertility resumed its decline in the West Bank but not in the Gaza Strip, which experienced a substantial rise in fertility, reaching a peak of 8.1 children per woman in 1991.⁴⁷ The cause was a sharp increase in early fertility (see Table 2) that most sources attribute to an increased rate of marriage among teenage women⁴⁸ (Abu Libdeh 1992; State of Israel 1996; Giacaman 1997). Behind demography, politics was at play. To understand demographic changes that were unpredictable according to common frameworks for interpreting the fertility transition, one has to notice their synchronization with a major political change, the *Intifada* (uprising, lasting from 1987 to 1993) that began in the Gaza Strip and then rapidly spread to the West

TABLE 2 Age-specific fertility rates (per 1,000 women) in the West Bank and the Gaza Strip, 1985, 1991, and 1995

	1985	1991	1995
West Bank (East Jerusalem not included)			
15-19	73.1	160.1	100
20-24	235.4	346.3	273
25-29	264.9	294.0	264
30-34	296.2	220.4	229
35-39	260.5	174.3	155
40-44	113.2	81.7	62
45-49	18.8	11.8	5
<i>TFR</i>	6.31	6.44	5.44
Gaza Strip			
15-19	79.3	195.1	144
20-24	284.2	399.6	340
25-29	299.7	385.3	347
30-34	320.6	294.5	289
35-39	261.8	244.8	230
40-44	89.2	100.3	123
45-49	19.7	7.1	5
<i>TFR</i>	6.77	8.13	7.41

SOURCES: For 1985 and 1991 State of Israel (1996); for 1995: <http://www.pcbs2.org/english/populati/table5.htm>

Bank, generating for the first time a measure of support from the Arab community of Israel.

Resistance and the politics of Palestinian fertility

In Israel as well as in the West Bank and Gaza Strip, Palestinians apparently have achieved the main preconditions for fertility transition. Their endowment in such resources as education, health, and access to information permitted by an urban environment stands well above that of many other Arab populations who have already experienced a steep decline of fertility. In addition, considering the deprivation in many basic material resources endured by Palestinians of the Gaza Strip and the West Bank and the widening gap between their aspirations and actual material circumstances, one would expect a fertility transition accelerated by economic hardships. Why did the costs of schooling children not motivate parents to limit the number of their offspring? Why did the knowledge and skills that young women gained at school not motivate them to delay marriage and space births? Why did changes such as drops in infant mortality or high rates of urban-

ization not result in an increasing prevalence of small families? The remainder of this section shows how the political situation in Palestine has distorted the predicted effect of each of these factors.

Palestinian children and adolescents have one of the highest rates of school attainment in the Arab world.⁴⁹ Not only do all children attend school in early childhood, as attested by a near 100 percent rate of schooling around the age of ten, but they spend an average of 12 to 14 years at school (see Table 3). In other settings, parents providing secondary or higher education to their children would be motivated to limit their number. For reasons that are linked to the political conflict, neither economic nor sociological motivations for birth control have emerged from increased school attainment. First, school entails only modest costs, direct or indirect, for individual families. The children of refugees have free access to education provided by the United Nations Relief and Works Agency (UNRWA), established in 1950, which also provides school uniforms, books, stationery, meals, and transportation.

Second, the additional income children might bring to the family by working is negligible because of very limited job opportunities in the West Bank and the Gaza Strip, making unemployment, not employment, the only likely alternative to school. In light of the economic hardships faced by households, one would have expected the norm of a large family to wane given the need to reduce the number of dependents. But the consequences of large families for households are mitigated by the action of such organizations as UNRWA, the Palestine Liberation Organization, and Hamas,⁵⁰ which ensure that childrearing costs do not weigh directly on the family alone.⁵¹ Moreover, the idea of trading off quantity for quality—that is, the perspective that increased educational investment in smaller numbers of children would provide opportunities for intergenerational social advancement—seems to be conceptually irrelevant in the peculiar situation of the Palestinians. Families claim that both quantity and quality matter, that the number

TABLE 3 School enrollment rates (percent) by age, West Bank (excluding East Jerusalem) and Gaza Strip, 1997

Age group	West Bank		Gaza Strip	
	Male	Female	Male	Female
5–9	79.7	79.4	78.9	79.1
10–14	94.8	95.2	94.6	95.6
15–19	52.1	53.6	64.2	55.5
20–24	15.8	10.4	24.4	11.5
25–29	5.8	2.0	9.3	1.6
Average number of years of schooling	12.4	12.1	13.6	12.2

SOURCE: Palestinian Central Bureau of Statistics 1999.

of children they will give to the nation is a condition of its very existence and of a higher quality of life for future generations of Palestinians.

During the *Intifada*, incomes dropped by 40 percent in a single year (Roy 1995). In another context, the ensuing austerity might have prompted couples to control their fertility. Instead, fertility rose significantly in the Gaza Strip. I have already noted that a rise in very early marriages contributed to this rise. In turn, rising numbers of teenage marriages were a consequence of fathers suddenly lowering bride price to facilitate the marriage of their daughters during a period of great insecurity (World Bank 1993). Thus, the demographic response to growing economic distress was an increase in fertility, probably resulting in tens of thousands of additional Palestinian births.⁵²

As young educated generations reach the ages of childbearing, new reasons for birth control are expected to emerge as women’s status in the family and society improve and nourish new aspirations. With an average of eight years of schooling in the generation of women born in 1960, and nine years in the generation born in 1970 (see Table 4), Palestinian women are among the best educated in the Arab region. But increased education did not change women’s fertility; to the contrary it increased it in the Gaza Strip, and possibly the West Bank, during the *Intifada*. Indeed in these territories under Israeli occupation, education of girls does little to enhance the situation of women, in particular outside the family. Human capital gained at school does not result in greater material resources earned in the labor market. Upon graduating from school, women, instead of gaining access to paid work opportunities that would provide alternatives to the exclusive role as mother and wife, encounter unemployment, discouraging them from seeking a job.

Local employment opportunities in the West Bank and the Gaza Strip are extremely limited because of a domestic economy successively devastated by an influx of landless refugees (1948–49), Egyptian and Jordanian mis-administration, and finally Israeli military occupation (Owen and Pamuk 1999). Short of land and capital and disadvantaged by an institutional framework unfavorable to economic development, the population relies heavily on resources generated in external labor markets in the Gulf and Israel. While emigration to the Gulf often meant a loss of local population, with

TABLE 4 Average number of years of schooling in three Palestinian female birth cohorts, 1995 Israeli estimates

Birth cohort	West Bank	Gaza Strip
1950	5.1	6.8
1960	7.6	8.3
1970	8.9	9.1

SOURCE: State of Israel, *Statistical Abstract* 1996: 609.

return being subject to restrictive Israeli rules, employment in Israel was available exclusively on a daily or weekly basis. With migrations to the Gulf slackening in the 1980s, the Israeli labor market became of prime importance, employing up to 47 percent of Gaza's workers and 25–33 percent of those of the West Bank as commuters, before the *Intifada* (Roy 1995; Kadiri 1998). While commuting to work across ethnic boundaries is a viable solution for men, it is not so for women.⁵³ Figures are telling (see Table 5): according to the 1997 census only some 5 percent of Palestinian women in the Gaza Strip were economically active and 9 percent in the West Bank, rates of participation that rank among the lowest in the world; in addition, 25 percent of economically active women in the Gaza Strip and 19 percent in the West Bank were unemployed. These figures reflect the effect of the *Intifada*, which resulted in the closure of the Israeli border. For many men, this meant being cut off from their place of work;⁵⁴ for women, the inability to maintain their selling of homemade textiles on the Israeli market.

Among the various factors that did not have the expected effect on fertility, improvements in child health deserve particular mention. According to reliable data, Palestinians have one of the lowest levels of mortality in the Arab region, in apparent contradiction to their very high fertility.⁵⁵ For those living in Israel, the low mortality is attributable to the high general standard of health in the country, despite Palestinians' persisting disadvantages vis-à-vis Jewish Israelis.⁵⁶ For those living in the West Bank and the Gaza Strip, infant mortality rates as low as 25 and 30 per thousand live births respectively (1995 estimates)⁵⁷ are puzzling if one considers the low economic status of the population and the maldistribution of health care resources (Giacaman 1994). At a closer look, this could be another paradoxical effect of the protracted state of belligerence.

A significant share of material resources flowing to the Palestinians, as far back as the early 1950s from the international community (UNRWA), and later (1970s and 1980s) from the oil-rich Arab states and from the Palestinian diaspora (through workers' remittances), took the form of investments in constructing health centers, developing primary health care, and training medical and paramedical staff. These steps presumably contributed greatly to reducing infant and child mortality under Israeli occupation,⁵⁸ if not ensuring a satisfactory health status to every surviving child. By target-

TABLE 5 Labor force participation rates (percent) of the population aged 10 and older by sex, West Bank and Gaza Strip, 1997

	West Bank		Gaza Strip	
	Male	Female	Male	Female
Percent in labor force	65.1	9.3	58.8	5.2
Percent unemployed	14.1	19.2	24.1	25.4

SOURCE: Palestinian Central Bureau of Statistics 1999.

ing refugees, the most vulnerable segment of Palestinian society, UNRWA probably had a greater impact in reducing mortality than a system of the same cost addressed to the population at large.⁵⁹ In addition to a health program funded from abroad, a Palestinian peculiarity was also at play: a strong political sense that all members of society contribute to the collective goal of resistance to Israel. For the Palestinians, improvements in health status became a means of resistance,⁶⁰ with an “alternative health movement” defying the Israeli military by not waiting for official permissions, by openly promoting cooperation with political organizations banned by Israel,⁶¹ and by developing parallel health care infrastructures under the control of the Palestinian movements during the *Intifada* (Barghouti and Giacaman 1990). Lives lost because of the war, however numerous they may have been from the beginning of the conflict, have been more than compensated in numbers by lives spared thanks to external solidarity and internal popular mobilization.

The absence of any visible effect of urban life style on fertility also presents an apparent puzzle. How could the Gaza Strip, with 96 percent of its population living in towns,⁶² also show extraordinarily high fertility? The West Bank is less urban⁶³ yet less fertile than Gaza. Some reasons why urbanization does not favor birth control among Palestinians have already been suggested: it favors education but not the fruits of education (in terms of socioeconomic position and welfare); it promotes child survival but not the need to have fewer children; and so forth. An additional reason is the quality of urban life: towns and cities placed for decades under curfew and martial law lessen the ability of people to communicate with each other and reduce the exposure to the cultural globalization and alternative ways of life diffused by the media. This effect seems particularly relevant in Gaza.

The Gaza Strip has been isolated from the rest of the world, including the West Bank, since the beginning of the Israeli military occupation. When a corridor road between these two territories was opened in October 1999, the population of Gaza greeted the event as the end of a 30-year siege.⁶⁴ For people less than 30 years old, it was the first time in their lives that they were allowed to leave the narrow strip between the Mediterranean and the barbed wire of Israeli borders. In addition to their isolation from the outside world, the refugees and their descendants, who form some 65 percent of the population in the Gaza Strip, were not only severed from their previous places of residence in Palestine but were (and still are) living in camps separating them from the indigenous population. In contrast to the inhabitants of the West Bank, Palestinian refugees in Gaza had been excluded from political participation at the time of Egyptian rule as well as under Israeli occupation, which left them with no other means of political expression than violence (Roy 1995). Military repression and popular resistance were interacting in a vicious circle. Because the people were forced by the military to stay at home, they turned inward to their families. Deprived of hope

to improve their material wellbeing after the collapse of their domestic economy, they also had only limited exposure through the media to alternative ways of life abroad. Because they were subject to rigorous control over mobility, the inhabitants of the Gaza Strip were motivated to create large family households.

The above reasons for the persistence of high fertility among the Palestinians are primarily negative: neither school attainment and health status nor urbanization provided incentives to control births because they have been neutralized by the state of belligerence and its side effects. Are there also positive reasons, that is, reasons of self-interest for keeping the fertility rate high? As the prospect of a withdrawal by the Israeli army from the territories occupied in 1967 became indefinitely put off, both Israeli and Palestinian politicians realized that demographic growth is the Palestinians' most potent weapon. The certainty that in the first decade of the twenty-first century, in the light of dwindling future Jewish immigration and continued high Arab fertility, the Arabs would become the numerical majority in the territory under Israeli control (Israel, the West Bank, and the Gaza Strip), became a crucial element in the conflict. Long before the Oslo agreement in 1993—by which the government of Israel abandoned the intention of complete annexation of the occupied territories—an Israeli preoccupation with Palestinian fertility had emerged. Prime Minister Golda Meir (1969–74) had clearly expressed this concern soon after she took office: “[In case of complete annexation] we would have to wake up every morning wondering how many Arab babies have been born during the night” (quoted in Najjar and Warnock 1992: 270). Two decades later, before the Madrid conference of 1991 that was to launch the Israeli–Palestinian peace negotiations, a report from the Strategic Studies Center of Tel Aviv University commented on the annexation by Israel of the occupied territories, one of four scenarios envisaged for the future: “In view of the presence of over 1.5 million Palestinians in the territories, Israel—assuming that it wished to remain a Jewish-Zionist state—would have to either deny them political participatory rights, or eventually ‘transfer’ most of them from the West Bank and The Gaza Strip to the surrounding Arab states” (Strategic Studies Center 1989). In other words, with the annexation of the territories and the incorporation of their Arab population, demography would defeat democracy as proportional political representation would negate the Judaism of the state.

Palestinian leaders, it seems, only gradually became aware of the potential to use fertility as a political weapon. One of the first manifestations is seen in the following declaration by Umm Khalil, an activist since the 1950s, in an interview she gave in the 1980s: “I also encourage women to have more children. I once advertised that the society [women’s organization] will give away 200 prizes to people with the most number of children. I realize that having many children constitutes a burden on women, but we are in a battle for survival, and the Israeli concern with our birthrate is to

be taken seriously. Israelis want our land without Palestinians on it” (quoted in Najjar and Warnock 1992: 47). Eventually, the Palestinian leadership officially endorsed pronatalism. For example, the Palestine Red Crescent Society declared in 1993: “the high fertility of mothers among the Palestinian community [must be seen] as something positive, as a reassurance of the continued existence of the nation” (quoted in Kanaaneh, forthcoming). But how could the message of a collective scheme motivate individual choices in the private domain of procreation?

The absence of family planning clinics in the Gaza Strip before the end of 1995, albeit a consequence of pronatalism, is unlikely to be a cause of high fertility. Free contraceptive devices may not have been available, but many populations have reduced their fertility without the support of public birth control programs. Moreover, a contraceptive prevalence of 34 percent in Gaza and 50 percent in the West Bank (1995 figures, World Bank 1998) was not far below that of the neighboring Arab countries, despite a much higher fertility in the former two areas. Palestinian couples were familiar with contraception, but they were using it for spacing births not for terminating fertility. Total fertility was high because it was desired. Various channels, in particular the media, may have fostered pronatalist values. For example, a front-page headline in the Arab Israeli newspaper *al-Ittihad* was advertising “Every month, four thousand newborns in Gaza,” with a picture of all male children, that is, all future combatants. The valuation of motherhood, a tradition among Palestinians, was reinvented in a political context with the idea that giving birth to boys and bringing them up to be men would make women feel like “mothers of the nation” (Kanaaneh, forthcoming). In addition to the media, folk stories and tall tales passed by word of mouth transmitted the same pronatalist message. One of these tales coming from Gaza in the middle of the *Intifada*—“the stones uprising”—goes as follows: “One time the town was under curfew, a pregnant woman started to have labor pains. The soldiers took her to a military hospital to give birth there. It turned out that she was pregnant with twin boys. The head of one of the babies came out. He looked around and saw all these Israeli military uniforms, turned back to his brother and shouted, ‘Ahmed! Ahmed! We are surrounded, get some rocks!’” (Kanaana 1995). Pronatalism has penetrated the discourse of all branches of the Palestinian resistance, secular as well as Islamist. The preservation of pronatalist values by the families—which is different from the adoption of new values—was one sign among many that the Palestinians were mobilizing toward collective national goals.

A complementary hypothesis for explaining the persistence of high fertility among the Palestinians of the Occupied Territories is the resurgence of political Islam and the reviving Islamic values and practices of gender differentiation (Teitelbaum and Winter 1998). If the hypothesis that Islamism encourages fertility were valid, that would help explain why fertility is the

highest in Gaza, precisely where the *Intifada*—a movement led by Islamist groups—was the strongest, and would support my contention of a fertility transition inhibited by causes related to the Palestinian–Israeli conflict. However, three arguments challenge this interpretation. First, the political visibility of Islamist movements does not imply a corresponding prevalence of fundamentalism in the society. There is no evidence that Palestinians have greater allegiance to fundamentalist values than do Egyptians, for example. On the contrary, it seems that the ongoing legal reforms of personal status laws in Palestine do not arouse the same passion as they have in Egypt. Second, whereas Islamic fundamentalists claim familist values, there is no systematic association between Islamism and fertility. Among the many examples of the absence of such a relationship at the macro level are the cases of Iran and Algeria. Iran, a country ruled by Islamic fundamentalists where every institution and every aspect of public life bear the mark of Islamic values, has undergone one of the fastest fertility declines ever recorded, with the TFR dropping from 6.4 to 3.1 between 1986 and 1995 (Ladier 1999). Algeria has experienced, during the last two decades, a continuous and dramatic reduction of fertility (TFR in 1980: 6.4; TFR in 1997: 2.9; ONS 1998) in the context of the rising popularity of fundamentalists in society and, since 1992, during a period of internal turmoil and civil repression with a strong Islamic component. Third, until the mid-1980s, secular nationalism was the leading political force in Palestinian resistance, and Islamist movements did not emerge much before the *Intifada* (Legrain 1997), at a time when fertility in the neighboring Arab countries where Islamism was more prominent was already significantly lower than in the Occupied Territories.

Future prospects

At the dawn of the twenty-first century, a political turning point seems to have been reached in the Israeli–Palestinian conflict. The negotiations that began in 1993 are behind schedule, but are clearly heading toward the creation of a Palestinian state in part of the West Bank and the Gaza Strip. For Israel, this could mean that the Palestinian “demographic bomb” has been defused. With natural population growth working to their advantage, the Arabs are still assured of soon becoming a demographic majority in the territory of former Palestine. However, with perhaps three-quarters of them living under a Palestinian state, Arab demography will no longer be a threat to Jewish demographic hegemony in the territory directly ruled by Israel, that is, Israel in its internationally recognized borders, including the territories eventually annexed. For Israel, the advent of a Palestinian state in a territory delimited in order to contain nearly all Arab inhabitants of the West Bank and Gaza would largely relegate the question of Palestinian demography outside its borders.

The conflict, if it is to last, will take another turn with the recognition of a Palestinian state. The emergence of such a state could undermine the economic sustainability of population growth. The high fertility rate of the Palestinians was rendered feasible by the external support given to their economy. But their capacity to draw resources from abroad has been weakened by the closing of the two main outlets for Palestinian labor: the oil-rich countries of the Gulf and Israel. In the future, the political conditions for a resumption of labor migration to the Gulf or employment in Israel are likely to be compromised. In addition, the population of the new Palestinian state would not readily admit, after such a protracted struggle in nation-building, that exporting their labor services is the only route to economic sustainability.

On the other hand, reliance on external support does not necessarily imply that the work force has to emigrate in order to bring economic resources back home. Other routes would include direct investments in Palestine made by Palestinians living in the diaspora, provided that a political and institutional environment favorable to investors is established by the new state (Hanafi 1997). The Palestinian diaspora, mainly produced by the emigrations that took place in the course of the war of 1948–49 and during the 40 years following,⁶⁵ has given rise to a sociologically heterogeneous and geographically dispersed population; nevertheless, flows of persons, goods, and ideas maintain the diaspora as a viable group. The relationships that Palestinian communities, which have settled around the world, have maintained among themselves and with the West Bank and the Gaza Strip could preserve their capacity to mobilize for national goals. The mobilization that occurred in the political domain during the resistance to Israel and the negotiations for the recognition of Palestine may have an economic dimension in the future.

It is also possible that economic achievements of the new state—which seem problematic at the present stage—would attract capital of non-Palestinian origin. The future Palestine is not obliged to live only on the resources of its territory, but can rely on the social capital that its population had accumulated all around the world. However, the particular kind of external support that fed its demographic growth under the state of belligerence was not investment prompted by economic incentives. Rather, it was subsidies generated from outside, most of them of public origin, that constituted a substitute for a domestic welfare state. Once peace prevails, the international community will be unlikely to help sustain a Palestinian welfare state. With the probable disappearance of the exceptional conditions that have kept the fertility of the Palestinians at a very high level, the fertility rate is likely to follow that of the neighboring Arab countries, into rapid decline. After years of divergence between Israeli and Palestinian fertility trends, a convergence toward a more or less common low fertility is the most likely prospect for the future.

APPENDIX Total fertility rate by year and subpopulation

Year	Jews living in pre-1948 Palestine and Israel	Jews born in Israel	Jews born in North Africa or in Asia outside Israel	Jews born in Europe or America	Arab Palestinians living in pre-1948 Palestine	Arab Israeli Palestinians				Arab Palestinians living in the West Bank	Arab Palestinians living in the Gaza Strip	
						Total	Muslims	Christians	Druzes			
1931	3.09											
1932	2.78				7.98							
1933	2.64											
1934	2.66											
1935	2.72											
1936	2.62				7.47							
1937	2.35											
1938	2.45											
1939	2.25											
1940	2.41											
1941	2.18											
1942	2.47				7.44							
1943	3.44											
1944	3.54											
1945	3.44											
1946												
1947												
1948												
1949	3.42	3.56	4.47	3.19		7.31	8.14	4.99	6.55			
1950	3.89	3.93	5.69	3.28		7.29	8.10	4.72	6.90			
1951	4.02	3.56	6.30	3.17		6.98	7.97	4.59	6.86			
1952	3.98	3.36	6.22	3.05		7.31	8.32	4.49	7.68			
1953	3.87	3.21	6.20	2.86		7.37	8.47	4.33	7.75			
1954	3.58	2.88	5.67	2.64		7.99	9.39	4.61	7.87			
1955	3.65	2.84	5.71	2.64		7.62	8.65	4.90	8.20			
1956	3.65	2.78	5.62	2.62		7.89	9.31	4.53	7.44			
1957	3.63	2.82	5.44	2.60								
1958	3.40	2.72	4.94	2.47								
1959	3.48	2.78	5.27	2.33								
1960	3.50	2.72	5.15	2.47								
1961	3.36	2.70	4.84	2.39								
1962	3.30	2.60	4.68	2.33								

1963	3.36	2.76	4.61	2.39	7.81	9.02	4.59	7.42	6.86
1964	3.42	2.84	4.57	2.55	8.45	9.85	4.76	7.91	7.65
1965	3.46	2.90	4.59	2.60	8.38	9.85	4.74	7.60	7.17
1966	3.40	2.78	4.47	2.45	8.24	9.66	4.35	7.42	7.42
1967	3.19	2.70	4.20	2.39	7.40	8.61	4.00	6.53	7.57
1968	3.36	2.84	4.31	2.64	7.68	8.94	4.06	7.54	7.53
1969	3.38	2.95	4.20	2.72	7.73	8.98	4.12	7.40	8.00
1970	3.40	3.13	4.06	2.84	7.64	8.94	3.61	7.44	7.71
1971	3.44	3.19	4.06	2.93	7.44	8.71	3.38	7.15	7.66
1972	3.23	2.95	3.91	2.82	7.54	8.20	3.85	7.11	7.93
1973	3.15	2.95	3.77	2.74	7.33	8.28	3.77	7.48	7.42
1974	3.19	3.05	3.75	2.84	7.23	8.20	3.65	7.78	7.57
1975	3.19	3.07	3.77	2.82	6.82	7.75	3.36	7.05	8.00
1976	3.19	3.11	3.67	2.97	6.86	7.73	3.32	6.84	7.71
1977	2.99	2.88	3.42	2.82	6.49	7.29	3.13	7.13	7.39
1978	2.82	2.78	3.11	2.72	6.14	6.86	2.97	6.86	7.42
1979	2.76	2.76	3.05	2.68	5.93	6.63	2.84	6.47	7.02
1980	2.76	2.76	3.03	2.76	5.40	5.97	2.66	6.08	7.25
1981	2.71	2.76	2.96	2.61	5.05	5.64	2.35	5.56	7.15
1982	2.79	2.80	3.03	2.81	4.96	5.52	2.33	5.48	7.44
1983	2.90	2.93	3.10	2.86	4.86	5.40	2.45	5.21	6.77
1984	2.84	2.85	3.13	2.76	4.61	5.13	2.25	4.66	7.36
1985	2.85	2.89	3.13	2.79	4.37	4.86	2.12	4.47	6.77
1986	2.83	2.86	3.22	2.65	4.26	4.64	2.53	4.22	7.02
1987	2.78	2.81	3.08	2.69	4.26	4.64	2.58	4.16	7.28
1988	2.77	2.80	3.01	2.63	4.31	4.68	2.58	4.08	7.49
1989	2.72	2.75	2.97	2.54	4.31	4.68	2.66	4.00	7.82
1990	2.69	2.76	3.05	2.31	4.33	4.70	2.58	4.04	7.90
1991	2.58	2.70	3.14	2.05	4.22	4.70	2.27	3.69	8.13
1992	2.62	2.74	3.34	2.03	4.18	4.66	2.35	3.83	7.85
1993	2.60	2.72	3.29	2.08	4.16	4.68	2.31	3.75	7.70
1994	2.58	2.71	3.17	2.11	4.10	4.59	2.41	3.56	7.56
1995	2.53	2.66	3.18	2.07	4.18	4.69	2.43	3.50	7.41
1996	2.62	2.71	3.17	2.25	4.04	4.65	2.62	3.42	
1997	2.64	2.74	3.26	2.25	3.91	4.57	2.60	3.18	
1998	2.67	2.78	3.20	2.29	4.02	4.76	2.62	3.10	

SOURCES: McCarthy 1990; State of Israel, Statistical Abstract (various years); State of Israel 1996; Palestinian Central Bureau of Statistics 1997.

Notes

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1 Palestine is defined here as follows: (1) before 1948, the territory placed under British Mandate after World War I; and (2) after the creation of Israel in 1948, the portion of this territory that is not part of the state of Israel as it is internationally recognized, i.e., the West Bank of the Jordan River and the Gaza Strip.

2 Having to exclude, for statistical reasons, a majority of Palestinians—those now living outside the former Palestine—is a serious limitation; and although a significant difference exists between refugees and nonrefugees in the West Bank and the Gaza Strip, fertility data are not available at this level of distinction.

3 The Balfour Declaration figured later as a preliminary statement in the British Mandate over Palestine decided by the victorious Allied Powers in 1920 (San Remo Conference, at which the treaty abolishing the Ottoman Empire was approved) and ratified by the League of Nations in 1922.

4 “Capitulations treaties” increased the jurisdiction of foreign consulates in the Ottoman Empire in terms of commercial, civil, and penal matters. Initiated in the sixteenth century and intended to protect foreign subjects, these treaties eventually became a source of resentment, as local populations perceived them as a limitation to Ottoman sovereignty. “Jews of all nationalities could always enter as pilgrims.... Since the Powers [“the six ‘Great Powers’ represented at the Sublime Porte at the end of the nineteenth century were Great Britain, France, Russia, Austro-Hungary, Germany and Italy”] (except Russia during the 1880s) did not accept the entry restrictions, consular protection was readily granted and there was little the local authorities could do when the Capitulations were invoked” (Mandel 1976: 18–19; 3*n* [bracketed insert]).

5 “Two important phenomena, of the same nature but opposed, are emerging at this moment in Asiatic Turkey. They are the awakening of the Arab Nation and the latent effort of the Jews to reconstitute on a very large scale the ancient kingdom of Israel”; Negib Azouri, *Le réveil de la nation arabe dans l’Asie Turque*, Paris, 1905 (cited by Kimmerling and Migdal 1994: 75).

6 “Although by the term of that mandate and of the British Balfour Declaration (of 1917), Palestine was marked as the place for the establishment of a Jewish national home (with due regard for the rights of the non-Jewish population), the British did very little to carry out that mandate” (Friedlander 1974: 44).

7 Among the countless declarations that corroborate the Zionist determination to substitute one population for the other, let us cite two prominent Israeli politicians. The first is David Ben-Gurion, speaking at the Council of the MAPAI (the Social Democratic Labor party) after the Haganah (Israel’s pre-state army) was ordered to settle Jews in Arab districts of Jerusalem in February 1948 (before the creation of Israel): “From your entry into Jerusalem,...there are no Arabs.... Since Jerusalem was destroyed by the Romans, it has not been so Jewish as it is now. In many Arab neighborhoods in the west one sees not a single Arab. I do not assume that this will change. What has happened in Jerusalem is likely to happen in many parts of the country.... [T]here will certainly be great changes in the composition of the population of the country” (cited by Nathan Krystall, “The fall of the new city, 1947–1950,” in Tamari 1999: 103). The second is Yitzhak Rabin, architect of the Oslo peace accords, declaring shortly before his assassination in 1995: “The red line for Arabs is 20 per cent of the [Israeli] population, that must not be gone over” (cited in Kanaaneh, forthcoming).

8 Asked in 1946 whether she would accept for the Jewish minority the privileges she was offering to the Arabs, Golda Meir (the future Israeli Prime Minister) answered “no, because there needs to be a place on earth where the Jews are not a minority” (quoted in Rodinson 1967: 69).

9 Inter marriages between Jews and Arabs are so rare that the *Statistical Abstract* of Israel ignores the phenomenon and lists marriages according to the religion of the couple rather than giving the religion of the husband and wife separately.

10 The bulk of emigration to Israel by the Jews of Egypt (60,000) and of Syria (30,000) occurred between 1948 and 1951 (State of Israel, Central Bureau of Statistics 1987a). The peace treaties between Israel and Egypt (1979) and Israel and Jordan (1994) opened the door to visits but not to settlements, with the exception of limited numbers of diplomats. Labor market opportunities in Israel did produce sizable commuting movements from the Occupied Territories and across the Lebanese frontier, but not settlement in Israel.

11 According to the most reliable reconstruction (McCarthy 1990), 58,728 Jews out of a total of 748,128 inhabitants in 1918.

12 *Millet* is a system by which the Ottoman power delegated its authority on questions related to personal status to the spiritual head of each of the recognized religious communities (five Christian and one Jewish).

13 The assimilation of the Jewish communities within local populations, as described by Goiten (1999) for medieval times, was not called into question until the birth of the Zionist movement.

14 Mandel (1976: 30) remarks that "A few of these Jewish nationalists became Ottoman subjects, but the majority by far did not, so that they could continue to enjoy the privileges and immunities granted to Europeans under the Capitulations."

15 Eighty percent of the Jewish population of Israel at its creation (1948) were migrants or descendants of migrants arriving between 1918 and 1948; 85 percent of this migration originated from Europe, a region whose average crude birth rate did not exceed 25 per thousand at that time.

16 According to Kanaaneh (forthcoming): "Although 'Arab' and 'Jew' are constructed in Israeli Nationalism as two bounded and separate categories, Arab-Jews in Israel confuse this neat division." Her remark would apply as well to the members of Jewish communities who lived in Arab countries before the establishment of Israel.

17 No reliable data exist on fertility by religion in the Arab countries at that time.

18 Jewish immigration originating from Arab countries (600,000 in total) and from Turkey (60,000) represented about 50 percent of the total immigration between 1948 and 1964 (State of Israel 1987a).

19 Israeli statistics list, according to the country of origin, persons who were born abroad or whose father was born abroad. These data do not provide the origin of persons whose family migration dated back to their grandfather or earlier (some 20 to 25 percent of the Jewish population as of 2000), nor do they provide information on multiple origins. DellaPergola (1991) assesses at 52 percent the number of "Oriental" Jews, another designation for Sephardic Jews.

20 Cited in Goldscheider (1996). Military service is compulsory for women as well as men, but women can be exempted for causes related to marriage or parenthood.

21 "Demographic diversity and linguistic diversity appear to go together.... A common language facilitated the diffusion of new fertility practices and/or norms and values about appropriate family size, and linguistic boundaries acted as temporary brakes to fertility decline" (Watkins 1991: 173).

22 Among the marriage cohorts of 1978–82, the number of children ever born and the number of wanted children were respectively: 1.9 and 3.1 for "seculars," 2.2 and 3.6 for "traditionals," and 2.7 and 5.4 for "religious" (Kupinsky 1992).

23 This assertion presupposes an intergenerational transmission of religiosity within the family and the consequent political commitments, an interesting matter for the analysis of political behaviors.

24 Applying to a population of 58,728 in 1918 the annual natural growth rates actually recorded for the Jewish population of Palestine (McCarthy 1990) and later Israel (State of Israel, *Statistical Abstract*: Table 2.2) gives a figure of some 258,000 in 2000.

25 The 1952 citizenship law granted Israeli citizenship to every immigrant Jew upon arrival in the country.

26 Restricting the immigration of Soviet Jews was a great concern of the Palestine Lib-

eration Organization in 1990. Yasser Arafat told Algerian television: "I oppose in principle this immigration. It could reverse the balance of power. Abou Mazen [a PLO leader] even thought that it was a phenomenon similar to the immigration which followed the establishment of Israel. To understand the danger posed by immigration, we should recall that when Israel conquered 78 percent of Palestine, there were only 500,000 [Jewish] residents. Immigration then flowed from Iraq, Yemen, Egypt and Morocco to make good the deficit. I am convinced that if the population had remained what it was, Israel would not have survived. For Israel, immigration is an artery linked to the heart of a man. It feeds the economy, the army, the manpower and the farming community" (quoted in Ayalon 1992).

27 The Jewish population of Russia has been experiencing negative natural growth since the 1960s. With aging, its situation has recently reached a critical point where an extremely low crude birth rate (3 per thousand in 1993) is combined with a high crude death rate (30 per thousand in 1993); mixed marriages are dominant: 73 percent of Jewish men and 63 percent of Jewish women are marrying outside their community (Tolts 1995).

28 This includes Jews originating from North Africa, who maintained high fertility until the mid-twentieth century in their countries of origin, but rapidly adopted birth control when they settled in France (Schmelz 1984).

29 I. H. Herzog, "A call to the nation by the Chief Rabbi of Palestine," Jerusalem, 1943, and A. H. Fraenkel, *Fertility in the Jewish Community in Palestine*, 1944, both cited in Friedlander (1974: 54–55).

30 The committee also studied Ashkenazi–Sephardi differentials in fertility.

31 The Center has documented some issues of interest for enhancing fertility, such as attitudes of families toward the third child or the impact of the media on reproductive choices; it has designed some public policies, such as a plan to prevent abortions (1983); and it has prepared surveys to inform other policies, for instance a study on the modernization of Arab villages in order to find ways of reducing their fertility (1983) or another on modernization and its relationship to fertility in the Jewish population (Peritz and Baras

1992). However, none of these activities had a significant impact on demographic trends.

32 Ten years later, in Goldscheider (1996: 220), a similar sentence is found with "European Jews" replaced by "Israelis of European origin," a category that includes the non-Jewish family members of Jewish immigrants, an emergent group in the 1990s.

33 Fernand Boverat, a pugnacious natalist and president of the French *Alliance nationale contre la dépopulation*, held two contrasting viewpoints, according to the targeted population in question. In a pamphlet entitled "Defeating the fall of the birth rate, through truth, duty and justice," published on the eve of World War II, Boverat (1938: 16) fiercely advocated the revitalization of the French nation through natality: "At a time when the fall of the birth rate threatens the country and the society in their very existence...the increasing number of individuals who voluntarily refrain from procreating children is worse than poverty, worse than defeat; it is a moral suicide making invasion and ruin a deserved punishment." Many years later, as the uprising that would eventually lead to independence began in Algeria, Boverat (1955: 10, 45) advocated a sharp curtailment of fertility among the Muslim population of that country: "the Muslim population will inevitably suffocate the European population [in Algeria] if the latter does not reach the replacement level. Unfortunately, the present legal status of Algeria prevents [the government] from providing greater family allowances and child benefits to non-Muslims than to Muslims.... Generalizing the access of Muslims to primary school is thus a necessity for checking overpopulation."

34 "At current levels of transfers and taxes the Ultra-Orthodox population growth rate will render Israel's welfare system insolvent and bankrupt municipalities with large Ultra-Orthodox populations" (Berman 2000: 23).

35 The 1948–49 war had brought about an exodus that was never officially quantified but that the most realistic sources assess at some 725,000 persons. They all left the same territory, Israel, and separated into three groups: 280,000 refugees in the West Bank, 190,000 in the Gaza Strip, and 255,000 mainly distributed in neighboring Arab countries (Kossaihi 1989). The 1967 war was responsible

for a second exodus, of a more limited scope than that of 1948–49. Around 150,000 persons left the West Bank and 100,000 fled the Gaza Strip when the Israeli army entered the area; a number of these persons were refugees from 1948 (*ibid.*).

36 Between 1949 and 1967, the Gaza Strip (under Egyptian rule) did not experience significant emigration but, as of 1960, a regular flow departed from the West Bank (at that time part of the Kingdom of Jordan) with some 140,000 departures between 1960 and 1967: 25,000 to the East Bank of Jordan and 115,000 to other Arab countries. Some of these migrants were native inhabitants of the West Bank, others were refugees of the 1948–49 war and their children born in the West Bank (Kossaifi 1989). Under Israeli occupation, the West Bank and Gaza fed a sustained emigration assessed annually by Israeli statistics: a total of 171,000 left the West Bank and 114,000 left the Gaza Strip between 1967 and 1989 (State of Israel, *Statistical Abstract*, various years). The emigration stopped in the late 1980s, with the fall of oil prices and the subsequent closure of the Gulf labor markets. The Iraqi invasion of Kuwait (1990) and the war that followed in the Gulf area provoked a reemigration of some 300,000 Palestinians to Jordan and the Occupied Territories (El-Madi 1993). While Palestinian emigration to the Gulf was reaching an end, a significant return migration to the West Bank and Gaza took place in the 1990s: 30,000 persons as a result of the Gulf War, 30,000 members of the families of Palestinian policemen allowed by Israel to join their newly settled fathers or husbands, and a few thousand persons benefiting from the right to family reunification negotiated within the peace process (Zureik 1997).

37 The censuses carried out in the Gulf countries in the early days of their transformation into a major labor market, i.e., before the reunification of migrants with their families, indicate that the Palestinians constituted the only sex-balanced immigrant community with 114 men per 100 women in Saudi Arabia (1974) and 112 in Kuwait (1975), while other nationalities often had a sex ratio exceeding 200 men per 100 women.

38 The total fertility rate of the Arab Palestinians is estimated at 7.1 for the period

1940–44; by religious communities: 7.4, 6.7, and 4.6 among Muslims, Druzes, and Christians respectively (McCarthy 1990).

39 Christians had the highest fertility levels in the second half of the nineteenth century (Courbage and Fargues 1997).

40 Israeli military rule almost completely impeded mobility until 1966.

41 The characteristics of the Arab population of Israel, with lower socioeconomic status and significantly higher levels of fertility and mortality than the Arab population of former Palestine (Goldscheider 1996), were not documented by surveys at the time of the 1948–49 war.

42 One can counter the selectivity hypothesis with the case of Nazareth, a prosperous town with a large proportion of Arab Christians who did not emigrate. In July 1948, Israeli soldiers entering Nazareth were prompted by Ben-Gurion to avoid destruction of houses and expulsion of the population. According to the brigade's commander, Nahum Golan, "Because of its importance to the Christian world—the behaviour of the [Israeli] occupation forces in the city [Nazareth] could serve as a factor in determining the prestige of the young state abroad" (quoted in Morris 1987: 201).

43 During the first half of the twentieth century, the term "Arab" came increasingly to mean Christians and Muslims together, as distinguished from Jewish Palestinians (Tamari 1999).

44 Two tenets of the Muslim religion are responsible for this result: (1) mixed marriage is permitted between a Christian woman and a Muslim man but not vice versa—a Christian man must convert to Islam before marrying a Muslim woman; (2) the child receives the religion of the father, hence is born a Muslim.

45 Age-specific fertility rates by religion are obtained by dividing births of a given religion by numbers of women of the same religion. When Christian women marry Muslim men, they give birth to Muslim children: thus the fertility of Muslim women is overestimated, while that of Christian women is underestimated. This underestimation could be significant. If ideal family size—an index usually correlated with actual fertility—is considered, Christian–Muslim differentials are greatly

reduced. In the marriage cohort 1965–74, ideal family size was 4.2 and 4.3 among urban and rural Christians, compared with 4.8 and 5.3 among urban and rural Muslims (Goldscheider and Friedlander 1986).

46 In East Jerusalem (annexed by Israel in 1980) and in the West Bank, the size of the Christian community has diminished substantially, with low birth rates and high emigration rates attributed by some to “Christians’ self image as a small, unprotected community” (Tsimhoni 1983).

47 The Gaza Strip has the world’s highest national level of fertility.

48 In fact, the proportion never-married among women aged 15–24 dropped from 64 percent in 1986 to 49 percent in 1992 in the Gaza Strip and, over the same period, from 73 percent to 60 percent in the West Bank (State of Israel 1996).

49 Attainment of high levels of high school education has a long tradition in Palestine, an achievement shared only by Lebanon in the Arab region. According to the Survey of Palestine conducted at the end of the British Mandate, the percentages of Arab children who received at least some formal schooling were estimated in 1945 at 85 percent and 63 percent for boys in towns and villages respectively, and at 60 percent and 7.5 percent for girls. It was 100 percent for Christians. School enrollment rates at ages 5–14 were 33 percent for Arabs and 97 percent for Jews (Anglo-American Committee of Inquiry on Jewish Problems in Palestine and Europe 1946). In Jerusalem in 1948, there was almost a gender parity in Arab schools (Rochelle Davis, “The growth of the western communities, 1917–1948,” in Tamari 1999: 32–66).

50 Hamas is an Islamist movement that was particularly active during the *Intifada*.

51 This holds true not only for school and health, but for food in the case of persons entitled by the status of refugee to receive the rations distributed by UNRWA. Refugees account for 28 percent of the population of the West Bank and 65 percent in the Gaza Strip (Palestinian Central Bureau of Statistics 1999).

52 Demographic causes have been sought for the *Intifada* itself. Some have seen the uprisings as the result of three trends: an increase in the demographic weight of

youth because of decades of high fertility and a recent slackening in emigration to the Gulf; growing aspirations fed by rising levels of education; and frustration caused by unemployment (Gilbar 1997). But these are highly tenuous claims.

53 Ninety-five percent of the commuters were men (Kadiri 1998).

54 From 1987 to 1990, commuting labor to Israel declined by 33–50 percent (Roy 1995).

55 The relatively good health situation in Palestine seems to represent the regaining of an old advantage. The aforementioned Survey of Palestine noted a substantial and early decrease of infant mortality under the British Mandate, from 200 deaths per thousand live births in 1925–30 to 130 in 1940–44 among the Muslim population of towns. “Whilst in 1927–29 the rates of mortality of children in Moslem Palestine were among the highest in the world (185) and were close to those of most backward countries in the world, today they are closer to those of fairly progressive countries (122 in 1942–44)” (Anglo-American Committee of Inquiry on Jewish Problems in Palestine and Europe 1946: 709). The situation deteriorated under the rule of Egypt and Jordan, a period of very poor health status (Giacaman 1994), and remained a matter of controversy during the first two decades of Israeli occupation. In the early 1980s the population of the Gaza Strip had the highest prevalence of malnutrition among Palestinian refugees (Roy 1986).

56 Being less urbanized, less educated, and less represented among the middle and upper classes, Arab Israelis have less adequate access to the means of good health than Jews and consequently a higher mortality by age.

57 This level of the infant mortality rate is indicated by the demographic survey of 1995 and confirmed by several sources (Khawaja et al. 1996; Pedersen and Hooper 1998). Alternative Palestinian IMR figures follow. Israeli data: 34.0 in the West Bank and the Gaza Strip (State of Israel 1996); UNICEF 1991–92 survey: 41 in 1988 (Abu Libdeh et al. 1992); FAFO survey, showing a slight increase during the *Intifada*: 49 in 1985, 41 in 1988, and 48 in 1990 (Heiberg et al. 1993); Palestinian Central Bureau of Statistics: 27.3 for 1990–94 (PCBS 1998); World Bank: 25 for the West Bank and 32 for the Gaza Strip (World Bank 1998). A

substantially higher figure of 70.0 (West Bank and Gaza) in 1985 is given by Barghouti and Giacaman (1990). If one accepts the range of 25–30, then the West Bank and Gaza have a lower IMR than neighboring Arab countries in the 1990s, with the exception of Lebanon: Egypt (DHS95): 63; Jordan (Papchild): 33.3; Lebanon (Papchild): 27.9; Syria (Papchild): 34.6.

58 According to field surveys, the Israeli health system was poor and the number of hospital beds available in the system decreased as of 1985; the main role was played by the private and nonprofit sector supported by the PLO and by UNRWA (Giacaman 1994). On the other hand, the reduction of infant mortality was also a response to improved standards of living accompanying urbanization and wages earned in Israel by labor commuters (Giacaman 1997).

59 According to a report by the World Bank (1998), the currently impressive health and education status of Palestinians in the West Bank and Gaza Strip may not be sustainable,

because of the economic deterioration in Palestine and the major financial problems facing UNRWA.

60 Barghouti and Giacaman (1990) relate how, just after the occupation of Jerusalem in 1967, Palestinians managed to retain control of Al-Maqassed hospital.

61 For example, the Palestinian Red Crescent is chaired in Cairo by Fathi Arafat, the brother of Yasser Arafat, leader of the PLO and President of the Palestinian Authority.

62 Localities with more than 5,000 inhabitants at the census of 1997.

63 In 1997, 39 percent of the population of the West Bank was rural, but only 12 percent of the labor force was employed in agriculture.

64 "Siege ends for Gaza's people," *International Herald Tribune*, 26 October 1999.

65 An older emigration from Palestine had taken place during the last decades of the Ottoman rule and the period of the British Mandate.

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The Spread of Primary Schooling in sub-Saharan Africa: Implications for Fertility Change

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STATE EDUCATIONAL POLICIES are a critical aspect of the economics of family building in all societies, as well as a primary means of socialization by the state. Caldwell (1980) hypothesized that the onset of the fertility transition in developing countries would be linked with the achievement of "mass formal schooling," by which he meant near-universal enrollment of children in primary or basic schooling. In sub-Saharan Africa, a region in which the fertility transition has begun in some countries but not in others, this hypothesis remains untested. In all of these countries, formal schooling is a foreign import, imposed in a variety of ways over the last century by colonial regimes and foreign churches. In more recent years, as former colonies have gained their independence, most governments have made significant budgetary commitments to education, and educational systems have been revised and reformed to serve the goals of independent states. Today, the educational systems arrayed across the African continent show enormous variation, with many retaining strong links to their colonial roots. Some countries have achieved near-universal enrollment at the primary-school level, but most have not. In many, gender gaps in enrollment rates are closing but, in others, this gap remains large despite significant progress.

Two decades have passed since the publication of Caldwell's (1980) article on "Mass education as a determinant of the timing of fertility decline." The links he hypothesized between mass schooling and fertility were based largely on the historical experience of the West, where state enforcement of compulsory schooling laws was the rule. In that article, he faulted much of the literature on education and fertility in developing countries for having neglected the more immediate impact of children's schooling on the

reproductive decisionmaking of parents, and for having concentrated instead solely on the impact of parents' own education on their subsequent fertility. Even though the period since his article was written has encompassed the start of many fertility declines throughout the world, the same criticism could be equally aptly leveled at the literature today. In a review of the state of knowledge on education and fertility by the Committee on Population of the National Academy of Sciences (Bledsoe et al. 1999), not a single contribution addresses this question.

This article explores the associations between progress toward universal primary schooling in sub-Saharan Africa and the timing of the onset of fertility decline. We begin with a discussion and amplification of Caldwell's hypothesis. Our assessment of educational progress, which follows, is based on the most recent household survey data from each of the 23 sub-Saharan African countries that have participated in the Demographic and Health Survey program (see Table 1).¹

These countries experienced a range of colonial educational traditions, primarily British and French, but also including Portuguese, German, and Belgian. To our knowledge, this is the first time DHS data have been used to assess trends in children's schooling; elsewhere UNESCO gross enrollment ratios are commonly used despite their severe shortcomings to which we allude below. In the final section, we explore the cross-country relationships between levels of schooling attained and recent markers of the fertility transition.

Caldwell's hypothesis revisited

Classical demographic transition theory predicts that fertility decline will occur naturally in association with socioeconomic development. A transition from large families to smaller families will be accompanied by increased parental investments in children. Both sets of changes are associated with improved survival prospects, expanding opportunities for wage employment for parents, and rising rates of return to educational and health investments in children. Economists call this the quantity-quality transition. Some scholars of the demographic transition have given particular attention to the external factors that might trigger a fertility transition (conventionally defined as the point at which national fertility levels fall more than 10 percent below their historical high: e.g., Bongaarts and Watkins 1996), the timing of which is not predicted by the theory. Each of the mechanisms described by Caldwell for hypothesizing a causal link between the achievement of mass schooling and the onset of demographic transition implies the role of external agents acting in a variety of ways, including through the enforcement power of the state, the conditions on grants and loans imposed by external aid agencies, the content of textbooks, the choice and content of curriculum, and/or the teaching and use of language.

TABLE 1 Historical and demographic characteristics of selected countries of sub-Saharan Africa

Country	Colonized by	Date of independence	Population (millions) ^a	Percent residing in urban areas ^b			TFR ^c	Date of DHS survey
				1970	1980	1990		
				1975	1980	1990		
Benin	France	1960	5.3	16.7	27.3	34.5	6.3	1996
Botswana	Great Britain	1966	1.3	8.4	15.1	41.5	5.0	1988
Burkina Faso	France	1960	10.2	5.7	8.5	13.6	6.9	1992-93
Cameroon	Great Britain/France	1960	13.2	20.3	31.4	40.3	5.2	1998
Central African Rep.	France	1960	3.3	30.2	35.1	37.5	5.4	1994-95
Ghana	Great Britain	1957	17.4	29.0	31.2	33.9	4.5	1998-99
Ivory Coast	France	1960	14.1	27.4	34.8	40.4	5.7	1994
Kenya	Great Britain	1963	28.2	10.3	16.1	24.1	4.7	1998
Madagascar	France	1960	14.7	14.1	18.3	23.5	6.1	1997
Malawi	Great Britain	1964	11.1	6.0	9.1	11.8	6.7	1992
Mali	France	1960	10.7	14.3	18.5	23.8	7.0	1995-96
Mozambique	Portugal	1975	17.4	5.7	13.1	26.6	5.6	1997
Namibia	Germany/South Africa	1990	1.5	18.6	22.8	31.0	5.2	1992
Niger	France	1960	9.2	8.5	12.6	16.1	7.5	1998
Nigeria	Great Britain	1960	110.4	20.0	26.9	35.0	6.2	1990
Rwanda	Belgium	1962	5.3	3.2	4.7	5.0	6.5	1992
Senegal	France	1960	8.3	33.4	35.9	40.4	6.3	1992-93
South Africa	Great Britain	1910	41.4	47.8	48.1	48.8	2.9 ^d	1998
Tanzania	Germany/Great Britain	1961	29.6	6.7	14.8	20.8	5.9	1996
Togo	Germany/France	1960	4.1	13.1	22.9	28.5	5.4	1998
Uganda	Great Britain	1962	21.0	8.0	8.8	11.2	6.9	1995
Zambia	Great Britain	1964	8.2	30.2	39.8	42.0	6.1	1996-97
Zimbabwe	Great Britain	1980	11.2	16.9	22.3	28.4	4.5	1994

^aUnited Nations (1999).

^bUnited Nations (1998).

^cAuthors' calculations for women aged 15-49 based on individual DHS country surveys. Total fertility rate (TFR) is an average calculated for the five years before the country's DHS.

^dThe most recent fertility estimate for South Africa is from Medical Research Council (1999).

Caldwell (1980) listed five mechanisms through which the effective imposition of mass schooling by the state would change the family economy: (1) by reducing the time that children are able and/or willing to work on behalf of the family either in or outside the home; (2) by raising the costs of children, not only because of the many costs directly or indirectly associated with school attendance but also because of the additional resource demands placed on parents by children who have gained a new authority in the family; (3) by creating social norms about childhood as a stage of dependency; (4) by speeding up cultural change and creating new cultures; and (5) by propagating Western middle-class values within the less developed countries. He emphasized that the “most potent force for change is the breadth of education (the proportion of the community receiving some schooling) rather than the depth (the average duration of schooling among those who have attended school)” (Caldwell 1980: 249). Caldwell, citing Coale (1969), defined mass schooling as the point at which 90 percent of children of primary-school age attend school.

Mechanisms 1 and 2 are directly related to the economic changes that would ensue in a particular family if a child in that family, who would otherwise not have attended school, were to attend. Mechanisms 3, 4, and 5, however, appear potentially broader in their implications. Indeed, at the point where mass schooling has its effects in generating fertility decline, Caldwell posited that those effects would be universal, affecting all parents simultaneously, regardless of their educational level or the extent of their own children’s school attendance. Thus, although he saw the effects of mass schooling on parental reproductive behavior as working primarily through the cumulative changes in the economic situation of families who send their children to school, apparently he also expected that the arrival of mass schooling would raise the costs and reduce the benefits of large families even for those remaining families who choose not to send their children to school. Indeed, for clarity we might re-specify mechanisms 1 and 2 as pertaining directly to changes in the family economy and mechanisms 3, 4, and 5 as pertaining to some of the social externalities of schooling affecting society at large.

Caldwell’s hypothesis was based on a review of the experience of industrialized countries related to the onset of fertility decline and the timing of the arrival of mass schooling. He observed that the availability of schools and the adoption of compulsory schooling laws were clearly not sufficient by themselves. Rather, he identified the systematic *enforcement* of compulsory schooling laws as critical. Although recognizing that the beginning of the fertility decline in France antedates the enforcement of compulsory schooling laws, Caldwell linked the acceleration of the French fertility decline in the late nineteenth century to the achievement of effective compulsory schooling that took place during the same period. In discussing the

role of the state in the English fertility transition, Johansson (1991) also pointed to this key dimension of schooling. She identified the enforcement of compulsory schooling along with the raising of school-leaving ages as the most potent state policy in enforcing “altruistic parenting” (p. 400) and effecting fertility decline. Caldwell elaborates this argument in his recent analysis of delayed Western fertility decline in English-speaking countries (1999), in which he asserts that it was only with the enforcement of compulsory schooling laws and the spread of legislation protective of children that the costs of children rose to the point where the strong dictates against the use of contraception within the Victorian family could be overcome.

Caldwell’s hypothesis, particularly as it relates to mechanisms 1 and 2, which are directly linked to the economics of the family, is entirely consistent with Becker’s (1991) predictions of rapid fertility decline in response to rises in the price of children as parents trade off quality against quantity. Although Becker did not use the enforcement of compulsory schooling laws as an example of the rising costs of children, it could have been a particularly good one. With the enforcement of compulsory schooling laws, the price of each child rises and, at the same time, parents are no longer free to discriminate between children according to sex or birth order, at least during the basic years of schooling. This situation implies a shift in demand from quantity to quality, which leads to further increases in the price of children as parents incur the additional out-of-pocket expenses of sending their children to school and the opportunity costs of losing their children’s time for domestic work or in support of family enterprises. By identifying the ways in which power shifts from the older to the younger generation as parents increase their demand for quality, Caldwell put sociological flesh on the bare bones of economic theory by illustrating some of the processes through which the change from quantity to quality may occur. In particular, he emphasized the importance of mass schooling for both boys and girls, because only when girls are required to go to school to the same extent as boys will intergenerational relationships within the family be strongly affected through the equalization of treatment of boys and girls.

Caldwell’s hypothesis, particularly that part concerning mechanisms 3 and 4 which relate to the social externalities of schooling, is consistent in its implications with some of Watkins’s (1991) theorizing about the social forces underlying the demographic integration of Western Europe during the years 1870 to 1960. In her book, Watkins makes a compelling case for the decline in linguistic diversity, the rise in national markets, and the expansion of state power and control as key factors in the shift to greater national demographic homogeneity as fertility decline spread from just a few pockets within each country to encompass, ultimately, the whole of every European nation. Indeed, Watkins identifies schooling as the most important aspect of nation building, particularly because of the enforcement of a na-

tional language (or languages, in countries having more than one) as the medium of instruction in schools. She focuses primarily on the role of schools in bringing diverse regions of the state together through a common language. The imposition of a common curriculum, often taught by teachers from different parts of a country, might also be considered an important aspect of nation building. Watkins also confirms Caldwell's interpretation of the French case, dating the decline in the use of other languages and dialects in France to the reforms of Jules Ferry, Minister of Public Instruction under the Third Republic, which introduced free and compulsory primary schooling in the French tongue in 1875. Beyond this date, fertility decline accelerated in France as traditionally non-francophone areas of the country joined in the decline that had emerged earlier in francophone areas.

Thus, Watkins emphasizes the role of the state in promoting social interaction or diffusion through linguistic homogeneity and market integration as the main determinant of fertility decline. Caldwell, on the other hand, emphasizes the role of schools as socializing agents external to the family in changing norms about childrearing, both through their effects on the economics of individual families and through their more global effects on the national culture. These perspectives can be reconciled if changing norms about childrearing are, in fact, being diffused as a result of near-universal school attendance, greater linguistic homogeneity, and the growing role of the state in setting a uniform national curriculum. The role of schools in the development of common state languages in sub-Saharan Africa may be of particular salience to fertility decline because of the roughly 1,250 languages estimated to be in current use, only nine of which are spoken as a first or second language by as many as 10 million people each (World Bank 1988).

The fifth mechanism through which Caldwell hypothesized that mass schooling might operate in developing countries was through the importation of Western middle-class values, as presented by teachers trained with Western teaching materials and portrayed by textbooks either imported from the West or heavily influenced by Western pedagogy and images. Given the limits of technology during the time he was writing, Caldwell probably saw formal schooling as the primary vehicle through which such values could be spread. Today, with radio and television nearly universally accessible, new and powerful forces of globalization are at work that can reinforce the effects of mass schooling and possibly substitute for them. Bongaarts and Watkins's (1996) analysis of the pace of change in contemporary fertility transitions, primarily in Asia and Latin America, suggests that once fertility decline begins in a few countries within a region, it spreads to others, even to those where socioeconomic conditions are less favorable, suggesting a process of cross-border diffusion.

In our review of the empirical evidence, we found only three studies that have explored statistically the direct effects of children's schooling at

the community level on fertility or contraceptive use and only one that is specifically focused on a sub-Saharan African country. In each case, it was hypothesized that access to school at the community level served as a measure of the supply of schooling by the state or by a local administrative authority and therefore represented a factor exogenous to the family in affecting the economics of family building. Casterline (1985) used rural data from the 1980 World Fertility Survey for Egypt to test whether children's access to schools at the village level as well as the primary-school attendance ratio for girls and boys might affect parents' educational aspirations for their children and their own contraceptive use. He found that the desired number of years of schooling was negatively affected by distance to school, with parental educational aspirations for boys being more greatly affected by distance to secondary school while educational aspirations for girls were more greatly affected by distance to primary school. He found, too, that current contraceptive use was affected positively by the village primary-school attendance ratio for girls but negatively by the primary-school attendance ratio for boys. More recently, Guilkey and Jayne (1997), analyzing data from the 1989 Zimbabwe DHS, show that the number of educational opportunities in the community (the measurement of which was not defined) had a positive and statistically significant effect on contraceptive use. Most recently, Axinn and Barber (1999), using rich contemporary and retrospective data on 171 communities in Nepal, find that living near a school significantly increases a woman's chance of adopting a permanent contraceptive, even controlling for the proximity of a school during a woman's childhood—a variable with its own independent effect on contraceptive use.²

Interpretation of these studies is disadvantaged by the nature of their data. A theory about the onset of fertility decline cannot be tested by looking at cross-sectional correlations at a single point in time; comparisons across countries over time are required. Educational policy that affects the accessibility, price, and quality of schooling as well as the degree of enforcement of compulsory schooling operates at the level of the state. Indeed, if educational systems at the state level are the most salient in their implications for demographic change, then none of the extant empirical evidence reviewed can be used to prove or disprove the demographic importance of mass schooling (see Amin and Lloyd 1998 for an analogous point about gender systems). As Mason (1997) points out, the impact of changes in opportunity structures at the level of the state (she uses the example of women's opportunities as mediated by gender systems) can only be elucidated through the observation of successive cohorts. Furthermore, the experiences of one country over time must be set against the experiences of others in order to observe commonalities and differences.

In sub-Saharan Africa, where states are relatively weak and compulsory schooling laws (when on the books) are rarely enforced, cross-country

differences in educational trends reflect the differential role of external agents, such as the state, international donors, and Western pedagogy, as well as underlying economic and social forces—factors that cannot be easily disentangled. For this reason, our empirical assessment of Caldwell's hypothesis relies on description and deduction rather than on the estimation of multivariate models. By comparing the strength of the relationship between children's schooling and fertility among countries that have not yet achieved mass schooling levels with the strength of that relationship among countries that have achieved mass schooling levels, we can use statistical measures of the changing relationship as indirect evidence of a shift in attitudes and behaviors regarding fertility associated with the achievement of mass schooling. From this we seek to infer the role of external agencies in intensifying the schooling–fertility relationship.

Trends and patterns of formal schooling

Formal schooling as a Western import has been a presence in sub-Saharan Africa since colonial times and exhibited rapid spread in the early postindependence years as a result of substantial state investments. Between 1960 and 1980, new African governments outperformed most other world regions in the growth of educational expenditure and enrollment (Schultz 1987). Since Caldwell first elaborated his mass-schooling hypothesis in 1980, however, much has changed. The economic and political conditions of the 1980s led to a sharp curtailment of enrollment growth and, in some countries, even a cessation of the impressive education gains of the prior two decades. In 1990, various international initiatives, including the World Conference on Education for All, held in Thailand, and the ratification of the Convention on the Rights of the Child,³ led to a renewal, at least on paper, of national and international commitments to universal schooling. In the ensuing decade, however, many African economies continued to flounder while the international donor response was weak (Bennell and Furlong 1997). These disappointing trends are confirmed in the country assessments prepared for the World Education Forum, convened in Dakar in April 2000.

Before exploring the association between fertility trends and the provision of mass schooling, we first consider trends and patterns of education in the region using recent survey data from 22 sub-Saharan countries, including all the countries that are known to be leaders in educational investments.⁴ The indicator of educational progress chosen for this analysis is the proportion of 15–19-year-olds who have completed four or more years of schooling. There are several reasons why we feel that this indicator is more readily interpreted and compared across countries than two commonly used alternatives—UNESCO's gross primary-school enrollment ratio (e.g., Wils and Goujon 1998) and the proportion of 15–19-year-olds who have com-

pleted primary school (e.g., Filmer and Pritchett 1999).⁵ First, UNESCO's gross primary-school enrollment ratio, which is calculated as the number of children *of any age* enrolled at the primary-school level as reported by the Education Ministry⁶ divided by the number of children *of the appropriate age* as estimated by the United Nations on the basis of national data collected from households, is misleading. It does not provide a proper participation rate for school-age children and, because of changing patterns of school entry and grade repetition, it tends to exaggerate levels of school enrollment (see Table 2) and distort trends.⁷ Second, in a context in which ages of entry and rates of retention vary across countries, the measure of current enrollment suggested by Caldwell (1980) sometimes understates and other times overstates the proportion of any cohort that will ultimately complete some minimal level of basic schooling such as grade 4 (see Table 2). Third, our sample of countries contains enormous variation in the structure of school systems, with the duration of the primary-school cycle varying from as few as five years in Madagascar and Mozambique to as many as eight in Kenya and Malawi (UNESCO 1999)—making the proportion of 15–19-year-olds who have completed primary school a noncomparable indicator across countries. Furthermore, late ages of entry and grade repetition are common in these countries, increasing the probability that some 15–19-year-olds will still be attending primary school and, therefore, will not yet have had the opportunity to complete the primary cycle.⁸ Finally, in recent years UNICEF (1993) has singled out grade 4 completion as a meaningful educational indicator in international comparisons for the purpose of assessing progress toward education for all.

Using the educational distribution of the population by age from the most recently available DHS data for each of our sample countries, we estimate the percentage of 15–19-year-olds who have completed four or more years of schooling at five-year intervals starting with 1960. The percentage for 1960, for example, is estimated as identical with the percentage characterizing the current educational attainment of those who would have been aged 15–19 in 1960. For this calculation to be seen as an accurate estimate of the actual percentage of those who have completed four or more grades for each cohort, we must assume that no one in the sample was still enrolled in grades 1–4 at the time of their fifteenth birthday—a reasonable assumption given that even a child starting school at age ten should have had a chance to complete four years of schooling by age 15.

However, to the extent that systematic biases exist in age reporting and to the extent that survival rates differ significantly by educational attainment, estimates of trends will be biased. Because of differential survival rates by education, we expect older cohorts to appear more highly educated than they actually are, with the bias being greatest for the earliest estimates (those for 1960) and lessening for more recent years. Typical errors

TABLE 2 Alternative indicators of educational attainment in selected countries of sub-Saharan Africa

Country	Survey date(s)	Gross primary-school enrollment ratio ^a	Percent aged 7–14 currently enrolled in primary school ^b	Percent aged 15–19 who have completed 4+ years of primary school ^b
Benin	1996	78	44	36
Burkina Faso	1992–93	39	28	27
Cameroon	1998	96	70	75
Central African Rep.	1994–95	65 ^c	59	45
Ghana	1998–99	80	68	82
Ivory Coast	1994	68	49	51
Kenya	1998	85 ^d	88	91
Madagascar	1997	92 ^d	55	42
Malawi	1992	80	63	51
Mali	1995–96	44	28	23
Mozambique	1997	60 ^d	59	44
Namibia	1992	136	85	76
Niger	1998	29 ^d	24	26
Nigeria	1990	85	54	66
Rwanda	1992	70 ^c	57	63
Senegal	1992–93	71	33	40
South Africa	1993	115	95 ^e	95 ^e
Tanzania	1996	66	52	78
Togo	1998	119 ^d	71	59
Uganda	1995	74	72	65
Zambia	1996–97	89	65	80
Zimbabwe	1994	114 ^c	85	94

NOTE: See discussion in text.

^aUNESCO (1999).

^bAuthors' calculations from DHS household surveys, based on current survey year; not available for Botswana.

^c1990.

^d1995.

^eAuthors' calculations based on the 1993 South Africa Living Standards Survey.

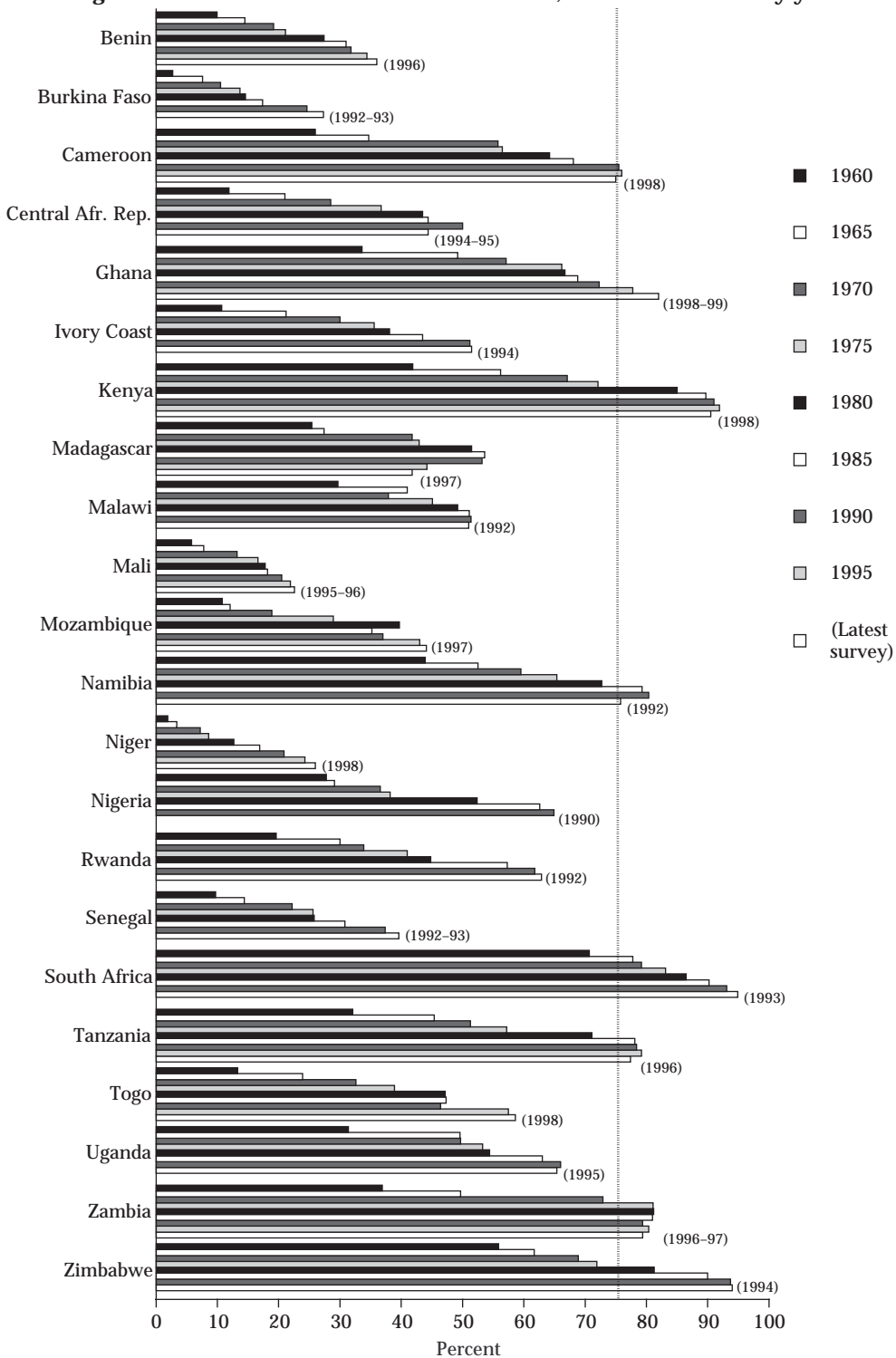
of age rounding are also likely to flatten trends. These biases, although not expected to affect country rankings in schooling levels seriously, will likely overestimate grade attainment in the earliest years of our comparison.

Caldwell defined the achievement of mass schooling as the point at which 90 percent of primary-school-aged children attend school. For these analyses, we use 75 percent of 15–19-year-olds who have completed four or more grades as the cutoff point for marking the achievement of mass schooling. Our designated threshold of 75 percent reflects the fact that we are focusing on a concrete level of grade attainment rather than simply on a measure of school participation.

Since the 1960s when our assessment of trends begins, all countries show clear increases in the percentage of children attaining at least grade 4, but the extent of those increases varies according to state spending patterns and educational strategies influenced considerably by former colonial experiences. Specifically, the levels of school attendance exhibited by the former French, Belgian, and Portuguese colonies are, in general, not as high as those achieved in the former British and German colonies represented here (see Figure 1). This pattern is congruent with British colonial education policies, which were more committed to some minimal education for all, particularly in areas of significant colonial settlement, whereas the French focused instead on educating a small elite (see Lloyd, Kaufman, and Hewett 1999 for discussion of the different colonial traditions). Outliers, nonetheless, exist within each of the major colonial traditions. Within the group of former British colonies represented here, Kenya has seen the percent completing grade 4 grow from 42 percent in 1960 to 91 percent by 1998, while Malawi, starting from a lower base in 1960 (30 percent), has experienced much more limited growth with the percent attaining grade 4 reaching only 51 in 1992. Variations exist as well in countries formerly colonized by the French, but the overall level is much lower and includes extremely poor educational performers such as Burkina Faso, Mali, and Niger—none of which has yet to achieve 30 percent of children completing grade 4. For example, the current percentage attaining grade 4 ranges from 23 percent in Mali to 75 percent in Cameroon (formerly British and French), while levels in 1960 ranged from 2 percent in Niger to 26 percent in Cameroon. In general, countries with an anglophone tradition have achieved higher levels of grade attainment than countries with other colonial traditions.

Nine of the 23 countries in this comparison have surpassed the 75 percent threshold that we define as the achievement of mass schooling, and, with the exception of Cameroon and Ghana, they are all countries from Southern or Eastern Africa.⁹ These nine are likely to be the only countries out of the 59 countries in sub-Saharan Africa to have achieved mass schooling. The first country in the region to attain mass schooling was South Africa by 1965, followed by Zambia by 1975, Kenya and Zimbabwe by 1980, Botswana (not shown), Namibia, and Tanzania by 1985, Cameroon by 1990, and Ghana by 1995. While progress remains steady but slow in West Africa, where attainment rates are much lower, progress in Eastern and Southern Africa has slowed or halted, with a number of countries even showing declines in grade attainment in the most recent period. Countries experiencing declines in the percentage of 15–19-year-olds attaining at least grade 4 in the 1990s include Cameroon, Central African Republic, Madagascar, Malawi, Namibia, Tanzania, Uganda, and Zambia. However, declines for Malawi, Uganda, and Zambia are relatively slight. Because of a general slowdown in the growth of grade attainment in the 1990s, only one country—Ghana—has achieved mass schooling according to this indicator during the 1990s.

FIGURE 1 Estimated percentage of children aged 15–19 who have completed 4+ years of schooling: Selected countries of sub-Saharan Africa, 1960 to latest survey year



SOURCE: Authors' calculations from DHS household surveys for all countries but South Africa. For South Africa, estimates are derived from the 1993 Living Standards Survey.

The historical growth in the percentage completing four years of education and the recent stagnation of this growth are considered here as background for an evaluation of how these overall trends and patterns differed by sex. Have these countries made gains in achieving gender equity in grades completed? To the extent that overall grade attainment has reached mass-schooling levels, have girls shared equally with boys in this achievement—an issue that is likely to be particularly important in considering the onset and pace of fertility decline? Have the recent stagnation, and in some cases declines, in school completion adversely affected girls? Overall levels of grade attainment can disguise substantial gender differences. As already mentioned, the full achievement of mass schooling should involve the participation of both boys and girls.

Table 3 presents trends in the percentage of children aged 15–19 who have completed grade 4, separately for boys and girls beginning with 1970.¹⁰ The estimates are grouped into one of three categories: (1) countries where girls and (in all but one case) boys have achieved mass schooling by the date of the most recent survey, (2) countries where the gender gap is narrowing but where girls have not yet achieved mass schooling levels, and (3) countries where the gender gap has been sustained over time.¹¹ Percentages are shown in boldface for each time period in which mass-schooling levels of 75 percent have been met or exceeded by either sex.

Seven of the eight countries that have achieved mass schooling for boys have also achieved mass schooling for girls, although in most cases girls have lagged behind boys in the timing of that achievement, usually by five to ten years. The exception to this is Cameroon, where boys achieved mass schooling in 1980 but girls as of 1998 had not yet achieved mass schooling. In all these countries, gender gaps continue to narrow and in some cases, such as Kenya, Tanzania, Zambia, and Zimbabwe, they have virtually been eliminated, while in a few—Madagascar, Namibia, Rwanda, and South Africa—they have been reversed, with girls' grade 4 completion rates now exceeding boys'. Namibia is an exceptional case because girls achieved mass schooling levels by 1980 while boys did not achieve those levels until a decade later.

In recent years, a more disturbing trend is developing in which continual narrowing in the gender gap is driven as much by declines in boys' grade attainment as by further increases for girls. In earlier years, the narrowing of the gender gap was primarily explained by more-rapid growth in girls' grade attainment relative to boys'. Boys' attainment rates have been declining since 1975 in Malawi and Zambia, since 1980 in Madagascar, Mozambique, and Togo (with some recovery in more recent years in Mozambique and Togo), since 1985 in Nigeria, Tanzania, and Zimbabwe, and since 1990 in Benin, Cameroon, Central African Republic, Kenya, Mali, Namibia, Senegal, and Uganda. Thus, over two-thirds of the countries for which we

TABLE 3 Trends in percentage of children aged 15–19 who have completed four or more years of schooling, by sex, in selected countries of sub-Saharan Africa, 1970–90 and latest survey date

Country and survey date(s)	1970		1975		1980		1985		1990		Latest survey date ^a	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Girls achieved ≥75%												
Ghana 1998–99	68	47	77	57	77	59	80	59	83	64	85	79
Kenya 1998	80	54	85	61	91	80	92	88	93	91	91	91
Namibia 1992	61	59	63	68	70	75	74	84	76	85	70	82
South Africa 1993	82	77	85	81	87	86	91	90	92	94	93	96
Tanzania 1996	67	37	74	43	82	61	83	74	82	76	78	77
Zambia 1996–97	87	60	90	72	91	74	87	75	85	75	81	78
Zimbabwe 1994	79	60	85	61	91	74	96	85	95	93	95	93
Countries narrowing gender gap												
Cameroon 1998	67	45	66	49	75	56	79	60	85	69	78	72
Madagascar 1997	44	39	48	39	55	48	54	53	52	55	41	43
Malawi 1992	56	22	67	26	64	35	64	40	60	44	55	46
Nigeria 1990	50	23	56	23	66	42	74	55	71	60	(b)	(b)
Rwanda 1992	46	23	51	32	50	41	59	56	61	63	61	65
Uganda 1995	66	31	66	41	69	42	75	53	75	59	70	61
Countries with sustained gender gap												
Benin 1996	30	10	36	11	42	16	45	21	46	21	46	25
Burkina Faso 1992–93	13	8	21	9	20	11	24	13	31	19	32	21
Central African Rep. 1994–95	46	13	55	20	58	31	58	32	64	38	55	35
Ivory Coast 1994	42	16	45	26	50	28	53	34	62	41	62	42
Mali 1995–96	18	8	22	13	25	13	25	14	30	14	29	17
Mozambique 1997	34	8	49	13	55	27	48	26	48	30	55	33
Niger 1998	10	5	13	5	18	9	25	12	30	16	36	18
Senegal 1992–93	32	15	34	20	33	22	41	23	47	29	45	34
Togo 1998	48	18	54	24	67	31	62	36	64	32	69	48

^aLatest survey dates are the years of the survey shown next to country name in the left-hand column.

^b1990 is the latest survey date.

SOURCE: Authors' calculations based on DHS household surveys for all countries but South Africa. For South Africa, estimates are derived from the 1993 Living Standards Survey. DHS household survey data on schooling are not available for Botswana.

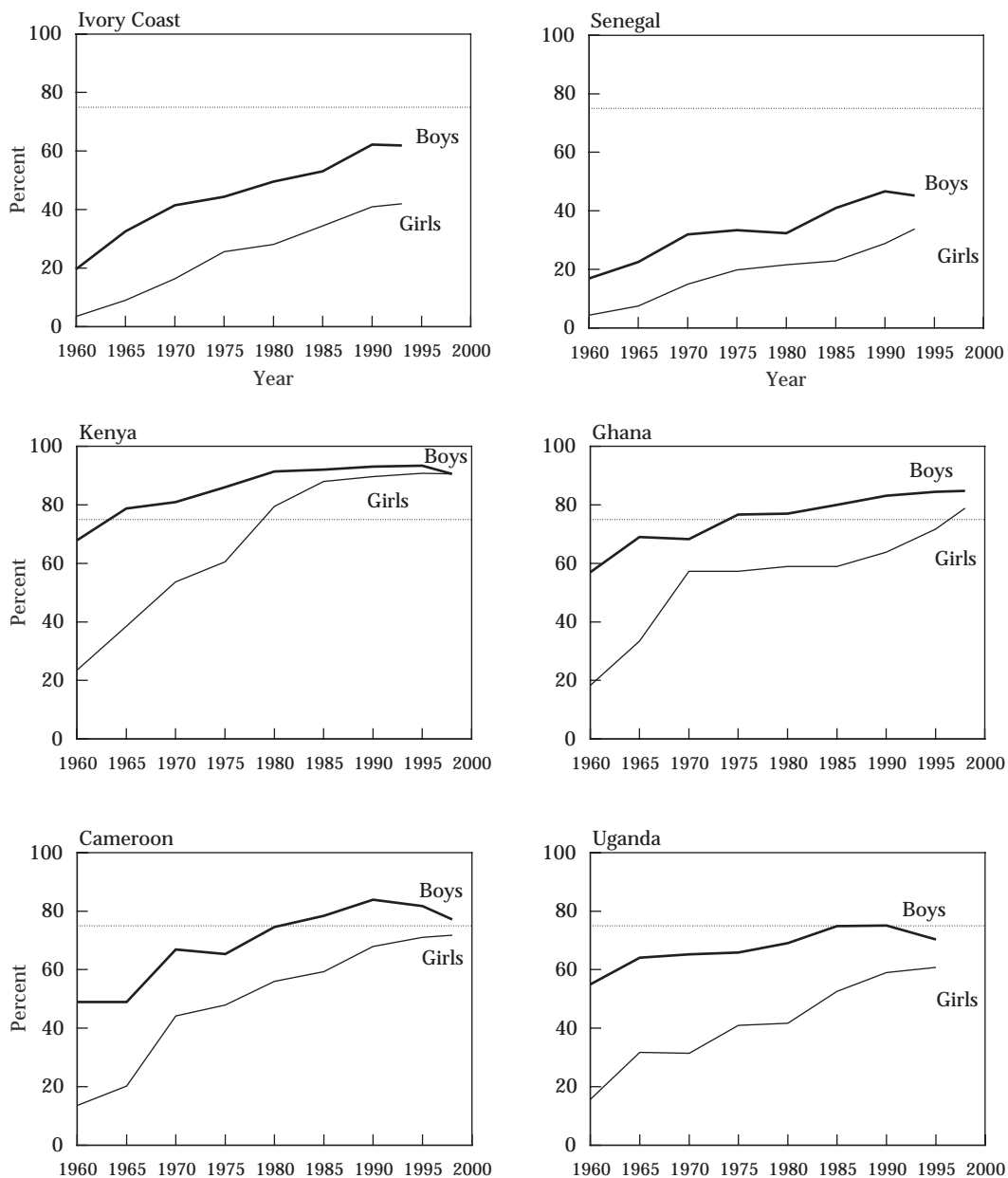
have data have experienced declines in boys' grade attainment.¹² It appears that declines in boys' enrollment have occurred primarily in those countries participating in World Bank-supported structural adjustment programs (Rose 1995).¹³ While all the factors underlying these trends are not known, we speculate that, when parents turn to their children for economic contributions to the family during economically difficult times, boys may be more able than girls to make such contributions in the context of persistent cultural constraints and differential treatment of girls.

Eight West African countries and Mozambique showed sustained gender gaps as well as relatively low levels of grade attainment even for boys. These countries have experienced no significant narrowing of the gender gap, with the possible exception of Central African Republic.

We choose six countries to illustrate patterns of educational differentials by sex: two countries that have achieved mass schooling for boys and girls (Ghana and Kenya), two countries with narrowing gender gaps (Cameroon and Uganda), and two countries with sustained gender gaps and lower overall levels of grade attainment (Ivory Coast and Senegal). In Ivory Coast and Senegal, a gender gap of 20 and 11 percentage points, respectively, has been sustained in the percentage with at least four years of schooling (see Figure 2), although in both countries grade 4 attainment stands at well below the 75 percent mark for both boys and girls. Interestingly, the gap is larger in Ivory Coast even though the country's overall attainment levels are higher and the proportion of its government expenditures for primary education is greater than in Senegal (for expanded discussion see Lloyd, Kaufman, and Hewett 1999). Recent observations indicate that, in both countries, girls continue a slow trend upward for this measure. In Ivory Coast, however, the measure for boys has reached a plateau, and in Senegal the percentage of 15–19-year-old boys completing at least four years of school has declined slightly to just over 45 percent.

In Eastern Africa, the gender gap has closed completely in Kenya with remarkable progress for both boys and girls. The percentage of 15–19-year-olds now completing four or more years of schooling stands at roughly 90 percent and appears to have reached a plateau at that level, with perhaps a slight decline for boys. Ghana has experienced improvement from a lower base, after some stagnation during the 1980s. The gender gap, which had narrowed considerably by the 1970s, has narrowed further in recent years and now stands at 6 percentage points. Progress in Cameroon appears very similar to that in Ghana up until the most recent period, when Cameroon experienced a substantial setback in grade 4 attainment for boys, leading to a sharp narrowing in the gender gap. While there has been a substantial increase in girls' grade attainment in Uganda, the attainment of boys has stagnated since 1985, and previous gains in the early 1980s were reversed in the early 1990s.

FIGURE 2 Estimated percentage of children aged 15–19 who have completed four or more years of schooling, by sex, selected countries of sub-Saharan Africa, 1960–98



SOURCE: See Table 3.

Disparities in educational patterns and trends across urban and rural sectors also reveal a government’s commitment or a country’s capacity to achieve primary schooling for all of its school-aged population.¹⁴ Although

the majority of the population in all countries under review still live in rural areas (as shown in Table 1), all countries have become more urban over time, and in six of them, Botswana, Cameroon, Ivory Coast, Senegal, South Africa, and Zambia, at least 40 percent of the population was living in urban areas by 1990. Trends in rural–urban educational attainment are illustrated in Table 4. Analogous to Table 3, this table provides estimates of the percent of children aged 15–19 who have completed four or more years of schooling by urban–rural residence for years spaced five years apart beginning with 1970 up to 1990 and for the most recent year for which data are available. Urban and rural estimates are based on residence at the time of the survey. To the extent that better-educated rural dwellers tend to migrate to urban areas over time, the estimates of grade attainment derived from the current distribution of grade attainment among household members in the DHS will increasingly understate educational levels for rural areas at successively earlier dates and, thus, increase the estimated gap between rural and urban areas.

In Table 4, countries are grouped into one of three categories: (1) countries where mass schooling appears to have been attained in both rural and urban areas, (2) countries in which the urban–rural gap is narrowing although the size of the gap in absolute terms is still large, and (3) countries where large gaps have been sustained over time. In no country has the gap between rural and urban areas been fully closed, although Kenya comes close to that state with a 2 percentage point gap between rural and urban areas. Moreover, the gains shown in narrowing urban–rural disparities do not appear to be as impressive as the gains in narrowing differences in education by sex. This result is all the more striking given the tendency for the urban–rural gap in earlier years to be overestimated. Only six countries—Botswana, Ghana, Kenya, South Africa, Tanzania, and Zimbabwe—have attained mass-schooling levels in both urban and rural areas. In three of these, the urban–rural gap has essentially been eliminated. While four additional countries have shown a narrowing of the gap between rural and urban areas, none has yet achieved mass schooling in rural areas. In more than half the countries in our sample, on the other hand, wide gaps in grade attainment have been sustained between urban and rural areas, and, given possible biases in our estimates of rural attainment rates in earlier years, may imply widening urban–rural gaps. In roughly half the countries we are also witnessing the beginning of a decline in urban grade attainment rates. These include Cameroon, Central African Republic, Ivory Coast, Kenya, Madagascar, Mozambique, Rwanda, Tanzania, Uganda, and Zambia and possibly Benin and Ghana. In most countries, however, a substantial gap between rural and urban schooling has been sustained for three decades, regardless of level of educational attainment.

In Figure 3, the same six countries as in Figure 2 are used to detail patterns in urban–rural differentials. For these six countries, rural grade 4

TABLE 4 Trends in percentage of children aged 15–19 who have completed four or more years of schooling, by urban–rural residence, in selected countries of sub-Saharan Africa, 1970–90 and latest survey date

Country and survey date(s)	1970		1975		1980		1985		1990		Latest survey date ^a	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
	Urban and rural achieved $\geq 75\%$											
Ghana 1998–99	72	50	82	58	83	58	85	60	82	66	88	79
Kenya 1998	89	62	87	68	92	83	96	87	95	89	92	90
South Africa 1993	89	64	91	72	92	79	94	87	95	92	97	93
Tanzania 1996	72	46	76	52	84	67	87	76	89	75	87	75
Zimbabwe 1994	89	58	89	62	94	72	96	87	97	92	97	93
Countries narrowing urban–rural gap												
Cameroon 1998	68	50	72	50	80	56	82	61	87	70	86	68
Nigeria 1990	64	27	68	29	80	42	86	54	86	58	(b)	(b)
Rwanda 1992	61	32	69	39	72	42	79	56	76	61	76	62
Uganda 1995	79	46	77	50	80	50	86	58	86	62	83	62
Countries with sustained urban–rural gap												
Benin 1996	36	10	40	10	45	16	51	18	49	20	50	25
Burkina Faso 1992–93	36	4	40	6	41	7	46	8	59	12	63	15
Central African Rep. 1994–95	39	21	56	26	63	30	63	29	69	33	65	24
Ivory Coast 1994	41	22	48	27	51	30	57	34	65	39	64	42
Madagascar 1997	60	33	65	34	76	43	74	46	71	46	66	32
Malawi 1992	72	34	74	39	75	44	76	46	76	47	77	47
Mali 1995–96	32	6	35	8	40	8	40	8	41	8	45	9
Mozambique 1997	38	13	52	23	67	29	72	24	70	27	66	34
Namibia 1992	76	47	79	55	84	64	89	73	92	75	93	69
Niger 1998	25	3	29	4	35	6	45	10	53	13	61	15
Senegal 1992–93	42	8	47	10	49	8	54	11	63	17	66	20
Togo 1998	57	21	61	28	67	37	70	34	67	33	74	49
Zambia 1996–97	85	63	94	71	93	72	95	69	93	69	92	69

^a Latest survey dates are the years of the survey shown next to country name in the left-hand column. ^b 1990 is the latest survey date.

SOURCE: Authors' calculations based on DHS household surveys for all countries but South Africa. For South Africa, estimates are derived from the 1993 Living Standards Survey, DHS household survey data on schooling are not available for Botswana.

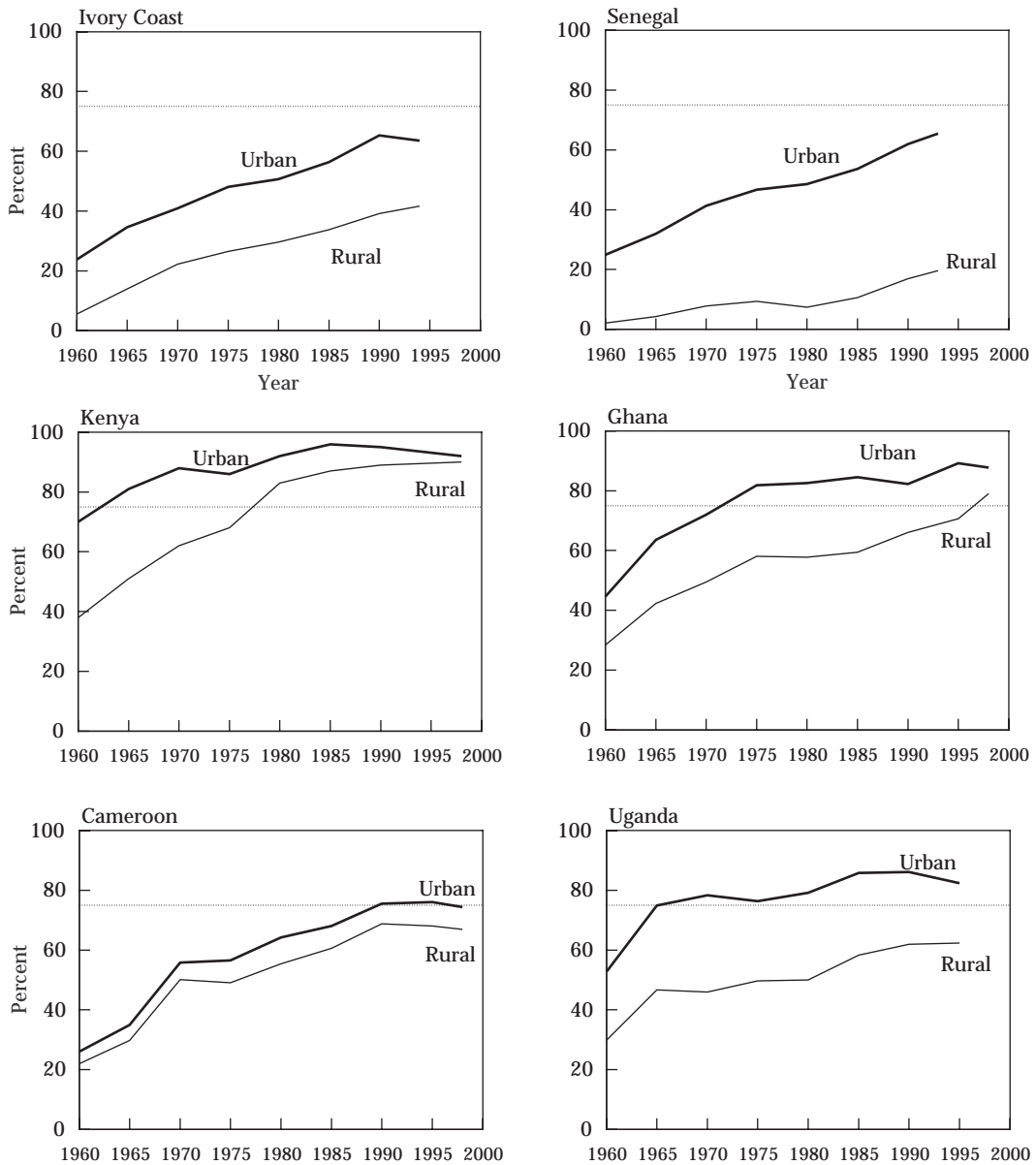
completion rates range from a low of 20 percent in Senegal to a high of 90 percent in Kenya, with the other four countries showing a range of 42 percent in Ivory Coast to 79 percent in Ghana. Trends in levels of 15–19-year-olds completing at least four years of schooling are strikingly dissimilar across the six countries. While all countries have shown some progress in increasing these levels for both urban and rural areas, in the case of Kenya the levels are approaching parity whereas in Senegal the absolute gap is widening. In Ivory Coast, a gap of 20 percentage points has been more or less sustained over time, while in Ghana a gap of 30 percentage points in 1970 had narrowed to 9 percentage points by 1998. Recent observations suggest a slight decline in urban areas in all countries except Senegal. The figure also shows that patterns are not necessarily a function of the overall level of education. The percentage of those completing four or more years of schooling, for example, is lower for Senegal than for Ivory Coast (see Figure 1). But while Ivory Coast has managed to sustain similar increases in education in both rural and urban areas, Senegal appears to have directed the bulk of educational resources to urban areas.

Even as we recall that improvements in grade attainment may be slightly underestimated given the possibility of overestimated grade attainment for earlier years, we feel confident in concluding that most countries in this review have made progress in expanding primary education for both boys and girls. However, at the same time that seven of the 23 countries reviewed here have achieved mass schooling for both boys and girls, there are still some francophone countries—including Benin, Burkina Faso, Mali, and Niger—where grade 4 attainment for girls has not yet surpassed 25 percent. Although gaps in education for boys and girls are narrowing, most countries are facing stagnating or declining levels of boys' educational achievement, even while girls continue to lag behind boys educationally. Furthermore, children in rural areas continue to lag substantially behind their urban counterparts in grade attainment despite substantial improvements in rural school accessibility (Filmer and Pritchett 1999). Most countries in sub-Saharan Africa are far from achieving mass schooling for their populations, and some have witnessed stagnation or erosion of the educational gains of earlier decades. We now pose the question: Is there a connection between the patterns and trends of education for children and fertility trends?

Implications of educational changes for fertility transitions

Although United Nations projections would imply that most countries in sub-Saharan Africa had begun a fertility transition by the late 1990s (United Nations 1999; for a discussion see Casterline 1999), firm evidence to support many of these projections is lacking. If we rely instead on fertility esti-

FIGURE 3 Estimated percentage of children aged 15–19 who have completed four or more years of schooling, urban–rural comparisons, selected countries of sub-Saharan Africa, 1960–98



SOURCE: See Table 4.

mates from censuses and surveys, particularly the recent Demographic and Health Surveys, fertility decline is apparently beginning to spread beyond the demographic leaders in Southern Africa and Kenya, but the spread is

by no means universal. In particular, evidence suggests the beginnings of a fertility transition in Botswana, Kenya, and Zimbabwe by the late 1980s and, in the case of South Africa, probably well before then (Cohen 1998; Kirk and Pillet 1998). Although another Southern African country—Namibia—is likely to have embarked on a fertility transition during the 1980s as well, data gathered at various points in time to track that transition are not available. Furthermore, there is now firm evidence from surveys conducted in the mid-to-late 1990s of moderate to larger fertility declines beginning in that decade for Cameroon, Ghana, Ivory Coast, Rwanda, and Senegal—the first countries in West Africa for which such evidence has been found (Cohen 1998; Kirk and Pillet 1998). In addition, Cohen (1998) presents evidence for small declines in total fertility rates for Malawi, Nigeria, Tanzania, and Zambia.¹⁵

If we assume that all countries in our sample were pretransitional in the early 1960s, we can develop reasonably comparable estimates of the percent decline in fertility from its pretransitional level by comparing the most recent TFR as estimated by DHS and the UN estimate of fertility for 1960–65 (see Table 5). If a fertility decline of 10 percent is used as a marker for the beginning of the transition (Bongaarts and Watkins 1996), this indicator would identify as still pretransitional ten of the 23 countries in this survey: Benin, Burkina Faso, Central African Republic, Madagascar, Malawi, Mali, Niger, Nigeria, Uganda, and Zambia. If we use, instead, current contraceptive prevalence as a marker (fewer than 10 percent of currently married women using contraception as pretransitional), we would include five of the previously named ten—Burkina Faso, Central African Republic, Mali, Niger, and Nigeria¹⁶—and also Mozambique and Senegal in the pretransitional category.

For the transition to diffuse widely throughout a population, fertility must begin to fall in rural areas. With the possible exception of South Africa, the majority of people in the countries of sub-Saharan Africa are rural dwellers. Furthermore, rates of urban growth vary greatly, from the striking cases of Botswana and Mozambique where there has been a near tripling in the case of Botswana and a doubling in the case of Mozambique in the proportion urban between 1980 and 1990, to the cases of Ghana and Rwanda where urban growth has been negligible during the same period. Levels and trends in urbanization matter greatly for the fertility transition; in some cases, such as Botswana and Mozambique, rapid trends in urbanization may be driving the transition.

Among the 23 countries considered in this article, eight had rural fertility rates lower than six children per woman: Botswana (5.4 in 1988), Cameroon (5.8 in 1998), Central African Republic (5.5 in 1995), Ghana (5.4 in 1998), Kenya (5.2 in 1998), Mozambique (5.8 in 1997), South Africa (3.9 in 1998), and Zimbabwe (5.1 in 1994) (see Table 6).¹⁷ Among the

TABLE 5 Percentage decline in total fertility rate from 1960–65 to latest survey, and percentage of married women aged 15–49 currently using contraception, by country and date of most recent survey, selected countries of sub-Saharan Africa

Country	Survey date(s)	Decline in TFR, 1960–65 to present (percent)	Currently using any contraception (percent)
Benin	1996	9	16
Botswana	1988	29	32
Burkina Faso	1992–93	1	8
Cameroon	1998	13	19
Central African Rep.	1994–95	5	9
Ghana	1998–99	34	22
Ivory Coast	1994	22	11
Kenya	1998	42	39
Madagascar	1997	6	19
Malawi	1992	4	13
Mali	1995–96	1	7
Mozambique	1997	12	6
Namibia	1992	13	29
Niger	1998	–1	8
Nigeria	1990	3	6
Rwanda	1992	16	21
Senegal	1992–93	11	7
South Africa	1998	55	56
Tanzania	1996	15	18
Togo	1998	18	14
Uganda	1995	0	15
Zambia	1996–97	8	26
Zimbabwe	1994	43	48

SOURCE: Authors' calculations using individual DHS country surveys for all countries; "present" total fertility rate is TFR calculated for the five-year time interval preceding the survey; 1960–65 TFR from United Nations (1999).

other countries, where some evidence suggests a fertility transition, direct evidence is available from at least two independent surveys of slight declines in rural fertility in Ivory Coast, Senegal, Tanzania, Uganda, and Zambia. Most of these same countries, however, show greater declines in urban than in rural fertility. All countries in the sample have urban TFRs below six children per woman, and 12 of the 23 have urban fertility rates below five children.

In order to explore more systematically the relationship between mass schooling and fertility change, we have regressed the percentage of 15–19-year-olds having completed four or more years of schooling on two indicators of the fertility transition presented in Table 5: (1) the percentage decline in total fertility from its pretransitional base (1960–65) and (2) the

TABLE 6 Trends in total fertility rates by urban-rural residence according to estimates from available DHS and WFS surveys in selected countries of sub-Saharan Africa^a

Country	Most recent DHS			Earlier DHS			WFS		
	Survey date	Urban	Rural	Survey date	Urban	Rural	Survey date	Urban	Rural
	Benin	1996	5.2	7.0	na	na	na	1981-82	6.2
Botswana	1988	3.9	5.4	na	na	na	na	na	na
Burkina Faso	1992-93	5.0	7.3	na	na	na	na	na	na
Cameroon	1998	3.9	5.8	1991	5.3	6.5	1978	6.0	6.5
Central African Rep.	1994-95	5.2	5.5	na	na	na	na	na	na
Ghana ^b	1998-99	3.0	5.4	1988	5.3	7.0	1979	5.8	6.8
Ivory Coast	1994	4.7	6.4	na	na	na	1980	6.6	7.7
Kenya ^c	1998	3.1	5.2	1988-89	4.9	7.1	1977	6.0	8.5
Madagascar	1997	4.2	6.7	1992	3.9	6.7	na	na	na
Malawi	1992	5.5	6.9	na	na	na	na	na	na
Mali	1995-96	5.7	7.6	1987	6.2	7.2	na	na	na
Mozambique	1997	5.1	5.8	na	na	na	na	na	na
Namibia	1992	3.9	6.1	na	na	na	na	na	na
Niger	1998	5.9	7.9	1992	6.6	7.4	na	na	na
Nigeria	1990	5.0	6.3	na	na	na	na	na	na
Rwanda	1992	4.7	6.6	na	na	na	1982	6.2	6.4
Senegal	1992-93	5.2	7.0	1986	5.6	7.3	na	na	na
South Africa	1998	2.3	3.9	na	na	na	1978	6.5	7.5
Tanzania	1996	4.3	6.3	1991-92	5.1	6.5	na	na	na
Togo	1998	3.3	6.5	na	na	na	na	na	na
Uganda	1995	5.2	7.2	1988-89	5.7	7.5	na	na	na
Zambia	1996-97	5.3	6.7	1992	5.6	7.1	na	na	na
Zimbabwe	1994	3.2	5.1	1988-89	4.2	6.5	na	na	na

DHS = Demographic and Health Survey. WFS = World Fertility Survey. na = not available.

^a 1-60 months before survey, except where otherwise indicated. ^b1993 data: 4.0 urban, 6.4 rural.

^c1993 data: 3.4 urban, 5.8 rural.

SOURCES: Most recent DHS: see Table 1. Earlier DHS: See Appendix. WFS: See WFS (1984).

percentage of all married women aged 15–49 currently practicing contraception. Both education and fertility indicators are measured as of the same survey date, keeping in mind that parental decisions about the schooling of children aged 15–19 at the date of the survey would have been made roughly ten years prior to the time at which fertility and use of contraception were measured. This time lag allows parental decisionmaking about family-building strategies to be influenced by overall societal levels of children's schooling.

Because Caldwell's hypothesis implies that the relationship between education and fertility decline will become much stronger once the mass-schooling threshold has been reached, we employ a Spline regression technique (Greene 1993). Spline regression allows us to estimate a piecewise linear function, such that the estimated slope of the regression line changes after a specified level of the independent variable has been reached.¹⁸ In this instance we specify grade 4 attainment by 75 percent of 15–19-year-olds as the point at which we expect the strength of the relationship to change.¹⁹

The Spline regression results for our sample of 23 sub-Saharan African countries are presented in Table 7. The estimated relationship between education and fertility change is clearly consistent with expectations. The size and significance levels of the estimated slope coefficients reveal a markedly stronger relationship between education and the fertility transition above the 75 percent threshold, relative to the coefficients before the threshold has been reached. This provides compelling evidence that education has a much greater impact on fertility change and use of contraception once the mass-schooling threshold has been met. For instance, focusing on the average effect of education on fertility change indicates that for every 10 percent increase in grade 4 attainment prior to levels of mass schooling, total fertility declines by about 1.1 percent. By contrast, after mass schooling has been achieved the same increase in grade 4 attainment leads to a 17

TABLE 7 Results of Spline regression analysis of fertility change and current contraceptive use as a function of grade 4 attainment, selected countries of sub-Saharan Africa

	β	SE(β)	t-value	p-value
Fertility change 1965 to present				
Education < threshold (75%)	-.11	.10	-1.08	.292
Education \geq threshold (75%)	-1.72	.27	-6.48	.000
Adjusted R ² = .77				
Currently using any contraception				
Education < threshold (75%)	.15	.08	1.95	.065
Education \geq threshold (75%)	1.53	.20	7.74	.000
Adjusted R ² = .84				

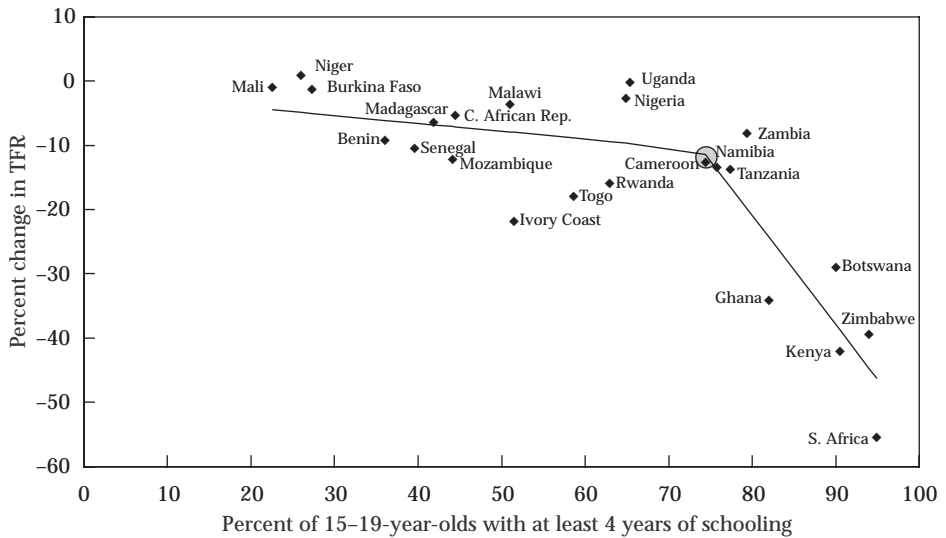
percent decline in fertility. These patterns are paralleled in the results for current use of contraception.

The overall fit of each of the Spline regression models is exceptionally good. The model estimation for fertility change has an adjusted R^2 of .77, while the model estimation for contraceptive practice has an adjusted R^2 of .84.²⁰ This indicates, respectively, that 77 percent and 84 percent of the variance in the dependent variables are explained by the cross-country variance in the percentage of 15–19-year-olds who have completed at least grade 4. The better fit of education and contraceptive practice could reflect the fact that the contraceptive measure has less measurement error, since the calculated percentage decline in the total fertility rate depends on the accuracy of estimates of fertility for two separate time periods. Furthermore, contraceptive prevalence is a more recent expression of deliberate fertility control, while the TFR reflects a five-year average that is sometimes subject to date shifting and timing and recall error.

Figures 4 and 5 present the estimated regression lines for the fertility and contraceptive practice regressions. The threshold or “knot” of the fertility regression line (the point in Figure 4 represented by the shaded circle at which grade 4 attainment reaches 75 percent) falls precisely at the point where fertility decline reaches 10 percent—a marker of the beginning of fertility transition. This is consistent with Caldwell’s general argument and the discussion throughout this analysis.

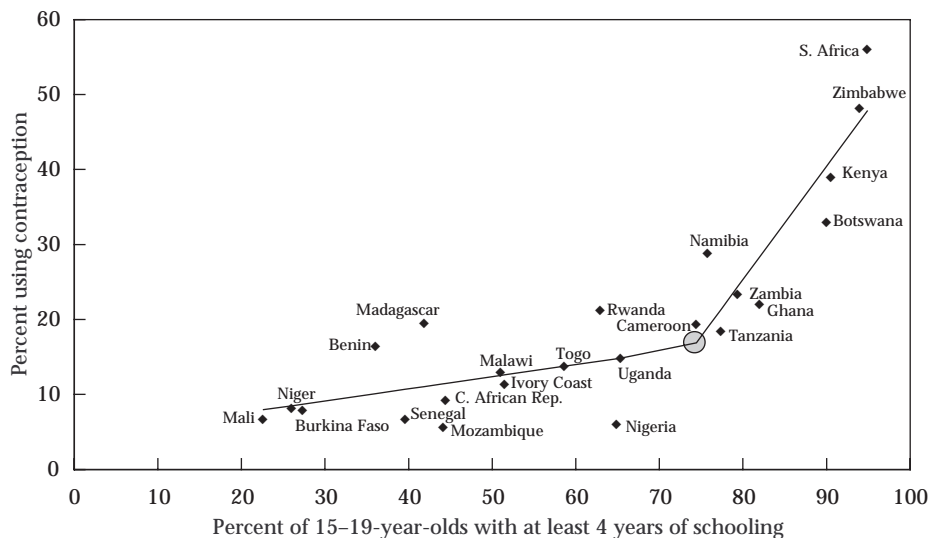
Although the expected relationship between educational attainment and the timing of the fertility transition is apparent from Figures 4 and 5, some deviations of the observed measures from the estimated regression line are worth noting. For example, in Figure 4, Ivory Coast, Mozambique, Rwanda, Togo, and possibly Senegal appear to have started a fertility transition despite the failure to attain mass schooling. The most extreme case in this group is Ivory Coast, which has apparently experienced a 22 percent decline in fertility despite only slightly more than 50 percent of 15–19-year-olds having attained a minimum of grade 4. On the other hand, Zambia does not appear to have started a fertility transition despite the achievement of mass schooling. Using 15 percent contraceptive practice as an alternative threshold for measuring the start of the fertility transition, it would appear from Figure 5 that Madagascar and Rwanda are the only countries that have started the fertility transition without attaining mass-schooling levels.²¹ On the other hand, all countries that have achieved mass schooling show evidence of deliberate family-building behavior. Given the likelihood that contraceptive practice is measured more accurately than fertility change, Figure 5 may be a better guide to possible outliers. Indeed, we note the possibility that inconsistencies between Figures 4 and 5 may be as likely to suggest inaccurate estimates of fertility decline as they are to suggest early fertility transitions in the absence of mass schooling.

FIGURE 4 Spline regression line showing fit of percentage change in the TFR from the pretransition level as a function of educational attainment, selected countries of sub-Saharan Africa



NOTE: Variables measured at the most recent survey date (see Table 5 and Figure 1).

FIGURE 5 Spline regression line showing fit of percentage of married women practicing contraception as a function of educational attainment, selected countries of sub-Saharan Africa



NOTE: Variables measured at the most recent survey date (see Table 5 and Figure 1).

Concluding comments

In most of sub-Saharan Africa, the promise embodied in early postindependence progress in education, namely that the next generation would be universally exposed to basic levels of formal schooling, has yet to be realized. Countries that have achieved mass-schooling levels—Botswana, Cameroon, Ghana, Kenya, Namibia, South Africa, Tanzania, Zambia, and Zimbabwe—are the exceptions rather than the rule, and most of these countries had achieved mass schooling by the early 1980s. In Nigeria and Uganda, roughly 65–70 percent of children have attained grade 4 or higher. The rest of Africa has even farther to go to achieve mass schooling, and in a few countries—Burkina Faso, Mali, and Niger—less than a quarter of girls and scarcely a third of boys have completed grade 4.

Since 1980, growth rates in grade attainment have slowed or halted; in some countries, these rates have even begun to decline in response to mounting economic difficulties. In countries at all levels of educational attainment, gender gaps are narrowing; in some, they have been largely eliminated and, in a few cases, reversed. In earlier years, this trend could be explained by relatively more rapid growth in educational attainment rates for girls than for boys. More recently, this trend has been accentuated by a cessation in growth rates for boys and, in a number of countries, a decline in these rates. In many cases, the narrowing of the gender gap is occurring at a point well below the achievement of mass schooling for either girls or boys.

Knodel and Jones (1996) have raised questions about the current international policy emphasis on closing the gender gap in schooling when much rapid progress has already been made on this front while the gap in education between rich and poor remains wide and neglected.²² The data presented here appear to confirm their conclusions, at least with respect to the gap between rural and urban educational attainment compared with the gap in education between boys and girls. An exploration of the interaction between gender and socioeconomic status or gender and urban–rural residence would be a useful next step in assessing the full import of Knodel and Jones’s argument. Moreover, not only do gender gaps in enrollment and attainment persist in the majority of sub-Saharan countries but also, when boys and girls attend school for the same number of years, their experiences are likely to be very different. Growing evidence in the education literature suggests that discriminatory attitudes and behaviors of teachers and fellow students toward girls can have long-term negative effects (for example, see Lloyd, Mensch, and Clark 2000). The narrowing of the gender gap in educational attainment or enrollment tells us little about the degree of gender equity within schools.

Our empirical results strongly support Caldwell’s original hypothesis about the link between the achievement of mass schooling and the onset of

the fertility transition. If we rely on contraceptive practice as a more accurate marker of that stage of the transition than perhaps imperfectly estimated fertility change, we find that all countries that have achieved mass schooling also show evidence of having entered the fertility transition. Only Madagascar and Rwanda appear to have begun the transition prior to the achievement of mass schooling.

In light of recent setbacks in the increase in educational participation rates at primary-school levels, the key question remaining is: What are the prospects for future fertility decline in a context of educational stagnation both for countries that have already begun the fertility transition and for those that have not? Once begun, are future fertility declines inevitable, even in the absence of further educational progress? Can we expect Africans to limit their fertility even if they see no prospect that their children will have a chance to complete primary school or, in some places, attend school at all? Will there be a “quantity” transition without a “quality” transition? Will the emergence of national languages and cultures through the influence of the mass media transform the role of education in fertility transitions as suggested by Watkins (1991)? To answer these questions, we can draw a few insights from past experience. A cautionary note is in order, however. Development in the past has been experienced as a steady and irreversible process; contemporary African experience has no historical analog, not just because of the economic reversals of the 1990s but also because of the escalating AIDS crisis in many parts of Eastern and Southern Africa.

Although relatively few sub-Saharan countries were included in Bongaarts and Watkins’s (1996) analysis of the timing and pace of the fertility transition in developing countries, they found that, for Asia, Latin America, and parts of Africa, the more recent the fertility transition, the lower the level of development at the time it began, a finding that supports a hypothesis of social interaction and diffusion across frontiers. Although the human development index (HDI) does not contain a measure of children’s schooling—it records only adult literacy—Bongaarts and Watkins also found that the lower the level of the HDI at the beginning of the transition, the less rapid the subsequent fall in fertility. This finding might imply that, although fertility transitions are likely to begin in Africa at lower levels of development than were necessary in the past, the pace of decline will be slower if mass schooling has not been achieved. This is because the mechanisms in place for social interaction and diffusion, including a common national language, will be more limited. Furthermore, high rates of population growth and the youthful age structure of the population are likely to make achievement of mass schooling in the presence of high fertility an even more daunting task than it might have been in the early days of independence, thus providing a likely further brake on the pace of the transition. Indeed, Casterline (1999), in a review of the pace of fertility decline, finds that recent declines are proceeding more slowly than earlier ones.

We conclude that formal schooling will remain an important mechanism of “demographic integration” (Watkins 1991: 45) in sub-Saharan Africa, even as other forms of mass communication spread. The enormous linguistic diversity still prevalent throughout Africa, with 1,250 languages currently in use across the continent, reinforces this view. The appearance of recent fertility change in a few countries that have yet to achieve mass schooling does suggest that, in the future, mass schooling may be tied more closely to the pace than to the onset of fertility decline. We predict, however, that in countries where mass schooling has yet to be attained or where recent setbacks have occurred, fertility declines will proceed much more slowly and demographic diversity will persist across regional and socioeconomic groups.

Appendix Earlier DHS publications providing data included in Table 6

Note: Order of entries below corresponds to sequence of countries listed under the column headed “Earlier DHS” in Table 6.

- Direction Nationale du Deuxième Recensement Général and Macro International Inc. 1992. *Enquête Démographique et de Santé Cameroun 1991*. Columbia, MD.
- Ghana Statistical Service and Institute for Resource Development/Macro Systems, Inc. 1989. *Ghana Demographic and Health Survey 1988*. Columbia, MD.
- National Council for Population and Development and Institute for Resource Development/Macro Systems, Inc. 1989. *Kenya Demographic and Health Survey 1989*. Columbia, MD.
- Centre National de Recherches sur l'Environnement [Madagascar] and Macro International Inc. 1994. *Enquête Nationale Démographique et Sanitaire 1992*. Calverton, MD.
- Centre d'Etudes et de Recherches and Institute for Resource Development/Westinghouse. 1989. *Enquête Démographique et de Santé au Mali 1987*. Columbia, MD.
- Direction de la Statistique et des Comptes Nationaux and Macro International Inc. 1993. *Enquête Démographique et de Santé Niger 1992*. Columbia, MD.
- Ministère de l'Economie et des Finances and Institute for Resource Development/Westinghouse. 1988. *Enquête Démographique et de Santé au Sénégal 1986*. Columbia, MD.
- Bureau of Statistics and Macro International Inc. 1993. *Tanzania Demographic and Health Survey 1991/1992*. Columbia, MD.
- Ministry of Health, Ministry of Planning and Economic Development, and Institute for Resource Development/Macro Systems Inc. 1989. *Uganda Demographic and Health Survey 1988/1989*. Columbia, MD.
- University of Zambia, Central Statistical Office and Macro International Inc. 1993. *Zambia Demographic and Health Survey 1992*. Columbia, MD.
- Central Statistical Office and Institute for Resource Development/Macro Systems, Inc. 1989. *Zimbabwe Demographic and Health Survey 1988*. Columbia, MD.

Notes

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knowledge the generous support of the Rockefeller Foundation under the project “Interrelationships Between Fertility and Child Investment: New Research Frontiers.”

1 While Senegal had its most recent Demographic and Health Survey in 1997, this survey did not include data on educational attainment as part of the household survey. Therefore, the most recent education data for Senegal come from the 1992–93 survey.

2 Axinn (1993) also explored the relationship between children's schooling and fertility in one village in Nepal. He found that whether parents sent their oldest child to school had a statistically significant positive effect on parents' ever use of contraception and a significant negative effect on their desire for more children. He found similar results for the proportion of children sent to school. Because the study was conducted in only one village, however, it cannot be viewed as a test of Caldwell's mass-schooling hypothesis. Furthermore, in light of the endogenous nature of fertility and schooling at the household level, problems are encountered in interpreting causality.

3 The Convention on the Rights of the Child became legally binding in September 1990 and committed its signatories (which included all sub-Saharan African countries except Somalia) to making primary education compulsory, available, and free to all (UNESCO 1999). Despite that fact, many of the individual country essays published in the 1994 issue of the *International Encyclopedia of Education* (Husén and Postlethwaite 1994) assert that schooling is not yet compulsory.

4 For all countries participating in the DHS 2 or DHS 3 survey programs, data on educational attainment of the adult population by age and sex are available from the household survey. For 21 of the 23 countries included in this analysis, the data are based on these household surveys. Because of South Africa's overall importance to the region, we added data for South Africa from a representative survey collected by the University of Cape Town and the World Bank in 1993—the South Africa Living Standards Survey. While South Africa participated in the DHS program, those data were not available in time for this analysis. In addition, for Botswana, data for women only are taken from the DHS survey of reproductive-aged women conducted in 1988. The 23 countries in our sample include a good representation of francophone and anglophone countries, all countries with some evidence of fertility decline, and a range of countries in

terms of phase of development and form of government.

5 The measure suggested by Coale (1969) and quoted by Caldwell (1980) was the proportion of school-aged children currently enrolled.

6 Some evidence suggests that enrollment as reported by school systems reflects opening-day numbers rather than enrollments in mid-year or year-end; the latter two measures would reflect school attendance more accurately (Behrman and Rosenzweig 1994).

7 A decline in UNESCO's gross primary-school enrollment ratio could reflect a decline in enrollment or, alternatively, could imply improvements in the efficiency of the system through reductions in grade repetition rates or a shift toward more appropriate ages at entry. Similarly, a rise in the ratio could imply a rise in enrollment rates or, alternatively, a deterioration in the efficiency of the system resulting from rising repetition rates or delayed ages of entry. More typically, trends probably reflect simultaneous changes in a variety of underlying factors, some of which may be favorable and some not so. While, in principle, the net primary-school enrollment ratio, which only includes children of primary-school age in the numerator of the ratio, might be a more reasonable alternative, it is not available for some countries in our sample (UNESCO 1999).

8 In a study of primary schooling in Kenya, Lloyd, Mensch, and Clark (2000) found that 54 percent of 17–18-year-olds still enrolled in school were attending primary school.

9 These nine include Botswana, which achieved mass schooling for girls by 1985 but is not included in Figure 1 because data are available only for girls.

10 While data are available from 1960, space considerations preclude gender comparisons for the full time period. Examples of grade completion by sex back to 1960 are provided for six countries in Figure 2.

11 Gender differences in this third group of countries range from 11 to 22 percentage points at the date of the most recent surveys.

12 Our data for Botswana come from the individual DHS questionnaire addressed to women of reproductive age only. Therefore data on boys' grade attainment are not available.

13 The only countries in our sample of sub-Saharan African countries that have not undergone structural adjustment programs are Botswana, Cameroon, and South Africa.

14 One serious problem with such a comparison is that definitions of “urban” vary by country. Most urbanites in sub-Saharan Africa live in settlements with fewer than half a million inhabitants, and a large minority live in very small settlements that are essentially rural centers. Furthermore, the extent of urban primacy, or the concentration of wealth and public resources in the largest agglomeration, is more pronounced in sub-Saharan Africa than in any other region of the world. Thus, the category “urban” may encompass a huge range of living conditions (Martin Brockerhoff, personal communication, 1999).

15 Moreover, Kirk and Pillet (1998) use birth histories from the most recent DHS to demonstrate evidence of fertility decline among younger women (aged 15–34) in Madagascar, Malawi, Tanzania, and Uganda.

16 The most recent national data for Nigeria are from 1990.

17 Cameroon and Central African Republic are known for high rates of childlessness and subfertility (Larsen 1994).

18 This is represented by the following regression equations:

$$\hat{Y} = \alpha_0 + \beta_0(X_0) \quad \text{if } X_0 < \text{threshold}$$

$$\hat{Y} = \alpha_1 + \beta_1(X_0) \quad \text{if } X_0 \geq \text{threshold}$$

19 We tested other potential thresholds to determine the appropriateness of the 75 percent marker, e.g., 65, 70, 80, and 85 percent. We found that the R^2 of the regression is maximized when the 75 percent threshold is designated.

20 The fit of the model, represented by the adjusted R^2 , is higher in the Spline regression than in either a simple linear model or a quadratic model. In modeling fertility change, the adjusted R^2 is .54 for the linear model and .65 for the quadratic model. In modeling current contraceptive use, the adjusted R^2 is .63 for the linear model and .80 for the quadratic model.

21 Data for Rwanda were collected prior to the recent ethnic massacre.

22 The existence of large gaps in educational attainment between rich and poor has recently been documented by Filmer and Pritchett (1999) using DHS data. These gaps are particularly striking in West and Central Africa.

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Does Female Disadvantage Mean Lower Access to Food?

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DEMOGRAPHERS OFTEN CLAIM that females' life chances are compromised by greater deprivation in food, but it remains unclear how gender affects food distribution. Conventional wisdom asserts that differences in mortality are frequently indicative of differential access to food. There is no doubt that excess female mortality means that women are disadvantaged. However, links between food allocation and mortality are weak at best. Furthermore, while there is plentiful evidence for gender bias in health and other forms of care, we show through an extensive literature review that evidence for gender bias in calorie adequacy is limited.

Although we highlight significant measurement issues in understanding calorie adequacy, our review did not find systematic bias against females either in childhood or in adulthood. Nevertheless, we found that pregnant and lactating women are clearly at a disadvantage relative to both men and other women. We suggest two possibilities for interpreting the lack of evidence for general bias against females in calorie intake. One is that females have lower access to calories than males, but that the available data do not show this to be the case. The other is that female disadvantage does not lie in low access to food energy, but in other aspects of daily life.

There is no necessary contradiction between women having low autonomy and having adequate calorie intake. Female autonomy has many dimensions, and restricted mobility or lack of access to economic opportunities does not necessarily correlate with lack of autonomy in the private sphere (see Mason 1986). We conclude from our review that women's disadvantage is manifest in realms other than calorie intake. If the relevant aspects of this disadvantage are better understood, then both research and

policy will be more focused to improve women's wellbeing. If, instead, greater female deprivation in access to food is uncritically assumed to exist across a variety of social settings, resources may be allocated away from those sectors where they are needed most.

Where food is part of female disadvantage, it appears to be a problem of quality (micronutrient intake) much more often than one of quantity (calorie intake). Pregnant and lactating women also have systematically lower calorie intake adequacy than both men and other women. There may be other groups of women in particular social settings (e.g., the very young, the very old, the widowed) who need targeted interventions, but the only finding that should be routinely taken into account in international and national policymaking pertains to female disadvantage associated with pregnancy and lactation. It should not be assumed that nutrition programs everywhere should target the energy needs of all females. To do so would decrease the efficiency of such interventions. Moreover, assuming that female disadvantage includes low access to food could decrease the efficacy of policies intended to raise female status.

Calorie adequacy and wellbeing

Social discrimination against women is widespread, especially in developing countries. Where excess female mortality is documented, it is often assumed that a major mechanism through which females are disadvantaged is access to food. Where excess female mortality does not exist, women are still often believed to consume less relative to need than men do. We evaluate the evidence for gender bias in calorie intake across the developing world because we are concerned about the impact of such bias on women's functioning even where it does not result in excess mortality. On the other hand, we question the conclusion that lower calorie intake is a routine part of female disadvantage in either circumstance.

We begin by asserting that excess female mortality can arise from discrimination in access to food, health, or care (or any combination of these). Assuming that all three mechanisms are operating can contribute to poorly targeted interventions if, in fact, discrimination operates more powerfully through one of these inputs than through others.

Our first step toward conceptual clarity is to delink health from death. While it seems intuitive that poor nutrition would lead directly to increased mortality, this is true only in cases of frank starvation (De Waal 1989). Although Mosley and Chen (1984) list nutrition as one of the proximate determinants of mortality, they recognize that nutritional deficiency usually works in synergy with illness to produce death. Other components of care determine whether undernutrition results in increased mortality. Put another way, malnutrition multiplies the number of child deaths caused by

infectious disease without malnutrition being the proximate cause of those deaths (see Pelletier 1998). Malnutrition has to be exceptionally severe to be a proximate cause of death, yet even mild malnutrition increases death rates attributable to infectious disease (Pelletier 1994).

This argument alone does nothing to assail the conventional wisdom that excess female mortality may reflect excess female undernutrition. At the country level, however, there is no link between female malnutrition and excess female mortality (Hill and Upchurch 1995). Even more compellingly, in communities where boys are more undernourished than girls, better access to health care for boys more than offsets their nutritional disadvantage. For instance, Basu (1989) has shown that even though boys in Delhi have higher malnutrition rates than girls, they have lower death rates. Pelletier (1998) reviews prospective nutritional studies that provide additional and powerful evidence for this point. He finds that the best data available (mostly from Bangladesh) do not link nutritional status with sex differentials in mortality.¹ When both boys and girls have compromised nutritional status, girls are more likely to die. This finding underlines the point that “the mortality consequences of the powerful synergism between malnutrition and morbidity can be mitigated by access to health care” (Pelletier 1998: 130). Pelletier’s cross-national evidence also makes clear that sex differentials in mortality (both those that favor males and those that favor females) cannot be explained by sex differentials in nutritional status. Thus the assumption that excess female mortality is primarily due to malnutrition in children (e.g., Caldwell, Reddy, and Caldwell 1988; Kishor 1998) is not borne out by either aggregate Indian data or cross-national evidence.

The analyses by Basu and Pelletier, which conclude that there is no direct causal link between undernutrition and death, argue for the importance of health care as a strong mitigating variable. In other words, nutrition does not directly determine mortality, but the effects of nutrition on mortality operate through access to health care. Although a review of the evidence on gender differentials in access to health care is beyond the scope of this article, the literature on this topic is extensive.² Differential access to health care potentially explains female disadvantage in multiple social settings, especially those with excess female mortality.

Female disadvantage does not necessarily include lower access to food. Studies that separate the fundamental aspects of nutritional wellbeing into food, health care, and other forms of care (such as clothing provision and protection from accidents) have found far less evidence for discriminatory allocation in food than for discriminatory allocation in health and care (Basu 1989; Drèze and Sen 1989; Gopalan 1987; Kurz and Johnson-Welch 1997; Pelletier 1998). While nutritional wellbeing is certainly influenced by food intake, female disadvantage in nutritional wellbeing has not been linked to deficient calorie consumption. Food intake data from India’s National Nu-

trition Monitoring Bureau show that where calorie intake does not differ by gender, protein-energy malnutrition is still more prevalent among girls (Rao 1987a). Furthermore, in areas where Indian girls are advantaged in intake, they still exhibit more evidence of growth retardation (Gopalan 1987). Therefore, both Rao and Gopalan conclude that differences in nutritional wellbeing between boys and girls result from differences in medical care, not in food intake.

Kurz and Johnson-Welch (1997) compile evidence on gender disparities that carefully separates the different dimensions of gender bias. Their literature review delineates mortality, morbidity, health care use, nutritional status, food and feeding practices, and psychosocial development. Sample size is small for many of these dimensions because studies on these topics do not commonly disaggregate by gender. Female disadvantage is more pronounced in health care use, however, than in nutritional status or food and feeding practices.³ Although these findings support our position that health care matters more than food intake for female disadvantage, the paucity of gender-disaggregated data makes it difficult to provide further conceptual clarity on this subject. While food, health, and care are conceptually distinct components of wellbeing in the hunger literature (e.g., Drèze and Sen 1989), they are often conceptualized in the demographic literature as colinear determinants of mortality.

Whether females are disadvantaged in access to food or in access to health care has little bearing on their overall wellbeing. Similarly, because disease and undernutrition create complications that reinforce each other, it matters little which is the proximate cause of death. Nevertheless, the distinctions we draw are not solely academic, for they help identify which aspects of disadvantage are the most acute and can be best addressed by policy.

We further focus our review on calorie intake, which is only one measure of food adequacy. At one time nutritionists assumed that if calorie intake was adequate, other measures of dietary quality would be adequate as well. Now public health nutritionists and policy planners have renewed concern that calorie-adequate diets may be deficient in micronutrients and/or protein, and therefore caloric adequacy does not necessarily confer dietary adequacy (Messer 1997). We choose to separate these concepts because targeting interventions appropriately requires an understanding of the components of the problem. Therefore, when we find in the data that females generally receive a greater proportion of their calorie needs than males, we show that male diets may nevertheless be superior by other measures such as micronutrient adequacy.

Scope and limitations

We assemble evidence on aggregate differences (and lack thereof) in calorie intake adequacy between males and females. The best measure of calo-

rie adequacy is calorie intake relative to need. Unfortunately, intake is not routinely measured and there is debate among nutritionists regarding need at various points in the lifecycle. We define adequacy by intake relative to international standards of need and then interpret the patterns emerging from the data with attention to the possible weaknesses of these standards. We take note of studies that provide data for national and subnational samples. We evaluate calorie-adequacy differentials by gender in both childhood and adulthood. Among adults, we also compare the calorie adequacy of pregnant and lactating women relative to other women and to men wherever possible.

Because few intake studies disaggregate by gender among young children, our primary indicator of food intake for this age group is gender differentials in children's growth. While anthropometric measurements are clearly influenced by food intake, they should not be interpreted as simple proxies for intake. All of the common measures—weight for age (underweight), height for age (stunting), and weight for height (wasting)—are heavily influenced by incidence of disease, health care, and other forms of care. We consider them because they are the only available measures for children in most populations. We also review the evidence from intake studies that do disaggregate by gender among children. For adults, the bulk of our evidence is from intake studies, but we supplement them with evidence from anthropometry and clinical studies of micronutrient deficiencies.

We address the question of whether females are routinely disadvantaged. A solid body of work takes up the question of why women are more disadvantaged in access to food in some social settings than in others (e.g., Bardhan 1988; Behrman 1998; Haddad and Reardon 1993; Harriss 1999; Svedberg 1990). For instance, differences in access may be related to socioeconomic status. While some writers have demonstrated that under conditions of poverty the least-valued family members (e.g., females) did not get enough to eat (Levinson 1974; Rosenzweig and Schultz 1982; Sathar 1987; Sen and Sengupta 1983), considerable evidence exists that well-off households are more likely to discriminate in the allocation of resources (Bairagi 1986; Bhuiya, Zimicki, and D'Souza 1986; Das Gupta 1987; Miller 1981). Whether or not this discrimination extends to food is a question that must be addressed elsewhere. Similarly, distribution of food by gender may differ between routine conditions and crisis conditions, and Sen's seminal work (1981) has generated a vast body of literature on this topic. (For an excellent review of other determinants of intrahousehold food allocation bias such as age, birth order, wantedness of children, and relationship to household head, see Haddad et al. 1996.)

Considerable work examines the gender dimensions of feeding practices. Harriss (1999) describes numerous ways in which feeding order, food quality, hierarchy of utensils, and other practices surrounding the distribution of food reflect low female status in a society.⁴ She emphasizes, how-

ever, the distinction between concluding that women are treated differently and asserting that their diets are differentially inadequate (see also De Waal 1989). Males receiving foods of higher social quality may not experience an advantage with respect to nutritional quality (Chen, Huq, and D'Souza 1981). Therefore, it is not surprising that there is more evidence of differential feeding practices than of differential nutritional outcomes (Kurz and Prather 1995).

Previous reviews of the literature

The issue of gender bias in access to food has often been conceptualized and reviewed as one dimension of inequality in intrahousehold resource allocation. The literature has evaluated the hypothesis that the least-valued family members will receive inequitable shares of common resources. This question has been addressed repeatedly by reviewers concerned with absolute deprivation in access to food (Behrman 1998; den Hartog 1973; Haaga and Mason 1987; Haddad et al. 1996; Lipton 1983; Pinstруп-Andersen and Garcia 1983; Piwoz and Viteri 1985; Van Esterik 1984). Their work derives from a food policy and nutrition perspective concerned with identifying the most vulnerable groups. Our concern with female disadvantage and whether food deprivation is a component of that disadvantage focuses on relative rather than absolute deprivation. We assemble available evidence on gender differentials in access to food, regardless of whether males, or females, or neither, or both, consume adequate diets.

Previous reviews of intrahousehold food allocation have commonly tested whether children are more vulnerable than adults. The concern for children as a vulnerable group may be one of the reasons why data on nutritional status infrequently disaggregate by gender among children. The extensive reviews of intrahousehold food allocation often present better evidence on age bias than gender bias, but the claim that women as well as children are especially vulnerable is still common. It is worth noting, however, that Lipton's (1983) seminal study on the "ultra poor" recognized that evidence for gender bias in food allocation is patchy and includes evidence for male as well as female advantage. He reports that bias against females is likely only among children under age five, and is found only in northern India and Bangladesh. Walker and Ryan (1990) came to the same conclusion in their later work.

Harriss's (1999) meticulous review of the evidence from South Asia also concludes that there is no consistent gender bias in food allocation. From the studies that link excess female mortality with access to food, we would expect to find the most pronounced pattern of female disadvantage with respect to food intake in South Asia. But Harriss concludes that the data "defy generalization." She finds stronger evidence of antifemale bias in north India,

but then only among the very young and the very old, and concludes that there is no “pan-Indian” problem of gender bias in food allocation.

Gender differences in the allocation of food to children

Cross-country comparisons of anthropometric data on children

Cross-country comparisons on the extent of gender differentials in child nutrition are limited by the availability of nationally representative data that report child malnutrition separately for boys and girls. The World Health Organization’s global database does not provide statistics on malnutrition disaggregated by gender for many of the countries that it covers. UNICEF has assembled anthropometric data by sex on children in 39 developing countries (Carlson and Wardlaw 1990; United Nations Children’s Fund 1993). Comparable nutrition data from Demographic and Health Surveys (DHS) have been analyzed for 19 developing countries from DHS I, 18 from DHS II, and four from DHS III (Sommerfelt and Arnold 1998). Svedberg (1991) has also assembled earlier data (1961–83) for 15 African countries.

The UNICEF findings seem to defy conventional wisdom regarding female disadvantage in access to food. The cross-country comparisons found that prevalence of underweight was roughly equal between the two sexes, while boys were more likely to be either stunted or wasted. While a few countries in Latin America and the Caribbean displayed the expected male advantage in nutrition in the anthropometric data, it was countered by female advantage in other countries in the region. It is noteworthy that none of the six Asian countries included in this dataset⁵ showed a pattern of male advantage. Nor did DHS data reveal a pattern of male advantage. In fact, none of the DHS countries showed higher prevalence of female undernutrition as measured by underweight, wasting, or stunting. Svedberg (1991) also concluded that his African data were not consistent with a pattern in which females receive less than their share of household food supplies. In his review of USAID data on children under age five from four countries, the proportions underweight, stunted, or wasted appeared to be slightly higher for boys than for girls. Svedberg also compiled data on body weights and heights of preschool children, schoolchildren, and adolescents by age and gender. Although both boys and girls were undernourished, girls came closer to international standards.

Other sources of anthropometric data on children

The findings from our review of 26 nutritional studies that report anthropometric information on children by gender show mixed results (see Table 1).⁶

TABLE 1 Findings of anthropometric studies of children by gender

Region and study	Area of study	Findings	Gender differences favor:		
			Boys	Girls	Neither
Latin America and the Caribbean					
Wray and Aguirre 1969	Candelaria, Colombia	No gender differences in protein-calorie malnutrition			✓
Ballweg 1972	Haiti	Underweight data: more girls in first-degree and third-degree malnutrition; more boys in second-degree malnutrition ^a			✓
Perez 1956 cited in Schofield 1975	Mexico	Growth retardation worse in males	✓		
Beghin 1965 cited in Schofield 1975	Haiti	No gender differences in underweight			✓
Standard et al. 1969 cited in Schofield 1975	Jamaica	More growth faltering among boys	✓		
Rawson and Valverde 1976	Rural Costa Rica	No gender differences in underweight			✓
Powell and Grantham-McGregor 1985	Urban Jamaica	Male advantage in underweight and wasting; no gender differences in stunting	✓		
Melville et al. 1988	Jamaica	No gender differences in underweight			✓
Graham 1997	Rural Peru	No gender differences in stunting or underweight			✓
Backstrand 1997	Rural Mexico	No gender differences			✓
CFNI/PAHO 1997	Guyana	No consistent gender differences; results sensitive to nutrition measure used			✓
Asia					
Grewal, Gopaldas, and Gadre 1973	Madhya Pradesh, India (12 villages)	No gender differences ^b			✓
Levinson 1974	Morinda, India (1 village)	More girls underweight	✓		
Yousif 1967 cited in Schofield 1975	Lebanon	More girls than boys underweight among 6–12-year-olds	✓		
National Nutrition Monitoring Bureau, various years	India ^c	More boys underweight		✓	

Chen, Huq, and D'Souza 1981	Rural Bangladesh (6 villages)	More girls underweight and stunted	✓
Kielmann et al. 1983	Narangwal, India (1 village)	Girls more likely to be stunted, wasted, and underweight from 0–2 years, but not at other ages	✓
Sen and Sengupta 1983	West Bengal, India (2 villages)	More girls underweight	✓
Abdullah and Wheeler 1985	Rural Bangladesh (1 village)	No gender differences in underweight	✓
Arnold 1991 cited in Pieris and Caldwell 1997	Sri Lanka	More stunting and underweight among girls in the 24–36-month age range; no gender differences among 3–36-month-olds as a whole	✓
Kynch 1994 cited in Jackson and Pearson 1998	Palampur, India	Girls more likely to be wasted and stunted	✓
Pal 1999	Rural West Bengal (6 villages)	More girls underweight	✓
Africa			
Kreysler and Schlage 1969 and Korte 1969 cited in Lipton 1983	Kenya and Tanzania	Protein–energy malnutrition more prevalent among boys; comparable growth curves for boys and girls	✓
Alderman 1990	Ghana	No gender differences on any of the indicators used	✓
Haddad 1991	Ghana	No gender differences on any of the indicators used	✓
Hardenbergh 1997	Madagascar	Significant differences favoring girls on some measures and at some ages	✓

^aThe Gomez scale assigns children weighing 75–89% of median weight for age from an applicable growth chart to 1st degree malnutrition; 60–75% of the reference median is 2nd degree malnutrition, and less than 60% is 3rd degree.

^bAuthors classified nutritional status into four categories based on a combination of weight-for-age and mean number of clinical signs of undernutrition. Our chi-square test for a relationship between gender and nutrition using their data was not statistically significant.

^cNNMB anthropometric data covered nine states, including all southern states and some northern states.

The cross-country studies cited above also included some findings of male advantage and some of female advantage, but girls' nutritional status was generally higher. However, when we turn to the studies shown in the table, which include national, subnational, and microlevel samples, boys are more often at an advantage when gender differences are found. The most common finding was of no gender differences in anthropometric data (12 studies). Among the studies that showed a gender bias, boys were favored in nine studies while girls were favored in five. Studies showing differences between boys and girls that were not statistically significant are reported in the table as showing no gender differences. Even among results of the latter type, both male and female advantage were sometimes present. The geographic pattern of this mixed evidence is discussed below.

This sample of available studies exhibits a clear pattern of male advantage reflected in anthropometric data on children in South Asia. Only one study outside this region shows male advantage, and then only for some indicators. This pattern will come as little surprise to most readers, given the existence of pervasive discrimination against females in South Asia. However, three of the anthropometric studies that confirm male advantage do not do so for all ages covered by the data. Furthermore, it is important to consider that the evidence for gender bias is primarily from village studies. Social conditions that help confer male advantage in growth may not pertain across larger geographical areas.

Data covering nine states from India's National Nutrition Monitoring Bureau show no evidence of gender bias. The female advantage reported in the table above is based on the use of a local standard. Millman and DeRose (1998b) have shown that although there is a 14.5 percentage point difference between the populations underweight among Indian boys and girls according to the Hyderabad standard, this female advantage shrinks to 1.9 percentage points using international standards. Although the aggregate data show no male advantage, using macrolevel data may mask severe female disadvantage in certain socioeconomic and cultural settings. However, even India's northern states, with mortality differentials favoring males, do not show bias against females in state-level anthropometric indicators. Gender bias is more likely to emerge in geographically restricted studies (like many of those in Table 1) than in nationally representative samples. This suggests that male advantage is probably a more localized and context-specific problem than much demographic literature would lead us to believe.

Other evidence of gender differentials in child food intake

We also looked at studies of gender differentials in child nutrition that measured either food intake or clinical nutritional deficiencies. Intake studies

that disaggregate by gender for children are relatively rare. In addition to children being considered vulnerable regardless of gender, there are also methodological obstacles that explain this fact. Intake data are difficult to collect regardless of age (e.g., weighing and measuring food is obtrusive, plate waste has to be subtracted from individuals' shares, recall is unreliable), but there are also issues unique to documenting children's food consumption. Measuring breastmilk accurately is notoriously difficult, and small children must be followed throughout the day to account for between-meals consumption.

Differences in breastfeeding practices (initiation, supplementation, duration) may reflect the relative social value of boys and girls, but interpreting these differences is problematic. For instance, if girls are breastfed longer than boys, is it because parents recognize the value of breastmilk and allocate it preferentially to girls or because breastmilk has no monetary cost and is therefore undervalued? Similarly, if male infants receive supplemental food at two months of age (too early according to WHO recommendations), is it because women favor girls by exclusively breastfeeding them for six months or because they value boys more and give them socially preferred foods at earlier ages? Furthermore, not considering differences in breastfeeding practices is consistent with not reviewing other evidence based on feeding practices (e.g., eating order) on the grounds that feeding practices may or may not confer differences in nutritional status. We are addressing the calorie intake adequacy of diets rather than the intake of particular foods.

In these child intake studies, the most common result is the same as it is in anthropometric studies: no gender differences are found (see Table 2). However, where gender bias was uncovered, it more commonly favored boys. The evidence of male advantage comes solely from South Asia and is less pronounced for intake than for anthropometric measures. This differential is consistent with boys' greater access to health care in South Asia, since anthropometric characteristics are influenced by health care along with food intake. The intake studies support the hypothesis of male advantage in calorie adequacy in South Asia (5 out of 11 show male advantage). Nevertheless, these studies predominantly showed male advantage only in particular age groups of children even though they all covered multiple age groups. Only Valenzuela, Florencio, and Gutherie (1979) found male advantage at all ages.⁷ Chen, Huq, and D'Souza (1981) and Abdullah and Wheeler (1985) found that boys under age five in rural Bangladesh had more adequate caloric intake than girls, but neither found male advantage among 5–14-year-olds. Brown et al. (1982) also found a male advantage among the 5–30-month-olds they studied in the rural Matlab area.⁸ In rural Nepal, Gittelsohn, Thapa, and Landman (1997) found a significant male advantage in calorie intake among 3–6-year-olds and 10–14-year-olds, with

TABLE 2 Findings of studies of children's food intake by gender

Region and study	Area of study	Findings	Gender differences favor:		
			Boys	Girls	Neither
Latin America and the Caribbean					
Backstrand et al. 1997	Rural Mexico	No gender differences in calorie adequacy			✓
Kennedy 1983	Mexico City	No gender differences in calorie intake among preschool children			✓
Graham 1997	Rural Peru	No gender differences in calorie adequacy			✓
Asia					
Bailey and Whiteman 1963	New Guinea highlands	No gender differences in calorie adequacy			✓
Valenzuela, Florencio, and Guthrie 1979	Philippines	Male advantage in calorie adequacy	✓		
Florencio and Aligaen 1980	Urban Philippines	No gender differences in calorie adequacy			✓
Chen, Huq, and D'Souza 1981	Rural Bangladesh	Male advantage in calorie adequacy among 0-4-year-olds	✓		
Brown et al. 1982	Rural Bangladesh	Male advantage in calorie adequacy among 18-30-month-olds	✓		
Abdullah and Wheeler 1985	Rural Bangladesh	Male advantage in calorie adequacy among 0-4-year-olds	✓		
Basu et al. 1986	India, West Bengal (hill areas)	No gender differences in calorie adequacy overall; some male and some female advantage among subgroups analyzed			✓
Chaudhury 1987	Rural Bangladesh	Female advantage in calorie adequacy among 0-4-year-olds		✓	
Brahmam, Sastry, and Rao 1988	India	No gender differences in calorie adequacy			✓
Malik and Malik 1992	Pakistan	No gender differences in calorie adequacy			✓
Gittelsohn, Thapa, and Landman 1997	Rural Nepal	Male advantage in calorie adequacy among 3-6-year-olds and 10-14-year-olds	✓		
Africa					
Hardenbergh 1997	Madagascar	Female advantage in calorie adequacy among 7-9-year-olds		✓	

insignificant female advantage in the 7–9-year-old age range. Where boys are advantaged in food intake, these data do not show an advantage that persists throughout childhood.

Gender differences in the allocation of food to adults

Adult intake studies

Table 3 summarizes studies that disaggregate adult food intake by gender. The number of studies on this topic is surprisingly small. We did not include studies that compared male intake to female intake without adjusting for need. The simple fact that men eat more than women does not necessarily mean that they satisfy a higher proportion of their needs than women: needs differ by body size, metabolic rate, activity level, health status, and reproductive status.

None of these studies shows a male advantage over nonpregnant, non-lactating women. Whenever men are compared to such women, either there is no difference in the calorie adequacy of their diets or women are at a relative advantage. Lipton (1983) also underscored this conclusion in his recommendations for policy interventions to raise the nutritional status of the “ultra poor.” Although no systematic bias against women emerges from these national and subnational calorie-intake studies, such bias may still exist in specific locales. Large national surveys could mask localized female deprivation in food. Nutritional programs that target women may be appropriate in some locations.

These results indicate that targeting pregnant and lactating women in a variety of contexts is appropriate. The emphasis on reproductive status in the literature on maternal and child health addresses a demonstrable need. Although this conclusion may seem obvious, the importance of the distinction depends on context. In low-fertility countries most women spend a limited number of years exposed to the nutritional stresses of pregnancy and lactation. In high-fertility settings extended lactation is usually common, and women spend most of their reproductive years either pregnant or lactating. Thus, policy interventions that target women at large are likely to be more efficient in high-fertility countries than in low-fertility countries, where such use of resources may be unwarranted. Furthermore, in high-fertility settings the cumulative disadvantage associated with repeated pregnancy and lactation is evidenced by clinical signs of nutritional deficiency. These are more common among pregnant women with fourth or higher-order pregnancies than among pregnant women with fewer children (Rao 1980). Also, higher-parity women have been shown to have lower body mass index (Alderman 1990).

TABLE 3 Findings of studies of adult food intake by gender

Region and study	Area of study	Findings
Latin America and the Caribbean		
Graham 1997	Rural Peru	No gender differences in calorie adequacy
Harbert and Scandizzo 1982	Chile	No gender differences in calorie adequacy
Bailey and Whiteman 1963	New Guinea highlands	Nonpregnant, nonlactating (NPNL) women had same calorie adequacy as adult men; lactating women had lower calorie adequacy than adult men
Asia		
Singh 1971 cited in Schofield 1975	India	Women had higher calorie and vitamin A adequacy than men, but were more deficient in vitamin C and iron
Valenzuela, Florencio, and Gutherie 1979	Rural Philippines	No gender differences in caloric intake; female disadvantage in protein and vitamin C intake
Florencio and Aligaen 1980	Urban Philippines	No gender differences in caloric intake; female disadvantage for overall diet rating ^a
Chen, Huq, and D'Souza 1981	Bangladesh	No gender differences in calorie adequacy among prime-age adult women and men ^b
National Nutrition Monitoring Bureau 1981	India	NPNL women had higher calorie adequacy than adult men; pregnant and lactating women had lower calorie adequacy than adult men
Pushpamma, Geervani, and Lakshmi Devi 1982	Rural Andhra Pradesh, India	Adult women had higher calorie adequacy than adult men; female advantage in some micronutrients, male advantage in others
Chaudhuri 1982 cited in Lipton 1983	Tamil Nadu, India	Adult women had more adequate diets than adult men
Chaudhury 1985	Rural Bangladesh	Both pregnant and lactating women had less calorie-adequate diets than other women ^c
Abdullah and Wheeler 1985	Rural Bangladesh	No differences in calorie adequacy between NPNL women and adult men
Basu et al. 1986	India, West Bengal (hill areas)	Women had higher calorie adequacy in three out of four ethnic groups; men had higher calorie adequacy among the better-off in the fourth group
Rao 1987a	India	Adult women had higher calorie adequacy than adult men
Rao 1987b	Urban India	No gender differences in calorie adequacy
Garcia and Pinstrup-Andersen 1987	Philippines	NPNL women had diets comparable to those of adult men; pregnant and lactating women had less adequate diets than adult men

TABLE 3 (continued)

Region and study	Area of study	Findings
Das Gupta 1995	Punjab, India	NPNL women had higher calorie adequacy than adult men; pregnant and lactating women had less adequate diets than adult men
Brahmam, Sastry, and Rao 1988	India	Adult women had higher calorie adequacy than adult men
Senauer, Garcia, and Jacinto 1988	Rural Philippines	No gender differences in calorie adequacy; male advantage in protein adequacy
Malik and Malik 1992	Pakistan	NPNL women had higher calorie adequacy than adult men; pregnant and lactating women had less adequate diets than adult men
Das Gupta 1995	Rural Punjab, India	NPNL women had higher calorie adequacy than adult men; pregnant and lactating women had lower calorie adequacy than adult men
Gittelsohn, Thapa, and Landman 1997	Rural Nepal	Women aged 25–49 had lower calorie and micronutrient adequacy than men of the same ages ^d
Africa		
Maher 1981	Morocco	Pregnant and lactating women had less adequate diets than other women
Nnanyelugo, Kubianga, and Akpanyung 1979	Nigeria	Elderly women had higher calorie adequacy than adult men; female diets were superior except in iron adequacy
Hardenbergh 1997	Madagascar	No gender differences in calorie adequacy
Gurney and Omololu 1971	Southwestern Nigeria	NPNL women had higher calorie and protein adequacy than adult men; both pregnant and lactating women had lower calorie and protein adequacy than other women and men
Several regions		
McGuire and Popkin 1990	Subnational samples from Mexico, Kenya, New Guinea	NPNL women had consistently higher calorie-adequacy ratios than lactating women and higher ratios than pregnant women except in Mexico

^aHousewives consumed a significantly lower percentage of their recommended daily allowance for protein and iron than did household heads.

^bThe apparent gender equity in intake relative to need in the 15–44 age group may result in part from an underestimation of women's activity levels.

^cWomen who were both pregnant and lactating fared still worse than either pregnant or lactating women.

^dGittelsohn, Thapa, and Landman (1997) attribute the relative calorie inadequacy of women in this age group to the unmet calorie needs of pregnancy and lactation. They measured need relative to reproductive status, but could not disaggregate the results for women by reproductive status because of small sample size. Women over age 50 had slightly more adequate diets than men of the same age, but the margin of this advantage was not statistically significant.

Other studies show that food intake is inadequate during pregnancy and lactation, but without assessing relative adequacy.⁹ These studies therefore do not evaluate whether intake is less adequate during these times than during the rest of women's lives, nor do they assess whether pregnant and lactating women are disadvantaged relative to men. For that reason, we have omitted the results of such research from Table 3. Nonetheless, such research highlights the nutritional vulnerability associated with reproductive stress.

Additionally, there is some evidence that lactating women may be more vulnerable than pregnant women (and that women who are both pregnant and lactating are at the greatest disadvantage). For instance, in Guatemala (Schultz, Lechtig, and Bradfield 1980) and the New Guinea highlands (Bailey and Whiteman 1963), lactating women did not increase their intake enough to meet their additional calorie needs. Among Mexican women, dietary disadvantage showed up during lactation but not pregnancy (McGuire and Popkin 1990).¹⁰

This raises another important point with respect to targeting. While in some settings the needs of lactating women are met through special diets and reduced physical activity (Maletnlema, Mhombolage, and Ngowi 1974), this type of favoring does not show up routinely in the literature on diet and reproductive need. It is likely that poorer women are less well positioned to meet the energy requirements of pregnancy and lactation. They are less likely to consume additional calories and, furthermore, less likely to be able to afford the opportunity cost associated with additional rest.

The salience of this argument is underscored by controversy in the nutrition literature on determining the actual calorie requirements during pregnancy and lactation. Some argue that women's calorie needs in pregnancy are less than the amount recommended by international standards. However, this contention is based on studies of economically well-off women which show that when food intake is unrestricted, pregnant women do not add much to their diets (Martorell and Merchant 1992a). The increased energy needs associated with gestation are met by a lowered basal metabolic rate, but also by less physical activity, particularly after the first trimester of pregnancy (*ibid.*). We contend that this argument applies only to women in advantaged social circumstances. Women whose families rely on the income they produce and who do not have domestic help cannot reduce their physical activity to the same extent as advantaged women. Therefore, even if the international standards overestimate the calorie needs of pregnant women, there is still a subset of women whose needs may be correctly estimated by the standards.

Furthermore, the World Health Organization's recommendation for 500 additional calories per day during lactation assumes that women have gained 4 kilograms of fat during pregnancy (Martorell and Merchant 1992b). Even if women are able to sustain a successful pregnancy despite not in-

creasing their calorie intake, entering lactation without fat reserves could mean that the energy needs during lactation are actually higher than recommended. Again, women whose energy expenditures are higher because of their domestic and/or paid labor may be less able to meet the calorie demands associated with reproductive stress.

Other evidence of gender differentials in adult food intake

Although calorie intake is best suited to address the central concern in our review, we supplement these data with evidence from clinical evaluations of nutritional status and anthropometric studies of adults. We do this to draw attention to the limitations of calorie adequacy as a measure of nutritional wellbeing. In Table 3 on adult food intake, we included findings that showed gender disparities along measures other than calories (*viz.*, overall dietary quality, protein, and micronutrients). Men were favored much more consistently according to these measures than with respect to calorie intake. Our review of calorie-intake data yielded some evidence on micronutrient deficiencies. This evidence is consistent with a pattern of male advantage in micronutrient intake. Therefore, while men are not routinely favored in the intrahousehold allocation of calories, their access to food with higher nutritional quality seems to be often superior.

Although the two clinical micronutrient deficiency findings in Table 4 (those for Guyana and Iran) confirm the impression from other intake studies that men have access to higher dietary quality, the anthropometric data in the rest of the studies cited are less consistent. One of the anthropometric studies shows male advantage; four show some female advantage; and two show no difference. These data are consistent with the previously cited finding that women's current calorie consumption is not deficient relative to men's. Weight for height is the most commonly used measure in adult anthropometric studies because height gain has already taken place in childhood. It measures current nutritional wellbeing rather than the cumulative effect of nutritional status from childhood.

Should we believe these results?

Although literature reviews over the past decades have not demonstrated gender bias in food allocation, women are still commonly believed to be at a disadvantage in access to food. We have shown that male advantage in anthropometric studies of children is pronounced in village studies in South Asia but does not appear in available evidence from other areas of the developing world. Food intake studies show a weaker pattern of male advantage in South Asia that does not persist throughout childhood. There is more consistent evidence

TABLE 4 Findings of adult anthropometric and micronutrient intake studies by gender

Region and study	Area of study	Findings	Gender differences favor:		
			Men	Women	Neither
Latin America and the Caribbean					
Desai et al. 1980 cited in Kanbur 1991	Brazil, agricultural migrant workers	Female advantage in anthropometric measures		✓	
CFNI/PAHO 1997	Guyana	More women overweight than men; women also had more hemoglobin deficiency and severe iodine deficiency			✓
Asia					
Kohout et al. 1967 cited in Schofield 1975	Iran	Women had lower plasma protein and hemoglobin adequacy than men	✓		
Pushpamma, Geervani, and Lakshmi Devi 1982	Andhra Pradesh, India	No differences between men and women in weight for height			✓
Rao 1987a	India	Women closer to weight-for-height standards than men		✓	
Kynch 1997 cited in Jackson and Pearson 1998	Palampur, India	Fewer women wasted than men		✓	
Africa					
Masseyff 1959 cited in Schofield 1979	Cameroon	Men closer to weight-for-height standards than women	✓		
Hardenbergh 1997	Madagascar	Direction of gender advantage varied by season			✓
Svedberg 1990	Sub-Saharan Africa	Women closer to standards for both height and weight than men in most samples (out of 17), but magnitude of gender differences small		✓	

of relative deficiency in micronutrient intake among females throughout the lifecourse. Our review has demonstrated that the only consistent gender bias in calorie allocation relative to need is against pregnant and lactating women. Other evidence of male bias requires qualification.

Should we believe these results? As we mentioned at the outset, two responses are possible here. One is that females have less adequate access to calories than males, but that our data do not show this to be the case. The other is that female disadvantage does not lie in low access to food energy, but in other aspects of daily life.

If females have lower access to calories than males, there are several ways in which their disadvantage might be masked. First, inconsistent methodologies may render comparisons across studies either unfeasible or misleading. Harriss's (1999) thorough review of 24 studies from South Asia details the various ways in which nutritional outcomes are assessed. Different studies address different nutritional questions; while one includes only retinol and carotene among the micronutrients measured (Abdullah and Wheeler 1985), others include a fuller range of comparisons (e.g., Chen, Huq, and D'Souza 1981). Differences in consumption cannot be found if they are not measured. Also, studies use different age categories and vary with respect to whether particular categories are disaggregated by gender or by reproductive status. Measurement methodologies also vary: if 24-hour recall reveals male advantage and three-day recall reveals female advantage, the inconsistency might be explained by methodology rather than reflecting social reality.

Second, the standards for nutritional status may themselves incorporate gender bias. What is considered normal intake or normal growth is defined relative to international standards. While international standards are assumed to be gender neutral, it is impossible to prove that they are. Standards for calorie intake are designed to allow for "economically necessary and socially desirable physical activity" (WHO 1985). Gender bias could take the form of "different levels of accepted debilitation for the respective sexes" (Drèze and Sen 1990). In addition to gender-based norms of appropriate activity levels, female intake does not need to be as high as male intake because of smaller female body size. However, if female disadvantage in food allocation is the norm from childhood, then girls and women adapt their bodies to function with lower levels of calorie intake than would be optimal. This adaptation occurs at a functional cost (see Dasgupta and Ray 1990) and could also be incorporated into standards for food intake and body growth.

Third, female requirements are lower in part because females are smaller, and body size is partly determined by dietary intake. Thus, low intake causes small size, which in turn can be used to justify low intake. This calls attention to the possibility that women's calorie adequacy may be on par with men's because their energy needs are lower than men's. But

these needs may be lower because women are suffering functional consequences of nutritional deprivation.

Fourth, women's calorie adequacy may be overestimated because their energy expenditure is underestimated. For example, India's National Nutrition Monitoring Bureau produces nutrition adequacy ratios (intake as a percentage of requirements), but they use three activity levels for men (sedentary, moderate, heavy) and only two for women (sedentary, moderate). Furthermore, "sedentary" is the only activity level given for pregnant women. If all pregnant women are sedentary and if no women have heavy activity levels, then this classificatory scheme could be used to accurately compare intake to need. But if some women are assigned to a lower energy expenditure class than is appropriate, then the ratio of intake to need is overestimated because need is underestimated (Millman and DeRose 1998a). Estimation of calorie adequacy has been shown to be very sensitive to estimates of energy expenditure (e.g., Chen, Huq, and D'Souza 1981).

We know that substantial numbers of pregnant women in India have heavy workloads (Jejeebhoy and RamaRao 1998). However, underestimation of energy expenditure only matters in assessing relative deprivation if women's workloads are underestimated more than men's are. Pitt, Rosenzweig, and Hassan (1990) find that apparent male advantage in food allocation disappears when calorie needs are measured meticulously. After they incorporated actual energy expenditures into their analysis of intrahousehold food distribution, they found that adult males had less adequate diets relative to other household members. Therefore, while women's energy expenditure is undoubtedly underestimated in some comparisons of adequacy, men's may be underestimated less, to the same degree, or more.

Fifth, Haddad et al. (1996) have suggested several reasons why female disadvantage may not appear in household nutrition studies even if it exists. Anthropometric measures of children might not reveal gender bias if girls' ages were more likely to be underestimated than boys' ages. While age data in many developing countries are imprecise, it is reasonable to believe that an undernourished child would appear younger than an adequately nourished counterpart of the same age. Therefore, if girls were undernourished more often than boys, then girls' ages could be consistently reported as lower. Two of the common anthropometric indicators, weight for age and height for age, would be sensitive to gender bias in age estimation and therefore might not reflect gender bias in nutrition even if it were present. This argument does not apply to the prevalence of wasting (low weight for height), which is less common among girls than boys (see the cross-national anthropometric studies reviewed above), but still needs to be taken seriously for the other two anthropometric indicators. However, if age misreporting masked gender differentials in childhood stunting (height for age), we would expect to see more adult women with low height attainment than men. We do not see this in the 17 African samples for which

Svedberg (1991) compares male and female height attainment (see Table 4). However, it is impossible to draw universal conclusions from the African data. Researchers do not commonly analyze height data for adults because adult nutrition does not affect height.

Although significant measurement issues are involved in understanding gender bias in access to food, pregnant and lactating women are clearly at a disadvantage relative to both men and other women. While we conclude that there is no systematic bias against women in general, the most unambiguously deprived group with respect to calorie adequacy is pregnant and lactating women. Furthermore, in some settings women spend significant portions of their lives either pregnant or lactating. For instance, in Nigeria, where the total fertility rate is over six and the median duration of breastfeeding is close to two years (Federal Office of Statistics 1992), women on average spend over one-quarter of their lives with elevated nutritional needs related to reproduction. Although the magnitude of this problem becomes smaller as fertility decline progresses, the burden of reproductive stress falls disproportionately on poor women. Such women generally have higher fertility, longer breastfeeding durations, and less opportunity for rest during pregnancy and lactation.

The disadvantage imposed on women by undernutrition during pregnancy and lactation contributes to the intergenerational transmission of nutritional deprivation. Women undernourished during pregnancy are apt to have babies with low birthweight, thus perpetuating a cycle of disadvantage. Furthermore, with repeated childbearing women expose themselves and their children to increased risk of nutritional deprivation.

Conventional wisdom draws a clear parallel between women's low status and their low access to food. However, if women's low status led to lower access to calories, this circumstance would apply to all women, not just those with elevated calorie needs resulting from the demands of childbearing. Therefore, general status improvements may not address the specific issues pertaining to pregnant and lactating women, such as misunderstood need (Millman and DeRose 1998a).

Clearly, we give credence to arguments that real gender bias may not emerge in a comparative review of the literature such as our own. Nevertheless, we also argue that it is reasonable to consider the null hypothesis—that is, the absence of any statistically significant difference in energy allocation between males and females. Haddad et al. (1996) argue that food allocation studies that support the null hypothesis all too often remain unpublished manuscripts. The available evidence does not substantiate a consistent pattern of female disadvantage in calorie intake; the unpublished sources are more likely to support the absence of such disadvantage as well.

But why would calorie intake be equitable in societies that manifest other evidence of gender bias? Women's access to goods and services is determined in two distinct domains of action: public and private. Women's

access to resources in the public sphere may be mediated by men and patriarchal norms and, as such, their autonomy for independent action may be restricted, as is the case in India (see World Bank 1991). By the same token, women's relatively greater autonomy in the private sphere may allow them greater independence of action.

The preparation and distribution of food is one type of activity for which it is plausible to argue that women have greater independence in functioning. Although access to a resource such as food does not automatically confer control over it (Mason 1986), access does provide increased room for individual agency. Furthermore, the cooking, cleaning, and storing of food are dominantly or exclusively female tasks in developing countries. Even where women have little autonomy, their control over the processing of food is culturally supported. Wa Karanja (1983) explored numerous aspects of conjugal decisionmaking in Nigeria and reported that such support pertains only to control over the domestic food menu (see also Adomako Ampofo 1999; Blanc et al. 1996).

Women's control over the food cycle may end before the distribution of food at mealtimes. Harbert and Scandizzo (1982) confirm that when intake is measured only from main meals, male advantage is evident, but when snack foods are taken into account there is no gender bias in intake. Jackson (1998) argues that researchers' "too ready" acceptance of the notion that women have lower access to food overlooks "women's agency" and the ways in which this agency subverts norms through eating snack foods and "leftovers" and eating during meal preparation. But there is no evidence that this snacking behavior is part of a conscious strategy to secure better calorie intake: it could be merely a natural response to hunger. Certain categories of intake, including low-status foods and snacking, are not even socially defined as food (Messer 1984).

Taking a cue from the proposition that the public sphere is more conspicuously mediated by male interference and cultural norms, we suggest that regular meals are subject to a communal gaze while snacks are consumed in private. Furthermore, the foods that women consume outside of regular meals may be of lower nutritional and social quality. In some social settings, the foods consumed by females at meals reflect their lower social status, and women's additional consumption may contribute little to the quality of their diet. The studies we reviewed have shown that distribution of food in quantitative terms is generally free from gender bias, but micronutrient deficiency represents an important health concern especially for women. Therefore, women's ability to consume sufficient calories does not signify an equal social status. It also does not depend on high relative status nor require certain dimensions of autonomy such as control over expenditures or mobility outside the home. Calorie intake may thus be equitable in societies that manifest other evidence of gender bias.

Conclusions

The recognition that female disadvantage in calorie intake is not universal allows policymakers to focus their attention on other aspects of women's deprivation. The pattern of greater male advantage shown by anthropometric studies than in food intake studies of children in South Asia points to differential access to health care as a more salient component of female disadvantage, even in communities where food intake is inequitable at some ages. When access to food and access to health care are conflated, much of the problem falls in the private sphere and the potential for government intervention becomes limited. This conflation places the burden of responsibility for women's and children's health disproportionately on individual households (see Desai, forthcoming).

Two recommendations emerge from our evaluation of the evidence on gender bias in food intake. The first derives from the difficulties in assessing calorie adequacy. Both the numerator (intake) and the denominator (need) used in computing adequacy have problems associated with measurement. For intake, we recommend that further studies of food allocation differentiate by gender at all ages and by reproductive status among women. When measuring need, we recommend that energy requirements should be assessed with greater accuracy. Without well-informed approximations of the energy expenditures of both men and women, measured calorie adequacy ratios may be biased against either men or women.

Our second recommendation follows from the finding that discrimination against women operates through mechanisms other than calorie deprivation. Most importantly, perhaps, it operates through differential access to health care, education, and leisure. Deprivation with respect to these factors contributes to depressing women's functional capabilities. Women's lower functioning is part of a pervasive discrimination that does not necessarily include lower access to adequate energy than men have (Drèze and Sen 1990). However, standards to measure calorie adequacy incorporate norms for female body size and physical activity that may uncritically accept the notion that females are more physically passive. Maintaining adequacy by these standards could perpetuate low levels of female functioning. Since one of the goals of development is to expand choices, female calorie needs may increase if status improves and society offers women a wider range of choices.

Calorie adequacy for females may be socially assured in ways that are insufficient to provide them with access to overall healthy diets. Consuming leftover food is a low-status activity that may afford women access to traditionally male foods, but women may have less access to these at mealtimes, indicating a less reliable overall entitlement. Similarly, intake that is not even socially regarded as eating may be a larger component of women's

food consumption than men's and may not provide the same micronutrient adequacy as socially preferred foods. Because people categorize foods in ways other than according to their nutritional quality, more information about food composition might allow women to improve their overall consumption. However, intervening to improve female micronutrient intake in this way is complicated by the fact that women may not be fully aware of their calorie and micronutrient needs. Resistance to strategies that consciously address the needs of women may be greatest in the same societies where norms for food allocation are most heavily biased by gender.

Spreading information and social awareness about the elevated calorie needs of pregnant and lactating women has a broader scope for policy effectiveness. The fact that women who are neither pregnant nor lactating have calorie adequacy equal to or greater than men's in all societies, even those that show evidence of discrimination against young girls in intake at some ages, argues that low female status is not the primary problem in achieving calorie adequacy during pregnancy and lactation. Our most unequivocal conclusion with regard to female deprivation in access to food is that pregnant and lactating women have energy needs that should be given priority in nutritional intervention programs. Such interventions are especially important for women who continue their manual labor during pregnancy and lactation. Programs at the local level need to address other particular needs in particular communities, but one should not assume that females in general need to be targeted in nutritional programs. To do so would decrease the efficacy of interventions.

Excess female mortality represents the most extreme form of relative female deprivation. However, we emphasize that the components of well-being that contribute most to lower mortality are health care and other forms of care. Inadequate access to food contributes far less to reducing survival chances. Therefore, assuming that female disadvantage primarily manifests itself in low access to calories can also weaken the effectiveness of policies intended to raise female status.

Notes

This article has its antecedents in chapter five of the book *Who's Hungry? And How Do We Know? Food Shortage, Poverty, and Deprivation* by Laurie DeRose, Ellen Messer, and Sara Millman, published in 1998 by United Nations University Press.

1 There is debate among nutritionists about whether anthropometric measures can help predict mortality; see Lindskog et al. 1988; Smedman et al. 1987; and Yambi et al. 1991. Pel-

letier's (1998) analysis addresses the relevance of this debate to gender differences in nutrition.

2 See, for example, Basu 1989; Chaudhury 1987; Chen, Huq, and D'Souza 1981; Gopalan and Naidu 1972; Hill and Upchurch 1995; Kishor 1998; Kurz and Johnson-Welch 1997; Kurz and Prather 1995; Larme 1997; Pebley and Amin 1991; Timæus, Harris, and Fairbairn 1998. The literature on sex differences in access to health care establishes a di-

rect causal link between health care and mortality, while the literature on sex differentials in nutrition does not establish such a link between nutrition and mortality.

3 The review by Kurz and Johnson-Welch found eight articles presenting health care use data by gender: two found no gender differences, four showed female disadvantage, and two showed male disadvantage. Twenty-five articles present nutritional status by gender: 12 found no gender differences, seven showed female disadvantage, and six showed male disadvantage. Five articles present data on food and feeding practices by gender: three found no gender differences, one showed female disadvantage, and one showed male disadvantage.

4 We do not include studies that infer food intake shares from feeding practices or norms, e.g., Batliwala 1985.

5 Bangladesh, Indonesia, Pakistan, Singapore, Sri Lanka, Thailand.

6 These studies are not strictly comparable with each other since they differ in choice of anthropometric measures, definition of undernutrition, and sampling procedures.

7 Elsewhere, Valenzuela (1977, cited in Evenson, Popkin, and Quizon 1980) reported a small female advantage among preschoolers, but in his later publication (included in Table 2) using the same data (Valenzuela, Florencio, and Gutherie 1979) he showed male advantage at all ages.

8 Male advantage in energy intake was found only among 18–30-month-olds, but there was also a male advantage in vitamin A consumption among 5–17-month-olds.

9 See, for example, Chaudhury 1985; Fleuret and Fleuret 1980; Hamilton, Popkin, and Spicer 1984; Horowitz and Kishwar 1984; Katona-Apte 1975; Maher 1981; Martorell and Merchant 1992b; Schultz, Lechtig, and Bradford 1980.

10 Pregnant women do not have less adequate diets than lactating women in any of the studies reviewed. Therefore, cultural practices such as restricting food intake during pregnancy so as to deliver a smaller baby probably explain only a small part of the disadvantage associated with reproduction.

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On the Quantum and Tempo of Fertility: Comment

EVERT VAN IMHOFF
NICO KEILMAN

IT IS WELL known that, if successive cohorts of women differ in the timing of their fertility, the resulting period fertility measures will be seriously affected. Thus, period measures of fertility are a mixture of quantum and tempo effects. In a recent article in this journal, Bongaarts and Feeney (1998) propose a modification of the conventional (period) total fertility rate. This so-called tempo-adjusted TFR can be interpreted as the TFR that would have been observed in year t if the age pattern of fertility had been the same as in year $t-1$, that is, as a measure of the pure quantum effect.

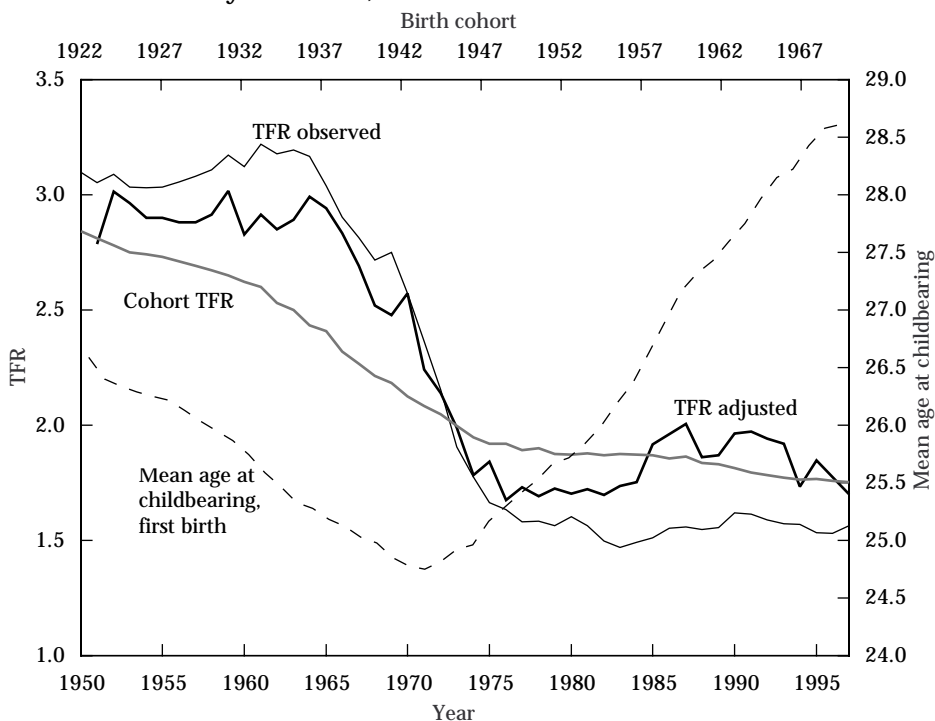
We intend to show that the Bongaarts and Feeney adjustment procedure is not in fact capable of isolating the pure quantum effect of year-to-year changes in fertility. Our critique focuses on two points: (1) cohort-specific changes in timing are much more complex than Bongaarts and Feeney assume; (2) the Bongaarts and Feeney method is based on unsuitable fertility measures. Although we cite data for the Netherlands only, the results we obtained for Norway are essentially the same.

Bongaarts and Feeney derive their adjustment formula under the assumption that “women of all ages bearing children [of a given birth order] in year t defer or advance their births to the same extent independently of their age or cohort identification” (p. 277). This assumption can be empirically tested. Data for the Netherlands and Norway (Van Imhoff and Keilman 1999) show that the “constant shape” assumption is clearly violated (see also Kohler and Philipov 2000). This means that period tempo changes are dependent on cohort, and therefore that a pure “period quantum” is an untenable concept.

Figure 1 plots the observed and adjusted period TFR for the Netherlands over the period 1950–97. During the baby boom period, the adjusted TFR lies below the observed TFR, and during the baby bust period the reverse is the case. This figure reflects the fact that the baby boom period was one of accelerating tempo, while the baby bust was one of delayed tempo (see the curve of the mean age at childbearing for first births in Figure 1). Indeed, the curve of the cohort TFR (shifted by 28 years, roughly the mean age at childbearing for all births combined over the full period) shows a much smoother time path. The adjusted TFR brings the observed TFR somewhat closer to the “true” underlying average number of children of “real” women; however, it still displays a remarkable boom–bust sequence.

Although Bongaarts and Feeney state that they do not attempt to predict cohort fertility, they also state that tempo-adjusted TFRs will “reveal the level of completed fertility implied by current childbearing behavior” (p. 286). But if such completed fertility does not refer to actual cohorts of women, then what does it refer to? The fact that (as is also evident from Figure 1) “of the two dimensions of calendar time—period and cohort—period is unambiguously the prime source of variation in fertility rates” (Ni

FIGURE 1 Fertility indicators, Netherlands



SOURCE: Statistics Netherlands.

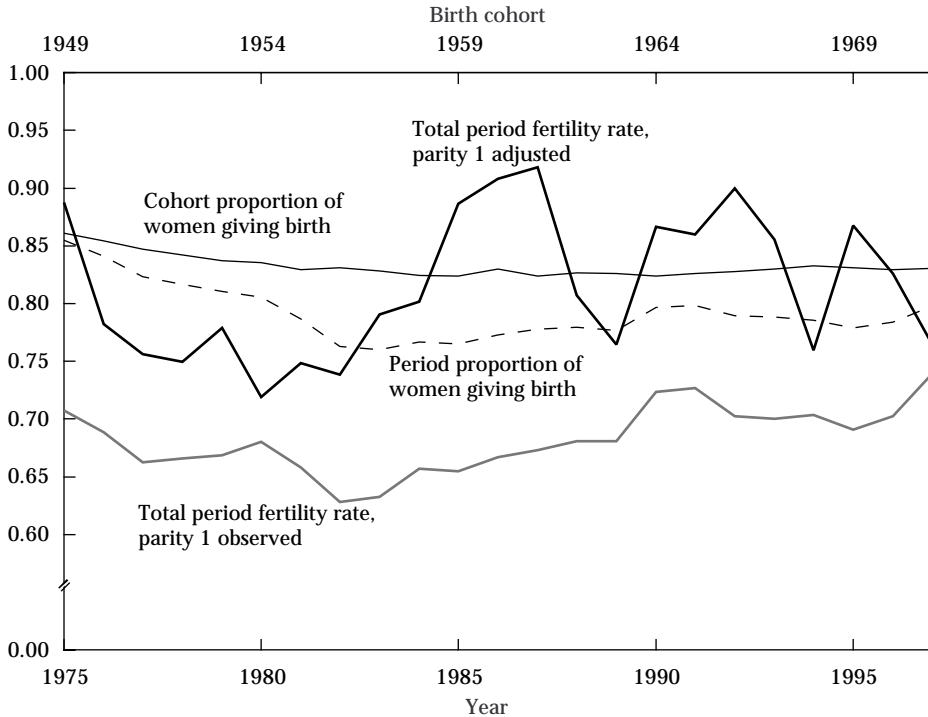
Bhrolcháin 1992: 600) does not mean that cohorts can be dismissed altogether. From the rejection of the “constant shape” assumption, we conclude that tempo changes may be period-inspired, but they affect age groups, that is, *cohorts*, in different ways. Thus, even though period changes in indicators of fertility quantum and tempo are obviously important, if the underlying level of completed fertility is to be found, then the distinction by cohort cannot be missed—for two reasons. First, completed fertility is by definition a cohort concept. Second, the impact of period factors on individual members of the population is definitely dependent on the individuals’ life histories up to then: since individuals behave conditionally on what they experienced in the past, it would be unreasonable to assume that different cohorts, each carrying a different past, would be affected in the same way. And indeed, the data show that they are not.

Our second point is that Bongaarts and Feeney use fertility rates expressing the number of births of order i by women of age x , relative to the number of women aged x *irrespective of parity*. Hence the fertility rates employed by Bongaarts and Feeney are not occurrence-exposure rates, but rather frequencies. There is nothing against frequencies per se, but they do present a problem in this particular context. When period frequencies are summed over all ages, the resulting index cannot be interpreted as a proper quantum indicator. For instance, the sum of the age-specific first-birth frequencies exceeded 1.0 (clearly an impossible quantum value) in many Western countries in the years immediately following World War II and in Portugal around 1977.

The reason for these high values of the period sum of the first birth frequencies is twofold. First, there is the well-known tempo distortion for which Bongaarts and Feeney seek to adjust. Second, when age-specific period frequencies for first births (for example) are summed, one erroneously assumes that the proportion of childless women at the end of one age interval is equal to that proportion at the start of the next age interval. This is not necessarily the case, since the age intervals refer to different cohorts. The stronger the tempo changes between the cohorts, the more the proportions for subsequent ages differ. Thus, *the use of frequencies exaggerates the effect of tempo distortions*.

Figure 2 gives an illustration for first births in the Netherlands in the period 1975–97. The period proportion of women giving birth (on the basis of occurrence-exposure rates) varies between 76 and 85 percent, corresponding to proportions of women childless between 15 and 24 percent. Dutch women born since 1950 have postponed the birth of their first child, hence the period proportions childless are higher than the cohort proportions childless. These period values appear reasonable. However, the values of the observed total period fertility rate based on frequencies are clearly too low, and the Bongaarts and Feeney adjustment (the adjusted total period fertil-

FIGURE 2 Indicators for first births: Frequencies versus occurrence-exposure rates, Netherlands



SOURCE: Statistics Netherlands.

ity rate) results in a time pattern that shows larger fluctuations than the period proportion of women giving birth, even after moderate smoothing.

To conclude, the Bongaarts and Feeney adjustment procedure has two major weaknesses. First, the method is based on fertility measures unsuitable for the purpose of tempo adjustment; as a result, the TFRs by birth order as employed by Bongaarts and Feeney are biased. Second, the assumption underlying their method that period-by-period timing changes are independent of age and cohort is not supported by the data. Period effects cannot be fully understood without studying cohorts, just as cohort effects cannot be fully understood without studying periods. The subtle interplay of quantum, tempo, period, and cohort effects renders a single measure, like the conventional TFR or the TFR as adjusted by Bongaarts and Feeney, incapable of telling the full story. So we end with a negative assessment: although attractively simple, the Bongaarts and Feeney procedure does not solve the tempo-distortion problem. A real solution will require more extensive data as well as additional methodological innovation.

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On the Quantum and Tempo of Fertility: Limits to the Bongaarts-Feeney Adjustment

YOUNG J. KIM

ROBERT SCHOEN

IN A RECENT article, Bongaarts and Feeney (1998) proposed a new method for adjusting the period total fertility rate (TFR) to eliminate the effects of the timing of fertility behavior. They claim that TFR_{adj} , their tempo-adjusted total fertility rate, “provides a better indication of the level of completed fertility implied by current fertility behavior, and hence a better answer to the question of how many births women will have if current childbearing behavior continues into the future” (p. 285). We take issue with that claim and show that the mathematical basis of TFR_{adj} holds only under very restrictive conditions and that, with those restrictions even slightly relaxed, TFR_{adj} is quite volatile in the presence of modest fertility fluctuations. We conclude that there is no reason to accept TFR_{adj} as a reliable indicator of the level of fertility.

The stringent restrictions underlying the tempo-adjusted TFR

In Scenario 2 of their Appendix, where the effects of birth order are ignored to simplify the presentation, Bongaarts and Feeney show that when the level of fertility does not change but the mean age at childbearing increases through a constant shift in the period fertility schedule, then $TFR_{adj} = TFR / (1-r)$, where r is the annual increase in the mean age at childbearing. That relationship (essentially their equation (7)) is obtained by integrating the cohort fertility of the reference year using a change-of-variables approach. Although they do not say so explicitly, this approach requires the assumption that those increases of r years per year have been in place long enough to have characterized the experience of all currently child-

bearing women. That restriction is notable because such a sustained pattern is extremely unrealistic, and a population's behavior in the short term can be very different from its behavior at long-term equilibrium.

To demonstrate this point, consider a hypothetical single-sex population in which the TFR is constant at replacement level ($TFR = 1.0$), with age-specific fertility rates identical at all ages of reproduction (ages 15 to 45 years). Then, beginning with year 0, an increase of $1/3$ year in the mean age of period fertility occurs each year as the fixed, uniform period fertility schedule shifts upward by $1/3$ year each year. While the period TFR remains constant, cohort fertility levels change as successive cohorts are differentially affected by that linear shift in fertility. In Figure 1a, we show schematically how period fertility shifts and indicate the cohorts that begin and end the transition from fixed fertility to upwardly shifting fertility. In

FIGURE 1a Schematic diagram of a single-sex model population with linear upward shifts of $1/3$ year per annum in the mean age of childbearing starting at time 0

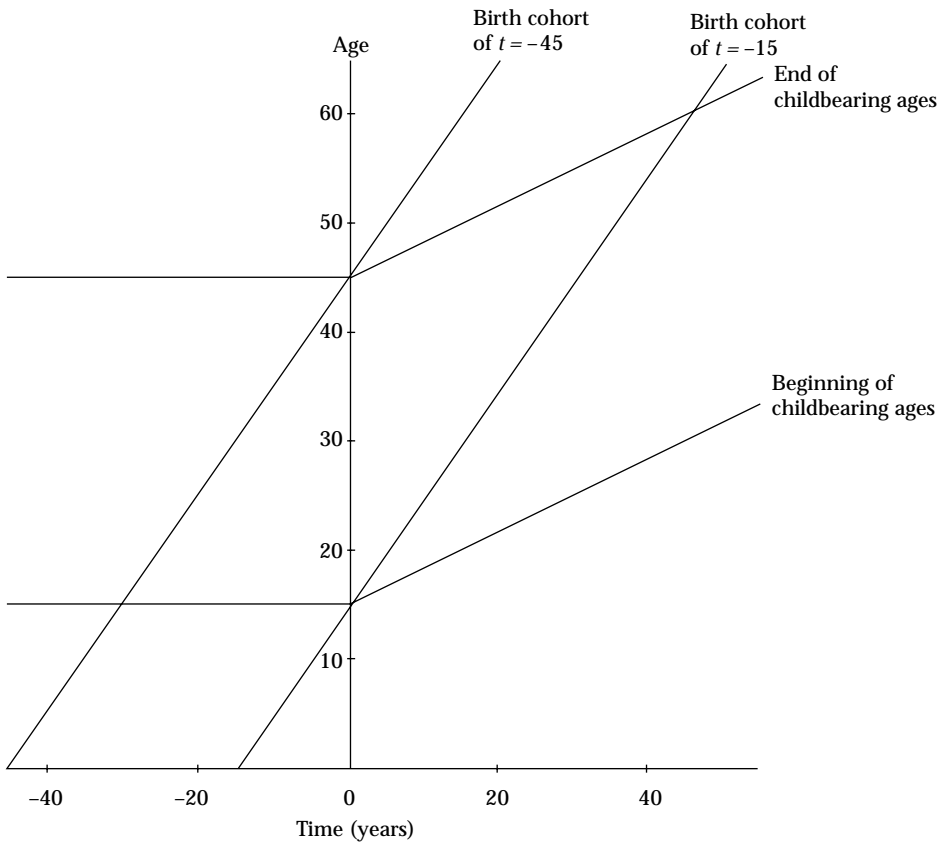
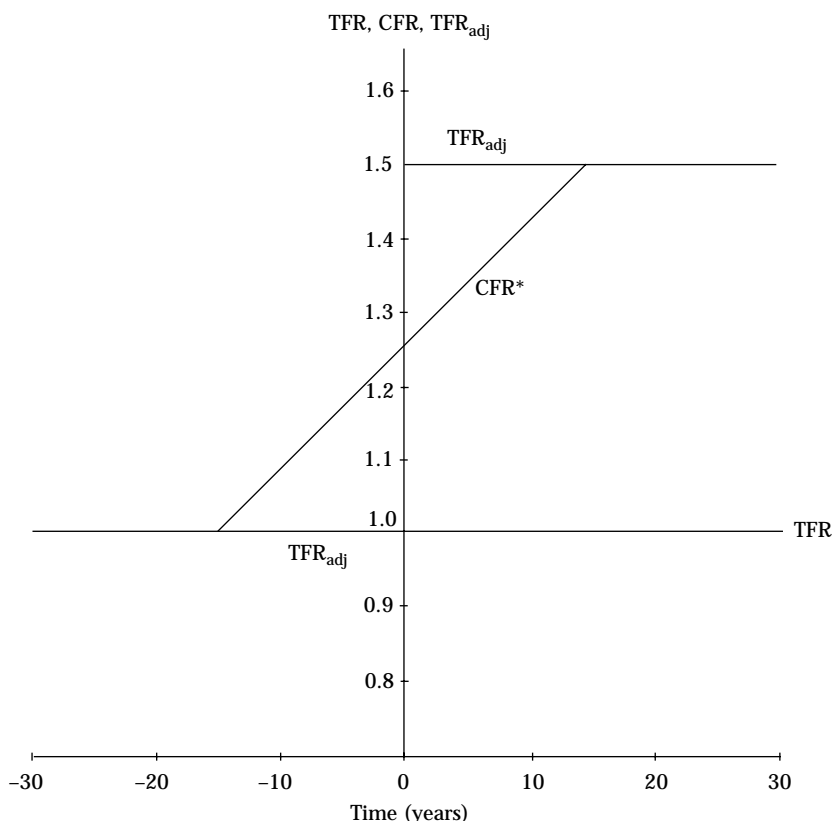


Figure 1b, we present the time trajectories of three fertility measures: the constant period total fertility rate (TFR), the cohort total fertility rate (CFR), the standard indicator of completed fertility), and the Bongaarts–Feeney adjusted TFR_{adj}. The CFR, taken as the completed fertility of the cohort born 30 years earlier, increases linearly from 1.0 for the cohort born in year –45 to 1.5 for the cohort born in year –15, and remains at that level thereafter. In the long term, here after year 15, the Bongaarts–Feeney measure is constant at 1.5 and equals the CFR. However, in the short term (here years –15 to 15) TFR_{adj} can differ appreciably from the CFR because of the gradually lengthening reproductive age span of the transitional cohorts. The discontinuity in TFR_{adj} at year 0 arises because TFR_{adj} only changes when the regime of period linear shifts begins, that is, when r goes from 0 to 0.33. Of course, period shifts such as the one described cannot be sustained in-

FIGURE 1b Adjusted total fertility rates and cohort fertility rates in the above population characterized by a period total fertility rate at replacement level



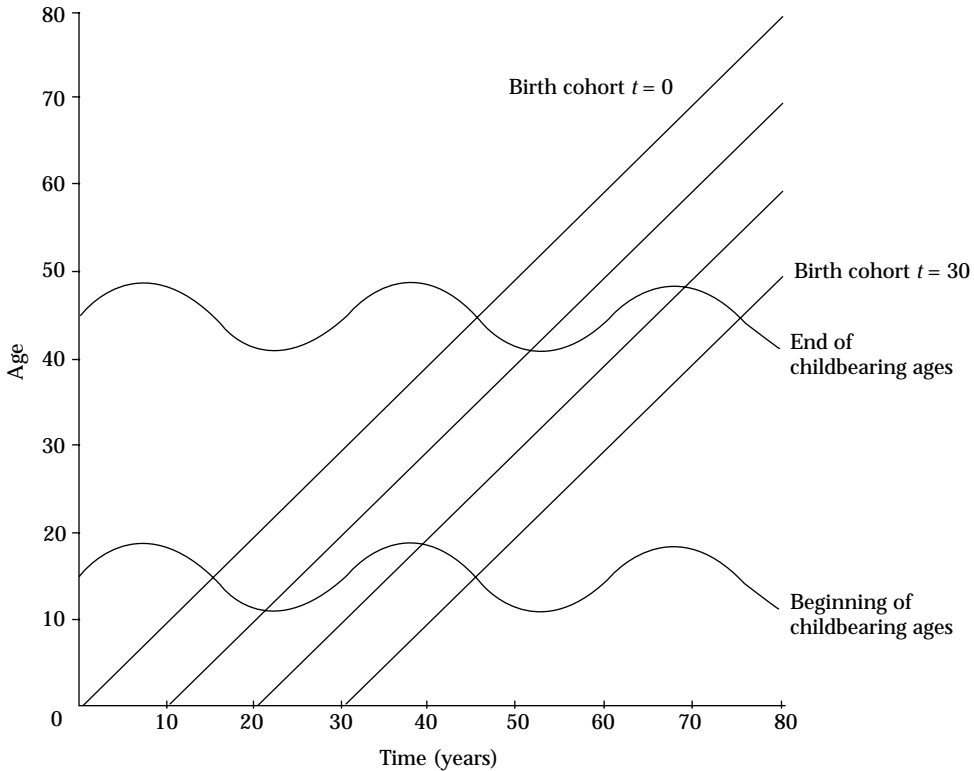
*CFR of the cohort born 30 years before the time indicated on x axis.

definitely. Here (as shown in Figure 1a) in year 45, the initial age at child-bearing has already increased from age 15 to age 30.

The volatility of the tempo-adjusted TFR

We emphasized Bongaarts and Feeney’s Scenario 2 above to specify the severe restrictions that are needed for their measure to hold. Bongaarts and Feeney recognize that the change of variables they use to obtain their result in Scenario 2 does not work when the amount of change in the mean age at childbearing varies, as it does under their Scenario 3. To avoid that difficulty, they focus on a single year and in effect seek to recreate a pattern of constant change. Their derivation is flawed, however, because it does not recognize that, even in Scenario 2, their equation (8) and thus their TFR_{adj} only hold in the long run, when all cohorts of reproductive age have experienced the same history of constant period shifts. Thus it is not sur-

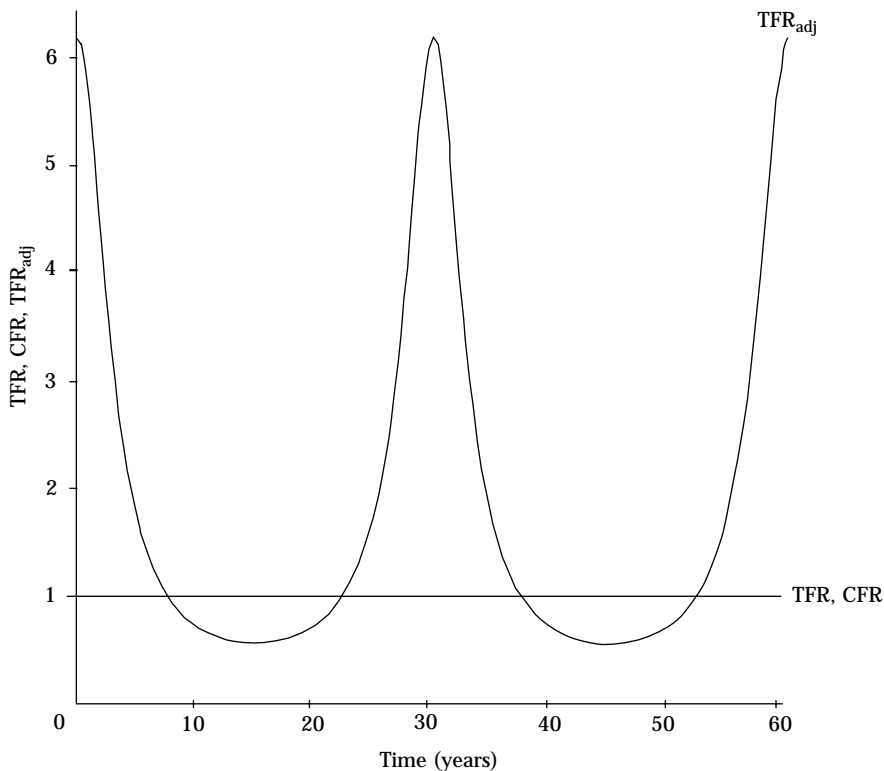
FIGURE 2a Schematic diagram of a single-sex model population with constant period and cohort fertility and with period sinusoidal shifts over time in the ages at which childbearing begins and ends



prising that when the change in the mean age at childbearing varies over time, their adjusted TFR becomes unstable.

To see that this is so, consider a “Scenario 3-type” model where fertility is at replacement level and does not vary over time or over age within the reproductive age range, but where the period reproductive age range shifts sinusoidally over time. In particular, let the timing of period fertility cycle so that the reproductive age range in year t goes from $15 + 4 \sin(2\pi t/30)$ to $45 + 4 \sin(2\pi t/30)$. Here, because both the cycle length of the sinusoidal fluctuation and the length of the period reproductive age span are fixed at 30 years, every *cohort* in the model also has a reproductive age span of 30 years. As shown in Figure 2a, each cohort ends its reproductive years at the same point in the sinusoidal cycle at which it started. In Figure 2b, we show the population’s time trajectories of TFR, CFR, and TFR_{adj} . Since fertility is the same at every reproductive age, and since every period and every cohort have reproductive age spans of 30 years, $TFR = CFR = 1.0$.

FIGURE 2b Adjusted total fertility rates in a population characterized by constant period fertility and constant cohort fertility, both at replacement level, and by shifts in the beginning and ending ages of childbearing as shown above



However, because the period reproductive ages shift, TFR_{adj} is not constant, but varies from a low of 0.54 to a high of 6.16. Thus, in a population with constant period and cohort fertility and modest swings in the ages of reproduction, the Bongaarts–Feeney measure fluctuates dramatically. In fact, even with the amplitude of the sinusoidal fluctuations remaining within demographically reasonable bounds, TFR_{adj} can become infinite.

We have further explored the behavior of TFR_{adj} under the more realistic assumption that fertility follows a normal distribution with a mean of 30 years and a standard deviation of 4.5 years. In such models, we have considered both period and cohort sinusoidal shifts in the reproductive age span. We obtain qualitatively similar results in those cases as well, with TFR_{adj} fluctuating markedly and showing pronounced peaks well above the CFR.

Conclusions

We find that the Bongaarts–Feeney measure performs as claimed only under the assumption of a constant linear shift affecting every cohort of reproductive age. In other cases, the measure performs poorly. It mischaracterizes the course of completed fertility in the short term, even when period timing shifts are linear. When timing shifts sinusoidally, the Bongaarts–Feeney measure is unstable. In a model with constant period and cohort fertility levels of 1.0, a relatively modest fluctuation in timing leads to TFR_{adj} values exceeding 6.1.

Fundamentally, the Bongaarts–Feeney measure, which is based on behavior in a single year, does not incorporate enough information to disentangle effects of fertility timing and level without imposing stringent and unrealistic restrictions. When those restrictions are not met, the measure can be unstable and can grossly mischaracterize fertility levels and trends.

Note

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NICHD grant P30 HD06268 and NCRR Shared Instrumentation grant S10 RR07268. Discussions with Juha Alho and research assistance from Xianbin Li are gratefully acknowledged.

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On the Quantum and Tempo of Fertility: Reply

JOHN BONGAARTS
GRIFFITH FEENEY

BEFORE EXPLAINING why we disagree with the views expressed in the two preceding comments, we summarize briefly the purpose and main features of the method described in Bongaarts and Feeney (1998).

Our study set out to address a well-known flaw in the total fertility rate, the most widely used measure of period fertility. The TFR is affected by changes in the timing of childbearing. In years when women's ages at childbearing rise, the TFR is depressed, and in years when timing of childbearing is advanced, the TFR is inflated relative to the level that would have been observed without such timing changes. To remove the distortions in the TFR caused by these tempo effects, we proposed a simple equation for calculating an "adjusted" total fertility rate (TFR'). Details are provided in our original 1998 article and in Bongaarts (1999), but we briefly reiterate a few key points.

First, TFR' should be interpreted as a variant of the conventional TFR. The TFR is defined as the number of births women would have by the end of their childbearing years (i.e., completed fertility) if the age-specific fertility rates observed in a given year applied throughout the childbearing years. This is a hypothetical rate because no actual cohort will experience these observed period fertility rates. Our TFR' is a similar hypothetical measure, but one that corrects for distortions caused by year-to-year tempo changes. Neither the TFR nor the TFR' attempts to estimate the completed fertility of any actual birth cohort, nor do they attempt any prediction of future fertility. Our goal is simply to provide a period measure of fertility that removes tempo distortions in conventionally calculated total fertility rates.

Second, our study was inspired by the work of Norman Ryder, and we gratefully acknowledge his fundamental contribution to this line of research. However, our conceptualization of quantum and tempo is different from Ryder's. In his work, quantum refers to the completed fertility of cohorts,

and tempo to the timing or mean ages of births within these cohorts. In our study, quantum and tempo are defined as components of the TFR observed during any given year. The quantum component is what the TFR would have been without tempo effects. The tempo component is the difference between the quantum component and the observed TFR. In Ryder's cohort-based formulation, quantum and tempo are observable quantities, but only after the cohorts in question have completed their childbearing years. In our formulation the terms quantum and tempo have meaning with reference to the period in question and can be calculated on the basis of a conceptualization that introduces a new indicator, namely, the TFR that would have been observed in a given year had there been no changes in the timing of childbearing over the course of the year.

Third, the derivation of our simple adjustment formula required us to make some assumptions about possible patterns of change in childbearing. Our central assumption is that the shape of the age schedule of fertility at each birth order does not change during the period for which the TFR is measured. That is, variations in these schedules are limited to multiplication by a constant factor to change the level of period age-specific fertility rates up or down and movement to lower or higher ages to change the timing of childbearing. This implies an absence of cohort effects because the postponement or advancement of births occurs uniformly over all ages within a period. Interestingly, Kim and Schoen (1999) consider this assumption to be "not unreasonable." More on this below.

We also note that our adjustment formula has been independently derived by Kohler and Philipov (2000). They advance a more general equation, which incorporates variance effects, but their formula reduces to ours when the shape of the fertility schedule is invariant.

Reply to Kim and Schoen

Kim and Schoen have misread our study. Their conclusions are based on the erroneous assumption that our adjustment formula attempts to estimate the completed fertility of actual cohorts. They demonstrate that our adjusted TFR indicator "mischaracterizes the course of completed fertility." This criticism is not relevant because we did not attempt to estimate the fertility of actual cohorts. Their analysis sheds no light on the accuracy of our method and there is consequently no need to comment further on it.

Reply to van Imhoff and Keilman

The first objection these authors raise is that our adjustment procedure is based on "improper" fertility measures. It is of course true that we did not rely on occurrence-exposure rates, but this not a problem for our method.

We never claimed that we relied on such rates, and they are not required for our method to be valid.¹

The second objection is that our “constant shape” assumption is “clearly violated.” The authors present no significant evidence to support this claim, but we comment briefly on this issue because it is central.

As we noted, our method is based on the simplifying assumption that fertility schedules are invariant over time at each birth order. This assumption is supported by empirical analyses by numerous researchers in recent decades (see Bongaarts and Feeney 1998 for details). As is customary in analyses of this kind, we do not imagine our simplifying assumption to hold absolutely, but only to be a good approximation of reality. As we noted, “It is likely that our assumption is in practice violated during certain years (e.g., in wars, famines, etc.) when fertility changes rapidly and suddenly from one year to the next....” The question then is not whether our assumption is violated but whether any violations are small enough to be inconsequential in most applications.

A full analysis of this issue is beyond the scope of this response, but we present some new data in support of our position. Specifically, we calculated the standard deviation of past fertility schedules in the United States for each year from 1917 to 1991. Table 1 presents the results for birth orders one through four in 1917 and 1991, the beginning and end points of our data series. The standard deviation increased slightly at each birth order (and there were fluctuations during this 74-year interval), but overall these increases were modest. For our simplifying assumption to be reasonable, year-to-year changes in the standard deviation should be small. Table 1 also presents the average absolute annual change (in percent) in the standard deviation of the fertility schedule for orders one through four from 1917 to 1991, a period that covers the depression of the 1930s, World War II, and the baby boom of the 1950s and early 1960s. These averages range from a high of 1.2 percent for birth order one to a low of 0.5 percent for birth order four. These annual changes are typically very small, and our

TABLE 1 Estimates of standard deviation of fertility schedules by birth order one through four for the United States, 1917 and 1991, and average absolute annual change in standard deviation 1917–91

Birth order	Standard deviation (years)		Average absolute annual change (percent) in standard deviation 1917–91
	1917	1991	
1	4.9	5.7	1.2
2	5.1	5.6	0.7
3	5.2	5.5	0.6
4	5.2	5.5	0.5

SOURCE: Bongaarts and Feeney 1998.

assumption of no change is generally a good approximation of reality. Of course, in some years the changes were well above average (e.g., between 1945 and 1946 the standard deviation at birth order one jumped by 4 percent). It would be desirable to extend our formula to accommodate changes in the fertility schedules, and we applaud the work of Kohler and Philipov (2000) on this issue.

Whether these small year-to-year changes in the shape of the birth-order-specific fertility schedules result in significant errors in our estimates of TFR' is a question that can be answered by undertaking a sensitivity analysis. Zeng and Land (2000) have undertaken such an analysis by implementing extensive computer simulations. They conclude: "the Bongaarts-Feeney formula usually is not sensitive to its assumptions on invariant shape of the fertility schedules and equal changes in timing across ages. That is, as compared to the classic TFR(t), the B-F method is generally robust for producing reasonable estimates of adjusted period TFR'(t) to reduce the distortion caused by the tempo changes, except in abnormal conditions (i.e., extremely large changes in the tempo and shape of the schedule)."

In sum, neither of these comments has changed in any way our view that the proposed new method is sound and useful for interpreting levels and trends in fertility. Definitive results must of course await more widespread application, but we anticipate that in most cases deviations from our assumptions will introduce only minor errors in estimates of the quantum and tempo components of period fertility.

Note

1 We do not comment on the two figures presented by Van Imhoff and Keilman because the occurrence-exposure rates they use contain tempo distortions that are not removed, and the adjusted total fertility rates they present appear to be calculated inaccurately. In our adjustment formula, r_o equals the change in the mean age of the fertility schedule at order o between the beginning and end of the year for which the TFR' is to be estimated. In practice, estimates of r_o cannot be

obtained directly from the annual data that are usually available. We recommended that r_o for year t be estimated as $(MAC_o(t+1) - MAC_o(t-1))/2$, where $MAC_o(t)$ is the mean age of the childbearing schedule at order o in year t . Van Imhoff and Keilman instead use the formula $MAC_o(t) - MAC_o(t-1)$, which is inaccurate and contributes to the fluctuations in the adjusted total fertility rates presented in their figures.

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The 1918 Influenza Epidemic's Effects on Sex Differentials in Mortality in the United States

ANDREW NOYMER
MICHEL GARENNE

THE 1918 INFLUENZA epidemic was a major demographic event in the United States and worldwide. It is notable for its virulence (over 20 million deaths worldwide, approximately half a million in the United States); its maleness (a difference between male and female age-standardized death rates of 174 per 100,000¹); and its W-shaped mortality age profile (death rates having a mode in the 25–34-year age group, strange for influenza, which usually has a U-shaped profile). This study presents a new finding from reexamination of published statistics on death: the 1918 influenza had a strong and fairly long-lasting effect on differential mortality by sex, diminishing the earlier female advantage. The mechanism we posit is a selection effect, whereby those with tuberculosis (TB) in 1918 were more likely than others to die of influenza. This outcome affected males more than females because TB morbidity was disproportionately male. The reduction of the pool of male TB cases lowered the male TB death rate in the years following 1918, and brought males' life expectancy closer to the longer female life expectancy.

Before going into detail about our reexamination, we briefly review some of the salient features of the 1918 influenza epidemic, which, in spite of its enormity, has not been a major focus of studies by demographers.

Background of the 1918 influenza pandemic

Influenza is caused by a virus, a member of the family Orthomyxoviridae. The genome of the influenza virus consists of eight single strands of RNA.

Formation of new flu strains can occur when a host cell is infected by two existing viral strains. For this reason, there are many strains of influenza virus, which explains why, in the practice of modern medicine, new vaccines, based on surveillance of early cases, are recommended before each flu season. Four aspects that set the 1918 epidemic apart from other flu epidemics are the sheer magnitude of the epidemic, the high mortality rate, the aforementioned unusual W-shaped age profile of deaths, and recent molecular discoveries about the 1918 strain.

The first noteworthy aspect of the 1918 epidemic was how many people were affected. Crosby (1989) cites estimates that one-quarter of the American population had clinically recognizable cases of flu during the epidemic. The epidemic was truly global, leaving no continent untouched, and it spread very rapidly. The geographic origin of the epidemic is still debated, with viable North American and European hypotheses (Pyle 1986; Oxford et al. 1999). The “Spanish” attribution of the epidemic, common in the literature, is thought to be a result of the fact that the press in neutral Spain was not censored during World War I, and therefore some early printed reports of the flu originated from Spain. The epidemic began in spring 1918 and much of its impact was experienced during that calendar year. But the epidemic also persisted into 1919 (albeit less so in the United States), when it was most severe in the southern hemisphere, and also dogged the representatives at the Paris peace conference. By 1920, the epidemic’s world tour was over; some cases but few fatalities were reported in 1921 in New Caledonia (in the southwest Pacific) after the island was released from maritime quarantine (Crosby 1989: 234).

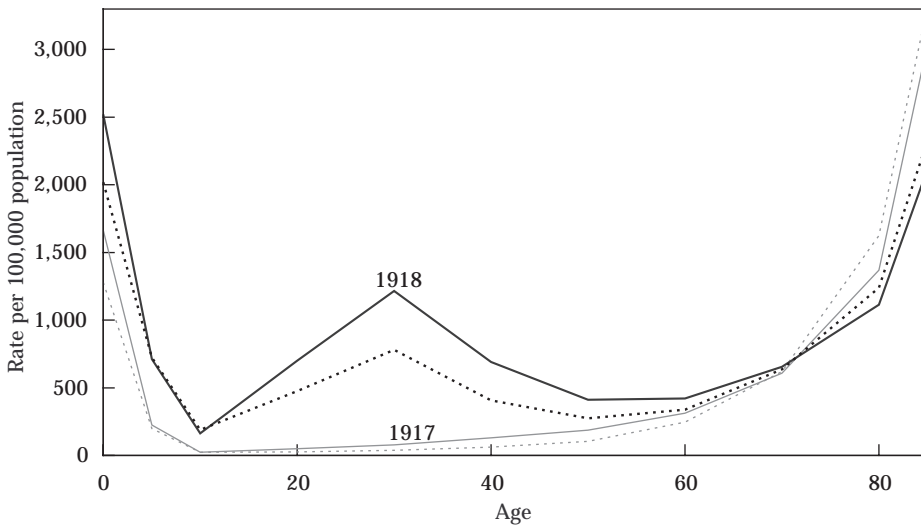
The next noteworthy aspect of the 1918 influenza epidemic is the exceptionally high mortality associated with it. Crosby (1989) estimates that it took the lives of 550,000 Americans, a figure that he deems conservative. The estimated population of the United States on 1 July 1918 was some 103 million (Linder and Grove 1943), so approximately 0.5 percent of the US population died as a result of the epidemic. Worldwide, the death toll is generally put at 20 million. Given the rudimentary state of vital registration in most of what was then the colonized world, this is a rough estimate. Kingsley Davis (1951: 237) calculated that in colonial India alone there were some 18.5 million influenza deaths during 1918–19, and in one of his scenarios the total is 31 million. Thus, the worldwide death total could easily have been in the neighborhood of 40 million. Before the 1918 epidemic, one has to go back to the black death (bubonic plague) of 1346 to find a similarly devastating epidemic. Since 1918, only the AIDS epidemic comes close in terms of global mortality, but, when taking the time frames into account, AIDS has a slow burn compared to the explosion of the 1918 influenza epidemic.

The mortality of the 1918 epidemic was exceptional not only quantitatively, but qualitatively as well. The W-shape of the mortality age profile

is the most peculiar aspect of 1918 flu epidemic. Normally, influenza kills only the very young and the very old. For adults, flu means a bad case of cold and usually some time in bed, but rarely death from secondary pneumonia. Figure 1 presents death rates for influenza and pneumonia combined (except pneumonia of the newborn) by age and sex for 1917 and 1918 in the United States. In 1917 (the bottom two curves in the figure), death rates are high at the very youngest ages, drop to near zero later in childhood, then show a gradual increase throughout younger adulthood and a steeper increase above age 60. As in the age pattern of mortality for all causes combined, this is the classic U-shaped mortality pattern by age. In 1918, the pattern is radically different: we have a W-shape. At the youngest ages, influenza death rates in 1918 are about the same as in 1917. At the oldest ages, influenza death rates in 1918 are less than in 1917. In contrast, the middle ages, the age groups 15–24, 25–34, and 35–44, show a drastic departure from the norm. The death rates have a local maximum at these ages, such that adults in the prime of their lives experienced death rates from influenza comparable to those experienced by the elderly. Note also in Figure 1 that the male death rates in 1918 far exceeded the female death rates among adults. Among the elderly in both years, there is a slight female excess death rate. Among children and adults, there is a slight male excess death rate in 1917. But in 1918, males were at a much greater disadvantage in terms of flu mortality.

The search for the cause of the 1918 influenza epidemic originally centered on bacteria, specifically Pfeiffer’s bacillus (*Haemophilus influenzae*). It

FIGURE 1 Age-specific death rates for influenza and pneumonia combined, males (solid) and females (dotted), 1917 and 1918



SOURCE: US Department of Health, Education, and Welfare 1956.

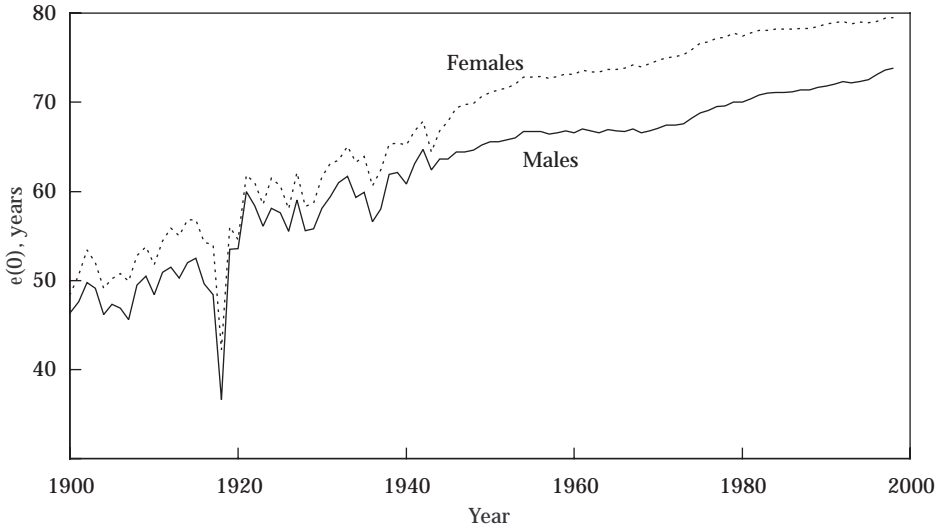
was in his research on the putative etiologic agent of the 1918 flu that Alexander Fleming made his serendipitous discovery in 1929 of the antibiotic properties of *Penicillium*. In 1933, it was finally determined that influenza is caused by a virus. Recently, with the advent of techniques permitting creation of laboratory samples of genetic code from the most minute traces of virus (through polymerase chain reaction, or PCR), molecular biologists have taken a renewed interest in the 1918 epidemic. Reid et al. (1999, 2000) report genetic characterization of the 1918 virus from human bodies preserved in Alaskan permafrost and from autopsy tissue samples embedded in paraffin. These studies show that of all the mammalian flu strains, the 1918 strain is closest to the avian strains of influenza virus; the 1918 virus is also related to swine strains. The general zoonotic nature of influenza (i.e., its transmissibility from animals to humans) appears to have played a particular role in the exceptional 1918 epidemic. Frustratingly, these findings have not answered the question why the 1918 virus was so virulent, nor do they offer an explanation for the unusual age profile of deaths.

Changes in life expectancy

Life expectancy at birth, $e(0)$, is a summary of mortality at a given time. It is the mean length of life that would be experienced by a birth cohort subject to the mortality rates of the reference period through the cohort's entire life span. The 1918 influenza epidemic affected life expectancy at birth in the United States, with the measure for each sex dropping by 11.8 years from 1917 to 1918.² There was no lasting effect on $e(0)$ values, however, as survivorship for both sexes rebounded quickly; indeed, $e(0)$ for both sexes was greater in 1919 than in 1917.³ We now examine changes in the sex difference in $e(0)$ before and after 1918. (On the merits of looking at absolute differences rather than ratios, see Sheps 1958 and 1959 and Keyfitz 1985: 60–62.)

To provide a broad perspective on the impact of the 1918 flu epidemic, Figure 2 presents the evolution of life expectancy at birth, by sex, for 1900 to 1998. Figure 3 presents the evolution of the age-standardized death rate (ASDR), by sex, for the same years. The ASDR measures the crude death rate (deaths per 100,000 population) calculated by applying observed age-specific rates to the US standard population.⁴ Changes in $e(0)$ need not track very closely changes in the ASDR.⁵ Figure 4 presents the absolute differences between male and female $e(0)$ and ASDR for the same years. The results in Figure 4 are striking: by either measure, the 1918 influenza epidemic had a major impact on male–female differences in mortality. After 1918, the female mortality advantage in $e(0)$ fell from 5.6 years to one year (the drop is the same whether comparing 1919 to 1917 or 1918); in ASDR the female advantage fell from over 350 per 100,000 to below 100. Females would not regain their pre-epidemic mortality advantage over males until

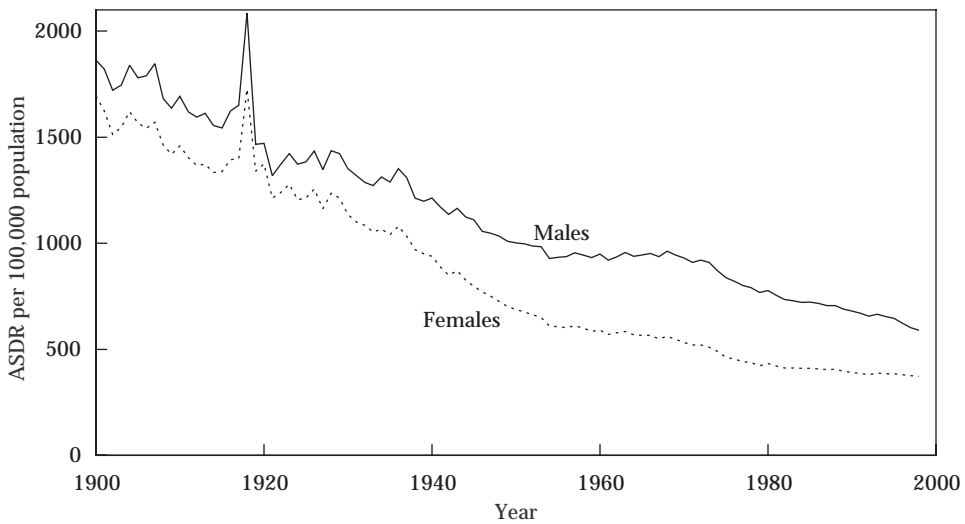
FIGURE 2 Expectation of life at birth, $e(0)$, males and females, 1900–98



SOURCES: Grove and Hetzel 1968; Murphy 2000.

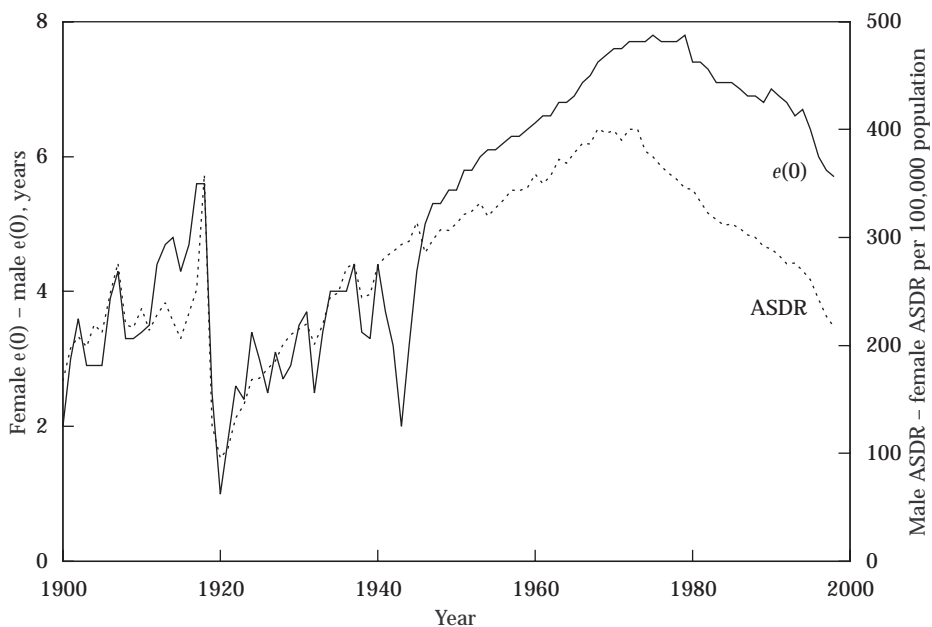
the mid-1930s, or, if the reference point is the female advantage registered in 1917 and 1918, until the 1950s. The literature on sex differentials in mortality does not discuss this finding (see, for example, Retherford 1975; Preston 1976: 120–162, 1977; Berin, Stolnitz, and Tenenbein 1989).

FIGURE 3 Age-standardized death rate, ASDR (all causes), males and females, 1900–98



SOURCES: Grove and Hetzel 1968; Murphy 2000.

FIGURE 4 Sex difference in expectation of life at birth, $e(0)$ (left scale, female minus male), and sex difference in age-standardized death rate, ASDR (right scale, male minus female), 1900–98



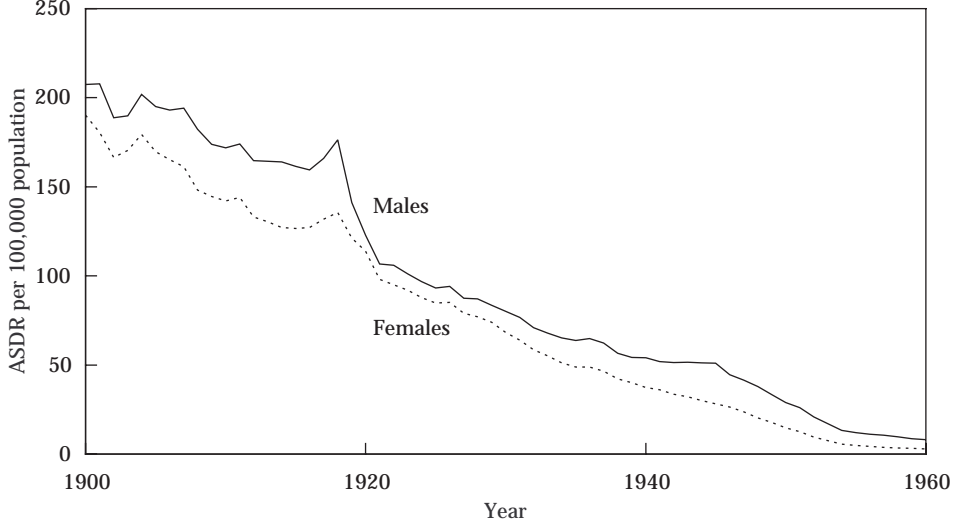
SOURCE: Calculated from data in Figures 2 and 3.

To understand better the origin of these changes, we examined death rates by age and sex for 30 causes, representing around 80 percent of all registered deaths in the United States. The age-standardized death rate is useful here, because the ASDR for all causes is the sum of all cause-specific ASDRs.

The key role of tuberculosis

Figure 5 presents the age-standardized death rate for tuberculosis (all forms), by sex, for the United States, 1900–60; and Figure 6 presents the male–female absolute difference in ASDR for TB for the same time period. Two aspects of Figure 5 are already well known: TB death rates fell precipitously in the first half of the twentieth century; and males have higher TB death rates. (Note also that the 1918 epidemic interrupted the downward trend, causing a temporary upsurge in TB death rates.) When plotted by sex, the rates reveal a third major feature that has not previously been discussed in the literature: just after 1918, TB death rates experience their steepest decline of the century, and this decline is much more pronounced for males than for females. In 1921, the male ASDR for TB exceeded the female ASDR by only 8.6 per 100,000 (compared with a difference of 40.7 in 1918).

FIGURE 5 Age-standardized death rate, ASDR, for tuberculosis (all forms), males and females, 1900–60



SOURCES: US Department of Health, Education, and Welfare 1956; Grove and Hetzel 1968.

Table 1 presents key data in numerical form, to complement the graphs. The raw data in the table are age-standardized death rates for males and females for several causes for the pre-epidemic year of 1917, for the epidemic year, and for 1921, when female mortality advantage began to re-

FIGURE 6 Sex difference in age-standardized death rate, ASDR, tuberculosis (all forms), 1900–60



SOURCE: Calculated from data in Figure 5.

TABLE 1 Age-standardized death rate per 100,000 population, males and females, selected causes

	1917		1918		1921		Δ 1917-1921	
	Raw	Smoothed	Raw	Smoothed	Raw	Smoothed	Raw	Smoothed
All causes								
M	1,650	1,540	2,085	1,504	1,318	1,432	-332	-107
F	1,398	1,398	1,727	1,393	1,213	1,264	-185	-134
M - F	252	214	358	173	105	111	-147	-103
Influenza and pneumonia^a								
M	193	207	672	235	108	154	-85	-53
F	156	184	498	216	96	144	-60	-39
M - F	38	21	174	18	12	12	-26	-9
Violence^b								
M	167	162	161	156	134	133	-32	-29
F	56	51	52	51	50	50	-6	-2
M - F	111	111	109	105	85	84	-26	-27
Modified all causes^c								
M	1,290	1,283	1,252	1,248	1,076	1,091	-215	-192
F	1,186	1,184	1,177	1,171	1,067	1,067	-119	-117
M - F	104	92	75	67	8	25	-95	-67
TB^d								
M	166	163	176	156	107	110	-59	-53
F	132	128	136	127	98	101	-34	-26
M - F	34	34	41	30	9	9	-25	-25
Nephritis^e								
M	137	133	125	125	105	112	-32	-21
F	110	103	101	101	96	99	-14	-4
M - F	27	27	25	24	10	13	-18	-14
Stroke^f								
M	126	123	120	120	114	118	-12	-4
F	125	123	123	123	121	123	-5	1
M - F	1	1	-3	-3	-7	-6	-7	-7
Heart disease^g								
M	229	224	221	219	205	211	-24	-13
F	200	200	204	200	192	199	-8	-2
M - F	29	21	17	16	12	13	-16	-9
All other^h								
M	632	629	609	609	545	545	-87	-84
F	619	619	614	609	561	561	-59	-59
M - F	13	5	-5	-5	-16	-9	-29	-14

NOTES: Raw data are age-standardized death rates per 100,000 population, from US Department of Health, Education, and Welfare 1956. Smoothed data were obtained by smoothing the entire dataset with the "3RSSH, twice" smoother (Tukey 1977). The M - F (male minus female) smoothed values are the smoothed differences, not the differences of the smoothed values.

^aInfluenza and pneumonia combined, except pneumonia of newborn.

^bMotor vehicle accidents, other accidents, suicide, and homicide.

^cAll causes, excluding violence and influenza and pneumonia (see text).

^dTuberculosis, all forms.

^eChronic nephritis (chronic and unspecified nephritis and other renal sclerosis).

^fStroke (vascular lesions affecting central nervous system).

^gDiseases of the heart (does not include rheumatic fever).

^hModified all causes, additionally excluding the above four causes.

bound (as seen in Figure 4). The category “modified all causes” in Table 1 was calculated by subtracting violent causes and influenza and pneumonia from the data for all causes.⁶ Violence is excluded to concentrate on biological causes of death, and influenza and pneumonia are excluded in order to measure the *indirect* after effects of the 1918 epidemic. Including influenza and pneumonia, the sex difference in mortality fell after 1918 in part because the flu epidemic vanished. Between 1917 and 1921, the smoothed male–female differential of modified all causes fell from 92 to 25 per 100,000, a drop of 67 (Table 1). Tuberculosis alone dropped by 25 per 100,000, or 37 percent of the overall drop between 1917 and 1921 in the differential in age-standardized death rates, more than any other cause.

Tuberculosis and influenza very likely interacted in 1918. Vital statistics cannot address this question well, because even if contributory causes are listed on the death certificate, a unique cause of death is recorded, a general problem that hinders cause-specific studies of death. Raymond Pearl (1919) published individual-level data on influenza–TB co-infection in 1918 (the uniqueness of the 1918 virus makes it important to have contemporary data). We have reanalyzed these data using logistic regression, and found that TB infection was a significant risk factor for contracting influenza.⁷ This analysis was conducted among persons classified as having no other cases of influenza in the household, so it measures community-acquired influenza infection. The different rates of disease progression for the two pathogens minimize reverse causality. Pearl’s dataset as published is not perfect: there are no controls for age, sex, or socioeconomic status, and the sampling frame is households with at least one case of tuberculosis (though data on all household members were collected). Only white households were surveyed. Despite these shortcomings, cautious use of Pearl’s dataset is justified because it is the only source of contemporary microdata on TB and influenza that we have found after an extensive search.

We conjecture that many influenza deaths in 1918 took place among the tuberculous—persons with clinical disease or latent infection with *Mycobacterium tuberculosis*. That the 1918 influenza virus, known to be atypical, should interact pathologically with *M. tuberculosis* seems likely.⁸ Influenza and TB are not strongly linked in the medical literature, though there are some clinical references to interactions (e.g., Couch 1981). The age pattern of the 1918 flu means that TB and influenza overlapped much more than usual. Seemingly no one was invulnerable to the 1918 flu, and we know that TB prevalence was high in 1918, even among some ostensibly healthy individuals (if we include those in whom infection was latent). The influenza–tuberculosis interaction need not be a molecular phenomenon (i.e., involving some direct interaction between the TB bacillus and the influenza virus). The secondary pneumonia that occurs as a complication of influenza infection could be exacerbated by active tuberculosis or by tubercu-

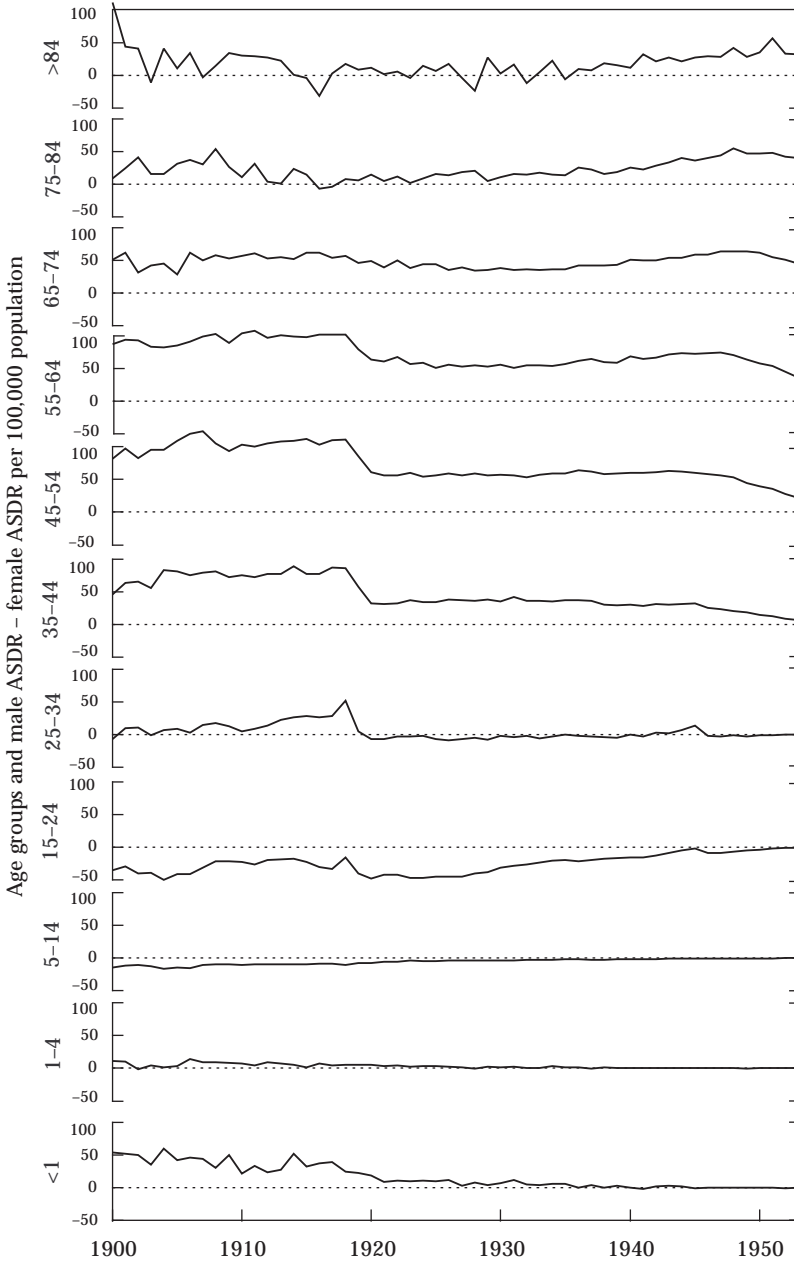
lar lesions in the case of latency. Virtually all influenza deaths involved the lungs, an important site of pathology for tuberculosis.

An influenza–tuberculosis nexus is consistent with what is known about the 1918 epidemic, including the high fatality rate and the W-shaped mortality age profile, and it helps explain the sex differentials we observe. The deadliness of the epidemic seems less extreme if we consider that many victims also had TB. Excess male flu mortality is consistent with the differential incidence of TB by sex. The fact that flu deaths had a mode in the 25–34 age group is also strongly indicative of a TB interaction; TB is a disease of adulthood, not of old age.⁹ In the natural history of TB infection, progression to clinical disease may take place years after initial infection with the TB pathogen (Bloom and Murray 1992; Murray, Styblo, and Rouillon 1993). At any given time, there is a pool of active and latent TB cases from which future TB deaths are drawn. The diminution of this pool by a selective effect such as death from influenza will reduce the incidence of TB deaths in subsequent years.

The age-standardized death rate alone is a blunt measure; a sufficiently large rate change in any age group could alter the ASDR. The selection hypothesis predicts that the narrowing of post-1918 male–female differences in TB mortality is due to drops in male TB death rates at the ages especially affected by the flu epidemic. Figure 7 shows sex differentials in TB death rates, with each panel of the figure representing a successive age group. This collection of graphs can be seen as a “rough cut” of a Lexis surface. The panels, each drawn with the same scale to permit comparison, represent a third dimension, the other two dimensions being period (the horizontal axes) and death rate (the vertical axes). Thus, in Figure 7 we have information by age and calendar year; true cohort data would be preferable but are unavailable. The decline in the male–female difference in TB death rates occurs only in the age range 15–64 years. Among those 65 years and older and below 15 years, there is very little change in the sex differential in TB mortality; the most pronounced effects are at ages 25–54. For age groups 15–64, we see a sudden and sustained drop in the sex differential of TB mortality after 1918, because male rates drop faster than female ones. Females have higher TB death rates at ages 5–24. However, males’ drop relative to females’ is not limited to age groups where their death rate from TB exceeds females’. Interestingly, following 1918, in the 25–34-year age group, among whom influenza death rates show a peak, men and women experienced near parity in TB death rates, as if starting with a clean slate (Figure 7). Changes in TB death rates below age five years reflect recent transmission of the bacillus, and are not illustrative of the effects we consider. The effects we observe are not driven by race: nonwhites have much higher TB death rates than whites, but qualitatively there is no difference in the observed patterns.

There is a modest rise in males’ excess TB mortality centered at 1945 (Figures 5 and 6). This effect is driven by changes in the 15–34-year age

FIGURE 7 Male minus female age-specific death rates, ASDR (per 100,000 population), for tuberculosis (all forms), 1900-53



NOTE: Each panel has identical scale.
SOURCE: US Department of Health, Education, and Welfare 1956.

groups (Figure 7), which is consistent with the selection effect, since the corresponding cohorts were largely untouched by the 1918 epidemic. If the “normal” pattern by sex is for men to have higher TB mortality rates, then the effect observed around 1945 could be seen as a temporary return to the status quo ante, after the effects of the 1918 epidemic had worn off and before TB death rates declined to very low levels.¹⁰

For two years after 1918, pulmonary tuberculosis as a percent of all TB deaths among males declined, from 86.6 percent to 85.2 percent. This is a relatively small decline, but the denominators are large: over 50,000 male TB deaths each year. Importantly, the general trend is toward pulmonary TB becoming more prominent, and the percentage of pulmonary TB among women did not decline after 1918. Because this decline is a short-term (two-year) phenomenon, it is more difficult to assess whether this is another consequence of the 1918 flu epidemic. There were three nonpulmonary TB forms for which male death rates increased but female rates did not: tubercular meningitis, Pott’s disease (tuberculosis of the vertebral column), and tuberculosis of other organs. The increased importance of nonpulmonary TB for males but not for females suggests that the lungs as a shared site of pathology for TB and influenza may have played a role in the diseases’ interaction. Specifically, if pulmonary tuberculosis made one more likely to die from influenza-induced pneumonia, then having nonpulmonary TB would be less of a risk factor for flu death; consequently, in the years after 1918, death rates for nonpulmonary forms of TB as a proportion of all TB deaths would increase, even if this reverses the secular trend of pulmonary TB being increasingly important.

If the pre-1918 trends in male and female age-specific death rates from TB had continued through 1932, the death registration area of the United States would have observed 500,000 more TB deaths than it actually did. In this counterfactual analysis, we fitted a quadratic trend to age-specific TB death rates, 1900–17, for each age group above age five years. We projected these trends forward and calculated absolute numbers of deaths that would have resulted, which were then compared to the true death tallies. This exercise demonstrates that the magnitude of the post-1918 shift in the trend of TB death rates is not too large to have been caused by the 1918 influenza epidemic.¹¹ That is, it would be surprising if the magnitude of the ostensible selection effect (the number of influenza deaths) did not have some concordance with the consequences (the shift in the TB trend).

Consider the above findings from the point of view of tuberculosis epidemiology as opposed to influenza epidemiology. The approximately 50,000 male TB deaths observed each year during the late 1910s correspond to approximately 300,000 male active TB cases in the United States at any given time (this estimate is based on data in Murray, Styblo, and Rouillon 1993: 238 and Lowell 1969: 17). Furthermore, the post-1918 reductions in

the number of TB deaths, compared to extrapolation of the pre-1918 trend, do not need to be precisely accounted for by the toll of the 1918 influenza epidemic. This is because of the cumulative effect of the shrinking number of tuberculous persons in the population. Tuberculosis is spread by those who have tuberculosis, so the accounting work should be done in light of a declining, not fixed, population of tuberculous individuals. Given the fact that many men in this period must have gotten TB from other men, such as those in the workplace, the cumulative effect on TB mortality would have reinforced the selection effect. Thus, the cumulative effect is consistent with the hypothesis that the 1918 flu epidemic's excess male mortality was disproportionately among tuberculous males.¹²

From a biological perspective, the link between influenza and TB may include a third pathogen. Tuberculosis infection causes lung cavities to form, which become a breeding ground also for non-TB bacteria, including *Staphylococcus aureus*. This would have had the effect of priming tuberculous individuals for *S. aureus* superinfection in the event of co-infection with influenza. It is highly plausible that TB infection laid the ground for the massive secondary bacterial pneumonias that killed the victims of the flu in 1918.

The role of other causes of death

The role of nontuberculosis causes of death in the overall decline in the male–female mortality differential after 1918 is less clear. Throughout the first half of the twentieth century, infectious disease death rates fell toward zero for both sexes, and so there is necessarily a tendency for the sex differential in absolute terms to decline. At the same time, death rates for heart disease, a major determinant of the overall death rate, rose and became more masculine, so women did not lose their advantage in the longer term. It took until the 1930s for female mortality advantage to return to its pre-1918 level. As seen in Figure 4, females began regaining their pre-1918 mortality advantage in 1920. But it took over ten years to regain the level of advantage prevailing in the first decade of the century and well over 20 years to reach and surpass the advantage registered in 1917–18. The factor (or factors) that depressed females' mortality advantage post-1918 were not persistent, but represented a temporary shock.

The cause that accounts for the second-highest share in the decline of the male–female mortality differential between 1917 and 1921 (14 per 100,000 in Table 1, or 21 percent of the drop in the modified all causes category) is chronic nephritis, a notoriously inaccurate death code (Dublin and Kopf 1913; Preston 1976: 6). Even if coded correctly, there are multiple etiologies leading to death from this cause (including *M. tuberculosis*). Stroke accounts for 10 percent of the fall in that differential during the period (7 per 100,000 in Table 1), due to the peculiar fact that from 1918 to

1925 females had higher age-standardized death rates for stroke than males. After 1925, mortality from stroke among males again became higher than among females, as was the case prior to 1918.¹³ Heart disease accounts for 13 percent of the observed decline (9 per 100,000 in Table 1). This cause is concentrated in older ages, and both sexes experienced a temporary drop in death rates from heart disease, but the drop was greater among males than among females after 1918. It is plausible that 1918 flu deaths reduced subsequent heart disease deaths, again through a selection effect. The diminution of the magnitude of TB transmission after 1918 (observable, for example, in the drop in childhood TB death rates) may have had secondary effects also on other diseases. The posited key role of TB in reducing the post-1918 male–female mortality differential is strengthened when causes of death other than TB are also examined, because, unlike with TB, no clear pattern emerges from these causes of death.

We emphasize that the highly unusual mortality age pattern of the flu deaths in 1918 (Figure 1) not only corroborates the connection with tuberculosis, which, as noted above, was a disease of adulthood in 1918, but also rules out causal connections between flu deaths and most other causes of death. For example, stroke is overwhelmingly a cause of death among the elderly. It is highly unlikely that the 10 percent contribution of deaths from stroke to the drop in the total male–female differential of mortality between 1917 and 1921 is causally related to influenza, as those who died of flu in 1918 were not susceptible to stroke in the years immediately following the epidemic. The reverse is true with tuberculosis, where the middle of the W-shape of flu death rates (Figure 1) coincided with the peak ages of TB death rates in the years following 1918.

Conclusion

Some of the huge losses of life resulting from the 1918 influenza epidemic were, in some sense, borrowed against future deaths from tuberculosis. Although males suffered more than females from the heightened death rates during the flu epidemic, males' life expectancy rebounded faster in the two years immediately after 1918. This is a selection effect, or what Hobcraft, Menken, and Preston (1982) called a "cohort inversion" effect. Stated succinctly, the robustness of a cohort in the face of death can increase over age and time (up to a point), because of a shift in the unobserved heterogeneity among mortality risk factors. In the present case, the selecting mechanism was sex-differential mortality resulting from the 1918 influenza epidemic, and the unobserved (at the time) shift in risk factors was a decreased prevalence of tuberculosis infection, also differentially affecting males and females.

These results have much to teach us. The details of the epidemiologic transition (Omran 1971) are sex specific. Epidemiologic shocks can have

long-term effects on mortality differentials by sex if they act as a selecting mechanism. A result of this kind has not previously been documented in the demographic literature. Our study does so for the United States; exploration of the effect elsewhere would be worthwhile. This requires accurate mortality data, detailed by age and sex and cause, from the period both before and after 1918. The non-belligerent European countries during World War I, as well as Canada, Japan, Australia, New Zealand, and South Africa, may provide fertile ground for further investigation.

If another pandemic of hyper-virulent influenza were to appear, it is possible that the United States, where since 1918 the prevalence of tuberculosis has been reduced dramatically, would not suffer as greatly as before. This is because some of the peculiar and intense middle-age mortality from influenza observed in 1918 appears to be related to prior tuberculosis infection. On the other hand, developing countries, where TB is still highly prevalent (Dye et al. 1999), would be vulnerable and very likely would subsequently experience appreciable changes in male–female mortality differentials.

Notes

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1 The reference is to the male minus female difference in the age-standardized death rate for influenza and pneumonia combined (except pneumonia of the newborn). By comparison the difference was 38 per 100,000 in 1917 and 13 per 100,000 in 1919.

2 All data presented here come from published vital statistics volumes. See Grove and Hetzel (1968) and US Department of Health, Education, and Welfare (1956). Before 1932, mortality statistics refer to the death registration area, not the entire country; in 1918, about 77 percent of the population of the United States was included in the death registration area (Linder and Grove 1943: 998).

3 Overseas war deaths are excluded from both the numerator and denominator of vital rate calculations (Grove and Hetzel 1968: 50).

4 The US standard population is the enumerated population of 1940, both sexes, all races. It is given in Grove and Hetzel (1968: 37).

5 This was the case in the 1940s, for example. A change in age-specific mortality rates affects the life table population (from which $e(0)$ is calculated) at that and all subsequent ages, so $e(0)$ is more sensitive than the ASDR to young mortality, except in cases where the standard population is weighted toward young ages. In the 1940s in the United States, male death rates attributable to childhood diseases improved more than female death rates, with improvements in both sexes possibly resulting from the introduction of antibiotic drugs or from wartime food rationing, which is redistributive (Drèze and Sen 1989: 181). This change affected $e(0)$ more than it did the ASDR.

6 Violent causes are: motor vehicle accidents, other accidents, suicide, and homicide. Influenza and pneumonia are listed as a single cause and exclude pneumonia of the newborn.

7 Analyzing Pearl's table 1, with influenza infection as the dependent variable, the logit coefficient for TB was 0.79 (odds ratio 2.2), controlling for household size ($p < 0.0005$). In other words, among those living in a household with at least one case of active tuberculosis, the odds of getting influenza (i.e., the probability of getting influenza divided by the probability of not getting influenza) were 2.2

times higher for actively tuberculous individuals, compared to nontuberculous individuals in the household. A random sample of households would be preferable to a sample in which each household has at least one known case of TB. However, Pearl did not design the study from the ground up; he was trying to make use of some routine data collected about tuberculous persons.

8 The analysis of Pearl's dataset is consistent with an interaction inside the body between the two pathogens. However, there are alternative explanations for the risk factor demonstrated in that analysis, such as occupational exposure to many other people and thus the increased likelihood of having contracted TB in the past as well as contracting influenza in 1918. Tuberculosis kills slowly, and in spite of public health campaigns not all those infected would have stayed away from work.

9 This was particularly true in the period we consider. In 1905, 1908, 1910–12, and 1915–20, TB death rates peaked at ages 25–34. In 1906–07 and 1909, non-infant TB death rates peaked in the 25–34 age group; in 1913–14, TB death rates peaked in the 35–44 age group. And in 1921–34, TB death rates had a mode in the 25–34 age group. After 1934, reflecting the changing epidemiology and de-

mography of TB, death rates shifted to a unimodal profile, peaking at older ages.

10 One caveat is the possible effect on TB death rates of American involvement, 1941–45, in World War II. This is hard to assess. Overseas servicemen, as noted earlier, are not included in the vital statistics system of the United States, and TB deaths can take place years after infection.

11 The exact agreement of excess TB deaths in the analysis with the estimates of the number dead in the 1918 epidemic might be a coincidence, but it is interesting to note that the two figures have the same order of magnitude.

12 The observation by Drolet (1942: A47), that in rural areas of the United States the sex differential of TB mortality was smaller than in urbanized areas, also points to the importance of transmission in the workplace.

13 Although the reversal in sign of the male–female ASDR differential for stroke lasted from 1918 to 1925, male rates were barely above female rates for stroke in 1917, whereas in 1916 and before men had a consistently higher ASDR for stroke. Whatever happened to the male–female differential in stroke death rates began in 1917, not in the year of the influenza epidemic.

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Dudley Kirk on Population Changes and Prospective Power Relations after World War II: A View from 1943

The theory of demographic transition in its best-known modern formulation was developed in the early 1940s by a small group of researchers associated with Princeton University's Office of Population Research, under the leadership of Frank W. Notestein. A notable early adumbration of the theory in print—in fact preceding the most often cited contemporaneous articles by Notestein and by Kingsley Davis—was by Dudley Kirk, one of the Princeton demographers, in an article titled "Population changes and the postwar world," originally presented by its author on 4 December 1943 at the 38th Annual Meeting of the American Sociological Society, held in New York. It is reproduced below in full from the February 1944 issue of American Sociological Review (Vol. 9, no. 1, pp. 28–35).

In the article Kirk, then 30 years old, briefly discusses essential elements of the concept of the demographic transition. He characterizes trends in birth and death rates as closely linked to developmental changes: to the transition "from a peasant, self-sufficient society to an urban, industrial society." He sees the countries of the world as arranged on a "single continuum of development" and, correspondingly, on a continuum of demographic configurations. These countries, he suggests, may be divided into three broad groups: the first, with high mortality and high fertility, possessing great potential population growth; the second, "caught up in the tide of industrialization and urbanization," hence exhibiting birth and death rates that are both declining but in a pattern that generates rapid population growth; and a third, with low fertility and low mortality, pointing toward the prospect of eventual depopulation. He describes the temporal and geographic process of material progress and demographic change as one of cultural and technological diffusion emanating from the West. But Kirk's main interest in this article is the effects of the patterns

generated by economic change and the ensuing demographic transition on shifts in relative power—military and economic—within the system of nations, both historically and in the then dawning postcolonial era. On the latter score, even if occasionally colored by judgments reflecting perspectives unsurprising in 1943, such as in his assessment of the economic potential of the Soviet Union, Kirk's probing of the likely consequences of evolving trends in power relationships as shaped by shifting economic and demographic weights—issues now largely neglected in population studies—is often penetrating and remarkably prescient. His views on the implication of these trends for the desirable American stance toward the economic and demographic modernization of less developed countries—friendly assistance resulting in rapid expansion of markets, and trade speeding a social evolution that also brings about slower population growth—represent what became an influential strand in post-war US foreign policy.

*Dudley Kirk was born 6 October 1913 in Rochester, New York, but grew up in California. After graduating from Pomona College, he received an M.A. in international relations from the Fletcher School of Law and Diplomacy of Tufts University in 1935 and a Ph.D. in sociology from Harvard in 1946. He was associated with Princeton's OPR between 1939 and 1947, where he published his influential monograph *Europe's Population in the Interwar Years* (1946) and, with Frank Notestein and others, coauthored the book *The Future Population of Europe and the Soviet Union* (1944). From 1947 to 1954 he was demographer in the Office of Intelligence Research of the US State Department, the first person having that title in the federal government. From 1954 to 1967 he was director of the Demographic Division of the Population Council in New York, and from 1967 until his retirement in 1979 he was professor of population studies at Stanford University. In 1959–60 he was president of the Population Association of America. Dudley Kirk died 14 March 2000 in San Jose, California.*

Great changes have occurred and are occurring in the size and distribution of the world's population. These changes are among the more fundamental and predictable determinants of the future. In their larger aspects population trends have shown a great deal of stability in the past and it seems reasonable to suppose that they will continue to do so in the future. They are one of the more certain elements in a most uncertain world. It is the purpose of this paper, first, to make some generalizations about population changes occurring in modern times and, second, to indicate some directions in which they, in association with other social trends, may affect the postwar world.

A generation ago, behind every discussion of population problems there loomed the gloomy figure of Malthus. The writings of demography were filled with the dangers of overpopulation. These dangers have not disappeared; in most of the world there is still a heavy pressure of popula-

tion on developed resources, and the Malthusian controls of famine, disease, and war are still the major checks to population growth. But a different interpretation of population phenomena has become more popular, partly owing to obvious changes in population trends, partly because of a re-evaluation of the relationship between population growth and economic development in the modern world.

Population trends as a function of “progress”

The dismal outlook of never-ending pressure of population on the food supply was dispelled in Western civilization by the achievements of the agricultural and industrial revolutions, and to a lesser extent by the exploitation of new lands and of old peoples. These have combined to provide the economic basis for both rising levels of living and extraordinarily rapid population growth. In the past three centuries the population of European race has increased sevenfold: from 100 millions in 1650 to 700 millions at the present time. In the same period it has increased from less than a fifth of the world's total to more than a third. But accompanying the achievement of higher levels of living, both as cause and consequence, has been the spread of the empirical outlook on life conducive to the restriction of family size and the termination of population growth. As is well known, the indefinite continuation of interwar trends would ultimately lead to the depopulation of Western Europe and of Europe overseas.

Rapid population growth and the subsequent slowing of growth arising from control of family size are intrinsic elements in the nexus of cultural traits that are valued as “progress.” Their development has not been haphazard. Within Europe, for instance, there has been a clear pattern of cultural diffusion from the initial locus of development in Northwestern and Central Europe. Modern education, improved health conditions, and economic advance are parts of the same cultural complex, indigenous to the West and for many decades past in the process of spreading across the continent. Progress flows along the lines of communication, is assisted by the presence of natural resources appropriate to industrialization, and is checked by natural and cultural barriers, but in general the level of material achievement of any given area in Europe is a function of its distance from the centers of diffusion in the West. Generally speaking, to go eastward in Europe is to [go] backward in time. The mode of life in some of the remote corners of Europe, as in the mountain districts of Yugoslavia, in Bessarabia, or in the Caucasus, has many points of resemblance to that existing in Western Europe several generations ago. Intermediate areas tend to blend towards one extreme or the other depending upon their geographical location and cultural associations. In these terms Europe is a cultural unit, all in the same stream of development, but with differences in the level

of attainment growing from differences in the time at which the transition began from a peasant, self-sufficient society to an urban, industrial society.

Outside of Europe technological civilization has made progress likewise in relation to the accessibility, both cultural and geographical, to the centers of its development. It has now gained a solid foothold even among non-European peoples, and the time has long since passed when our arrogance will permit us to assert that Orientals, for instance, are racially or culturally incapable of establishing a modern industrial civilization. The spread of industry and the growth of cities have been well nigh universal phenomena of recent times. Though in many countries these exist now only in embryonic form, it is questionable if there is a single country in the world that has not experienced some increase in industrial output and in modern urban influences during the twentieth century.

Demographic trends have shown an almost equal, and closely related, consistency in the direction of their development. Every country in the world with sufficiently good vital statistics to permit a judgment of trends displayed declining mortality rates in the interwar period. With few exceptions in the world, and none in the sphere of Western civilization, the birth rates likewise were lower at the end than at the beginning of the period.¹

The continuum of demographic development

In regard to demographic matters the different countries of the world may be considered as on a single continuum of development, a continuum having both spatial and temporal significance. It is spatial in that the degree of development is related to the cultural and geographical accessibility to the most advanced countries. It is temporal in that each country in its development is following a general historical pattern common to all. In areas relatively untouched by Western influences, the typical demographic situation today is one of high birth rates and high death rates, with a low value placed on human life both in its inception and in its destruction. Of course this was also the demographic position of Europe at an earlier period. In normal years such areas have a substantial margin of natural increase, which is periodically checked by disasters of one sort or another. As modern influences increase, the beginnings of police control, better transportation, and the application of elementary public health measures all ameliorate the effects of these disasters. Before the war, the British in India, the Dutch

¹In a number of countries the decline of the birth rate was checked in the late thirties as the result of economic recovery and, in Germany and the U.S.S.R., as the result of deliberate population policy. However, except in the U.S.S.R., this phenomenon occurred only in countries already having low birth rates. In all cases the rates of the thirties were substantially below those of the twenties. The birth rate in Germany proper averaged 19.6 per thousand in 1936–1940, 22.1 in 1921–1925, and 27.0 in 1913. In the Soviet Union, the reported birth rate of 38.3 per thousand in 1938 compares with an average of 43.7 (European Russia) in 1925–1927, and 43.8 (European Russia including Western areas of lower fertility lost as the result of World War I) in 1911–1913.

in Java, the Japanese in Korea, we ourselves in the Philippines and Puerto Rico, had softened the impact of calamity, and had made effective the normally high rate of natural increase. This is the typical "colonial" situation today, characteristic of most of the Far East, the Mohammedan world, and much of Africa and Latin America. It was the condition of roughly half the population of the globe before the war.

In more developed countries further application of relatively elementary principles in the saving of lives had brought about further declines in the death rates. Later, the advance of modern influences, in the form of urban ways of life and the values which have accompanied this way of life in Western civilization, has resulted in the spread of the small family pattern, first among the upper classes and then among all the urban elements of the population. Such developments have yielded the beginnings of the decline of the birth rate, with clear indication that it would continue if unimpeded by a return to earlier values or by the inauguration of repressive population policies. In Southern and Eastern Europe, in the more progressive countries of Latin America, and in Japan, the decline of the death rate in the interwar period was accompanied by a declining birth rate. In these countries the pattern of fertility decline was established. However, the momentum of past growth, as reflected in the youth of their populations, and the inevitable lag in the decline of fertility from its present levels posit substantial future growth of population in these areas for some years to come.

The countries nearer the centers of Western civilization have progressed further in the transition than those less fully caught up in the rising tide of material values. In the core of Western civilization in North-western Europe demographic evolution before the war had proceeded to the point where the birth rate was overtaking the death rate in its decline. The list of countries facing the likelihood of future population decline is a roster of the nations that have led the world in material progress.

The continuum of population development may be divided into three significant segments, each with its peculiar problems in the postwar world. About half the population of the world is in the first stage, the stage of great potential growth. Western influences have made possible a reduction in the death rate without compensating declines in the birth rate. In a relatively stable postwar world these areas will experience tremendous population growth, comparable in amount, though probably not in rate, to that experienced by the Western world at an earlier period of its history. A second, and transitional, stage has been achieved by those nations now caught up in the tide of industrialization and urbanization, but formerly, at least, on the peripheries of Western civilization. In these countries birth and death rates have both been declining, but the birth rates are still sufficiently high to support population growth for some time to come. Finally, there are those countries that face the prospect of depopulation if the net fertility declines of the interwar period are continued.

It would be tempting to consider a multitude of problems that may be encountered at each stage of economic and demographic evolution, but it would be impossible even to list them in the space allotted, and much less to analyze all the permutations and combinations represented in the various parts of the world. Perhaps what is most significant to us now, with the problems of planning a peace a public issue, is the political implications of the differing demographic trends, first, within Europe, and, second, in the relationships between the Western peoples and the rest of the world.

Power implications of population trends: Within Europe

It has been suggested that European peoples, and in fact almost all the nations of the earth, are moving on a continuum of economic and demographic development, representing greater or lesser change in the direction of an urban society. Within Europe, economic development and population change have gone hand in hand. Both have undoubtedly been elements in the changing distribution of political power.

The predominant position of France on the continent of Europe two or three centuries ago was partly a function of the fact that she was the wealthiest and in many respects the most advanced country in Europe. It is also undoubtedly associated with the fact that she was probably at the same time the most populous nation of the continent, not even excluding Russia, which now has four times her population. The economic and political position of France in relation to the remainder of Europe has changed enormously since 1800, and this change is probably not entirely unrelated to the fact that she now stands fifth rather than first among European nations in regard to population size.

The rise of Germany likewise has demographic foundations. In the Napoleonic period, Germans lived in a Europe dominated not only politically, but also numerically by the French. As the result of the economic development of Germany and the population increase made possible by this development, since the middle of the last century Germans have become much the most numerous of the European peoples aside from the Russians. As the largest single group, occupying a central position in Europe, it is natural that the Germans should have sought to bring the balance of political power into line with their growing numerical and industrial importance. That this could have been achieved more effectively through peaceful rather than through warlike means is now unfortunately beside the point.

By virtue of its more rapid natural increase and the Nazi annexation of German-speaking areas, Germany in 1939 had twice the population of

France and a considerably larger population than that of Britain. However, from the demographic point of view, Germany had already passed the crest of the wave. The last war had serious consequences. But these were overshadowed by the effects of fertility decline. The population of the old Reich in 1939 was perhaps 6 million less because of World War I. It was 13 million less as the result of the decline of the birth rate since 1910.² Prior to Hitler's accession to power the net reproduction rate had fallen to a lower level than that of France, the classic country of depopulation. The Nazi population policies, though moderately successful in their objective of increasing the number of births, nevertheless fell very far short of re-establishing 1910 fertility. The eastward wave of population increase has come and gone in Germany, and she is on the receding side of the tide in company with her Western neighbors. Demographically, Germany is in substantially the same position as England, France, and Scandinavia, all of which face the prospect of stationary or declining populations. War may speed the approach of population decline; postwar population policies may retard it. But the underlying demographic situation will probably not be altered. Aside from an unforeseen volume of immigration the era of rapid population growth in these countries is past.

The populations of Eastern Europe grew much faster than those of Western European countries in the interwar period despite political disorder and the more severe effects of World War I in the East. At an earlier period the large population growth of this region was made possible by the fact that large areas were then in the process of initial agricultural settlement, or, put in other terms, in transition from a pastoral to a settled farm economy. In Russia there was new settlement not unlike that of our own frontier. This agricultural settlement represented a superior form of land utilization, and made possible the support of a far denser population than had formerly existed. More recently the wave of material progress represented by industrialization and an urban way of life has reached Eastern Europe from its centers of origin in the West. In Russia the contrast of the old and the new resulted in such severe stress on the old social order that it was swept away and the new technical civilization was ushered in with an impetus previously unexampled in history. These developments have made possible rapid population increase such as existed in Western Europe at an earlier period. Despite war and revolution, which apparently cost Russia a total population deficit of 26 millions, including both deaths and loss of births,³ since 1900 the population of the territory of the Soviet

²Estimated by the author. For method of computation see: Notestein, Taeuber, Kirk, Coale, and Kiser, *The Future Population of Europe and the Soviet Union: Population Projections, 1940-1970*. League of Nations (Agents: Columbia University Press), 1944. Chapter III.

³As estimated by Frank Lorimer in his forthcoming work on *Population of the Soviet Union: History and Prospects*.

Union has grown more rapidly than that of Western Europe. Its present age structure and fertility levels suggest that the present war will not have a serious retarding influence on her future rapid growth. The youth of the Russian population is suggested by the fact that the median age is under 23 years, as contrasted with 32 in Northwestern and Central Europe now and with a median age of 40 in that region by 1970 on a projection of interwar vital trends.⁴ The reported birth rate in the U.S.S.R. for 1938 was 38.3 per thousand population or over twice that of the United States in the same year.

Ignoring the war and assuming fertility declines comparable to those experienced in Western Europe at the same level of fertility, the population of the Soviet Union in 1970 would exceed 250 millions. The war will reduce the growth potential, but barring a demographic catastrophe greatly exceeding that of World War I and the Russian revolution, the U.S.S.R. gives every promise of growing more rapidly than the remainder of Europe. In 1939 the U.S.S.R. had twice the 80 millions living in the area of Greater Germany. In 1970 it will probably have three times as large a population, and there will probably be no Greater Germany. What these differences can mean in terms of military potential may be indicated from the trends of manpower. On the assumptions of growth suggested the U.S.S.R. by 1970 would have more men of prime military age, 20–34, than its six closest rivals in Europe combined. The increase in the number of men of this military age by 1970 would alone be as large as the total German military manpower of that age today, or that to be expected from any reasonable demographic trends to 1970.

As long as the Russians were poor, illiterate, and thinly scattered over an enormous area, their numbers were not very effective against the industrialized nations of the West except in terms of resistance through sheer inertia of size. Even in the present war, distance and weight of numbers have been an important element in Russian successes. But the Soviet Union is moving into a position in which it will be able to make its people as effective economically, person for person, as those of Western Europe in general and Germany in particular. Since the Russian manpower of a generation hence will almost certainly be greater proportionately than it is today, a future German challenge to Russia and the world along the lines of 1914 and 1939 seems improbable. Demographic trends alone suggest that this conflict is Germany's last chance for European and world domination.

To say that Russia will be powerful is, of course, not equivalent to saying that she will be a threat. Large population growth in Russia does not involve the serious difficulties that it would, for instance, in Germany.

⁴This and other references to projected future populations of Europe are drawn from Notestein, et al. *Op. Cit.*

In the Soviet Union rapid growth for some time to come is probably necessary for the maximum development of large available resources in relation to existing population. It should present no greater problem than it did in the United States after the Civil War. Russia has ample resources, ample territory, and a great need for labor to develop unexploited areas in Asia and in the Arctic. The problem is not one of resources or of territory. It is rather that of converting a population only two or three generations from serfdom into a literate, physically healthy, technically competent, urban people. At least that is the job as seen by the Russians themselves according to many reports, and it is a job certainly appropriate to the predominant values of our own world.

Power implications of population trends: Europe and Asia

A less certain, but ultimately equally significant development is the eastward movement of power, not only in Europe, but in the world. As long as Western European civilization was able to maintain an effective monopoly on the industrial techniques that give power in the modern world, numbers were relatively unimportant in the relations between Western countries and the densely populated Orient. Numbers are an element of power in any social group. But to be effective they must be implemented with resources and skills, and cemented by social cohesion and unity of purpose. Clearly numbers are of little importance when two civilizations of very different values meet. The domination of India by a handful of Englishmen is an obvious case in point. The British had at their command a great technical superiority of weapons and a social organization directed at the achievement of material ends. The British and the Indians simply were not interested in the same things: the goals and values of their respective societies were almost diametrically opposed. To most Indians the assumption of political control by the British was a matter of complete indifference.

This is no longer the case. Whether through the success of our own efforts at indoctrination, or through frank admiration for our achievements, Oriental and other colored peoples are absorbing important elements of our civilization. Thus the Japanese have clearly demonstrated, first, that a non-European people can establish an astonishingly strong industrial civilization almost entirely on its own initiative, and, further, that a poor but industrious folk can accomplish this with a poverty of natural resources that would seem hopeless by Western standards. But in terms of a reasonable evaluation of its economic and political potential Japan seems no more formidable in relation to Asia as a whole than would England, shorn of its empire, in relation to a united Europe. And China, at least, seems on the way to achieving a unity that Europe was never able to accomplish.

It is commonly assumed that overpopulation in China, as indicated by the prevailing poverty of the people, will prove a great barrier to the economic progress of the country and hence to its rise as a world power. However, it needs to be pointed out that China is not so hopelessly overpopulated as is commonly supposed and that this condition does not represent an insuperable obstacle to industrialization. It is perhaps surprising to note that the over-all density of population in China is only half that of Europe west of Russia though her total population is roughly comparable in size. Even in China proper population density is much less than in Western Europe. Overpopulation in China, as elsewhere, is indicated by a high ratio of population to developed resources. It has reality only in relation to a given stage of technological development. In other areas technical changes have obviously brought about enormous changes in the carrying capacity of the land. Four hundred years ago the present area of continental United States supported only 200 or 300 thousand Indians living on the margin of subsistence. With our present technological development, the same area readily supports 130 million or several hundred times as many people, and at a much higher standard of living. In existing circumstances the level of living in a country is much more closely related to its degree of technological development than it is to the absolute numbers of its population. Overpopulation is not a matter of too many people any more than it is a matter of too little economic production.

Considered in this light the problems of the densely populated countries of the Far East take on a much more hopeful aspect than has commonly been attributed to them. Given its present economic structure, it is undeniable that China is overcrowded. But it does not appear fanciful to suppose that at the level of technical efficiency now prevailing in Europe the present population of China could be maintained at something approximating Europe's levels of living. This would assume a potential resource base somewhat comparable to that of Europe west of Russia in an area more than twice as large.

It is obvious that the Chinese population does not now have either the capital or the trained personnel to achieve the present per capita production of Europe in the near future. However, there are compelling precedents in recent history demonstrating that neither of these are insuperable obstacles. In Russia a backward and illiterate peasantry is being converted almost in a single generation into a literate, forward-looking proletariat, rapidly acquiring the skills necessary for efficient industrial production. And on the other side of China is the convincing example of Japan, which has constructed an industrial economy with a paucity of natural resources that would be appalling to any Western people.

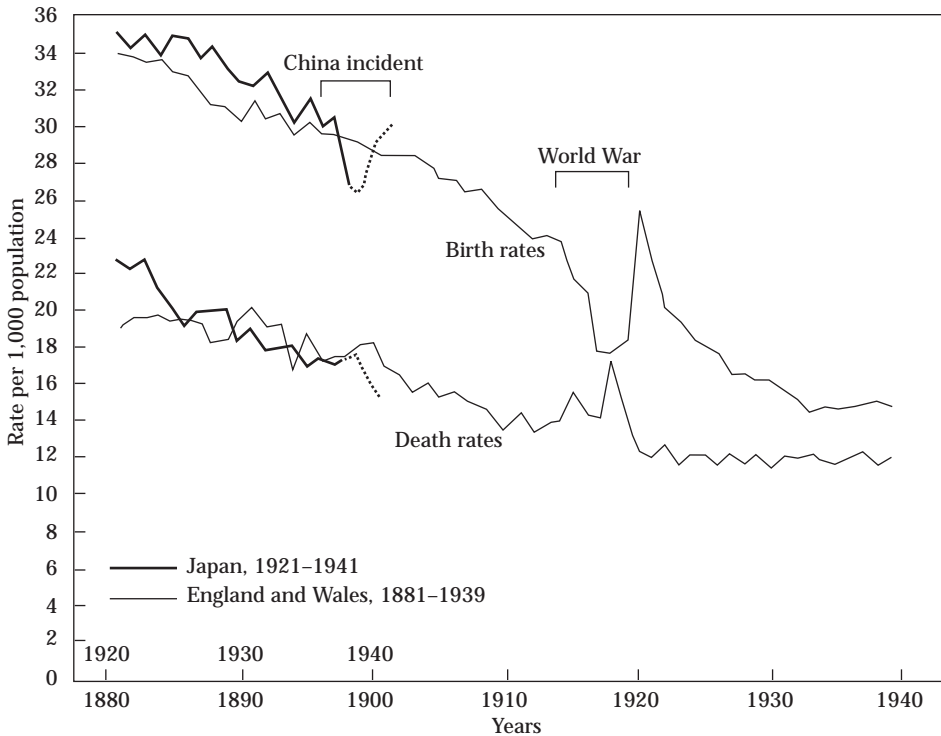
In China herself something of the possibilities both for industrialization and for higher per capita output in agriculture have been demonstrated

in these war years. In this period China has built up an army of some 10 million men, chiefly taken from the peasantry and consequently withdrawn from agricultural production. At the same time agricultural production in Western China has apparently remained at least as high as before the war, partly because the men withdrawn from agriculture were inefficiently used in agriculture anyway, and partly because even in the space of five years some progress has been made, especially in the use of better seed. These factors combined are sufficient to free 10 million men as industrial workers in this area after the war. Furthermore, the army was provided with small arms, i.e., rifles and light machine guns, and the appropriate ammunition, almost entirely from domestic production. When it is considered that most of China's prewar industries were located in the coastal cities now occupied by the Japanese, such an accomplishment must be considered a remarkable one. The capital for this achievement was naturally obtained at great sacrifice. But the means of industrialization can be wrung from a people living as close to the margin of subsistence as the Chinese if there is a central government with the necessary will and unity.

In these war years China herself has given ample evidence that with a stable government she is capable of great economic progress, even without effective assistance from outside. However, it is certainly true that unless some check is placed on population growth, her growing masses will ultimately consume the margin of production created by technical progress. Past experience has demonstrated, as in Japan, that even in very poor countries technical progress can outstrip population growth for a time and bring about a rising level of living in the face of large increments of population. Yet this can be no ultimate solution. Population growth, if unchecked, must ultimately destroy the gains of more efficient production, and through that destruction hinder and perhaps eliminate further gains. China's problem, then, is a combination of the economic and demographic. Her material progress will depend on how quickly she is able to make technical advances in production. It also depends upon how quickly she absorbs the pattern of birth control.

Whether Asia will follow the course set by Western Europe in the decline of the birth rate is obviously a crucial question. Where birth control runs counter to the prevailing values, as in India, its diffusion may be slow. However, the influences operating against the acceptance of birth control probably also operate against economic development and against further declines in the death rates. The only Asiatic country to have undergone sufficient industrialization and urbanization to offer a test case is Japan. In that country birth control had apparently established itself before the war. In Japanese cities, where birth control would most likely first achieve general use, the prewar fertility seems to have been only about five-eighths that in the rural areas. In the country as a whole the age dis-

FIGURE 1 Birth and death rates in Japan, 1921–1941, and England and Wales, 1881–1939



SOURCE: Office of Population Research, Princeton University.

tribution and vital trends in the interwar period were similar to those of England between 1880 and 1900, and indicate a stage of demographic evolution comparable to that of England in that period (Figure 1). The Japanese case is not conclusive, but it is illuminating; it suggests that the barriers between the Western and Eastern worlds are not too great to prevent the diffusion of the birth control pattern.

The decline of the birth rate in Asia is eminently desirable as long as the continent faces elementary difficulties in feeding its huge population. Emigration is no real solution for the future. There are no longer empty countries either willing or able to welcome the surplus populations on a scale sufficient to afford relief. The economic problems are serious. And yet it seems probable that given a modicum of political stability, the Oriental countries will be enabled to experience both a rising level of living and rapid population increase for a time. It is true that they have less of a margin above subsistence than the Western countries had at a comparable stage

of economic development. But it is also true that they have the experience of the West to draw upon in the solution of their difficulties.

Asia as a whole appears to be on the verge of a great awakening. This awakening may take many generations and undoubtedly will not occur evenly throughout the continent. But the tempo of change has been so increased that it seems possible that this awakening will occur with tremendous explosive force, and much sooner than is commonly supposed. If the modernization of Asia follows the course that it took in Europe it will be accompanied by large population increase. Increase of population, and the very mass of the Asiatic population itself, could be ignored in the past as unimportant in the balance of world power. But with the prospect that the Asiatic masses will ultimately learn to forge the tools that will give them power, the differential population trends may become of very great importance. Population increase has been part and parcel of the spread of European populations over much of the globe. In the past European populations have been growing very rapidly in a relatively slowly growing world. The present outlook is for relatively stationary or declining populations among Western European peoples in a rapidly growing world. Western European peoples will almost certainly become a smaller part of the total population of the world. To the extent that numbers are a factor in the distribution of economic and political power, there will be some redistribution of power from old to new centers.

Conclusion

What all this means for the future is that we are not going to see again a world in which huge areas inhabited by non-European peoples may be casually regarded as the political playthings of Western European and American powers. The day is rapidly passing when a handful of Europeans, equipped with superior weapons and a complacent and somehow contagious faith in white supremacy, can expect indefinitely to dominate the half of world that is occupied by the colored peoples. Either we must be prepared to meet the emerging nations halfway, helping them willingly along the road we have traveled to higher standards of living, and the more efficient creation of a better human product, or we must be prepared to maintain white supremacy by force of arms, and in defiance of our own conception of human rights. In the latter case, we would probably be faced with the prospect of an inter-continental conflict that might well dwarf the present war in ferocity and in its threat to the values that are considered the foundation of our society. If we choose to take the path of friendly assistance we will enjoy economic benefits through the rapid expansion of markets and trade. We will probably be serving our own ultimate political

interests by speeding the social evolution that will bring about slower population growth. Most important of all, we shall have led all of humanity to new possibilities of life for the common man, freed from the degrading influences of hunger and grinding poverty.

Note

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BOOK REVIEWS

JOSEPH LOPREATO AND TIMOTHY CRIPPEN

Crisis in Sociology: The Need for Darwin

New Brunswick, NJ: Transaction Publishers, 1999. xiv + 329 p. \$39.95.

Sociology is in a state of crisis, say Lopreato and Crippen. This is because, after more than a hundred years as a discipline, it has discovered not a single well-established law or principle to guide it into the future. Sociology was born and took its initial shape in the late nineteenth century. This was a period during which evolutionary biology was revolutionizing scientific thought, and early sociologists tried to come to grips with the new scientific outlook. In those days sociologists (even Durkheim) still believed in the dominant role of human nature and pondered its influence on social structure. For political reasons better explained by Degler (1991) than the present authors, the discipline later repudiated both the concept of human nature and any association with evolutionary biology. Most sociologists today have a fundamental antipathy toward any biological explanation of human behavior. Many of us share the suspicions of adherents of the “radical science movement” among biologists that any biological or evolutionary explanation of human behavior is based on racist and sexist motivations (Rose 1998). As Lopreato and Crippen put it: “Sociology is still addicted to the increasingly implausible assumption that human behavior is solely the result of socialization” (p. 21).

Their prognosis is that “Sociology will never get anywhere but farther out of the scientific course as long as it adheres to the banality that the fundamental cause of behavior resides exclusively in the immediate influence of culture and social structure” (p. 34). This sentence caused me to cringe at some of my own writing making the same point, and to ask myself whether such strictures are more likely to convince sociologists or merely alienate them.

Lopreato and Crippen present an exposition of evolutionary theory as applied to human behavior that is mainline among those relatively few who study and write about it. The remainder of the book is then devoted to showing how modern evolutionary theory can offer fundamental explanations for many problems central to sociology and can provide a theoretical foundation for the discipline. This discourse is organized around sex differences, social stratification, and ethnicity. The authors’ strategy is to show that, in each area, common patterns of behavior observed in humans are shared widely among primates and other mammals. This makes it easy to see, they believe, that an underlying evolutionary theory can encompass a broad range of seemingly disparate findings collected by sociologists.

Most sociologists have been to a zoo and have read a book or two about biology. The similarity of human and animal behavior has not escaped us. Nearly all sociologists are evolutionists when it comes to the study of animal behavior and to human bodies. But we can still argue that humans have evolved beyond the biological influence on our behavior. We *could* say that there are evolutionary genetic constraints and predispositions producing similarities among all humans, some of which are shared with our primate relatives. But we don’t *need* this for our expla-

nations. No incontrovertible evidence *forces* us to such a conclusion. I once wrote about human sex differences: “Whatever the innate predisposition, however, the variation in patterns from one society to another leads us to conclude that social forces shaping sex roles are so powerful that they can obscure any innate proclivity males and females might have for distinctive behavior patterns” (Udry 1971: 58). I wrote that 30 years ago. I have since been dragged reluctantly to a different perspective by learning some biology.

Meanwhile, science progresses. Darwin wrote before the concept of the gene and the mechanism of genetic inheritance had become established. The early Mendelians at first thought of themselves as anti-Darwinians (Segerstråle 2000). Today molecular genetics can show us that nearly identical genes are found in fruit flies, mice, and humans that control behaviors such as sleep-wake rhythms (Weiner 1999). Molecular genetics is changing our explanatory options. Today we say that environments activate and modulate the behavioral expression of genes. Tomorrow there will be no biological determinists. The day after tomorrow there will be no environmental determinists either.

Sociologists on balance may not believe their discipline is in crisis, but they accept the need to take account of advances in empirical data from within and outside their field. At the time Copernicus proposed a heliocentric solar system, the available data made it a toss-up compared to the then-prevailing geocentric model. It took more than a century, but we were all eventually convinced that the geocentric model is untenable. Eventually sociology will incorporate evolutionary behavioral biology, behavioral and molecular genetics, and behavioral endocrinology into a new synthesis as the evidence accumulates. It won’t take a hundred years. And yes, there will still be a field of sociology—just a better one.

Meanwhile, most readers will learn much that is valuable about the evolutionary perspective on behavior from reading Lopreato and Crippen. Sociologists do not have to believe that “Nepotistic favoritism is ‘wired in the brain’” (p. 266); that “...dominance orders have ancient evolutionary roots” (p. 227); or even that sex differences in behavior are evolutionary adaptations. At the same time, having read the book, they may find themselves more ready to agree that if animal behavior patterns are the products of evolutionary adaptations, there is a chance that some human behavior patterns might also be. That will be a step in the right direction.

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CORMAC Ó GRÁDA

Black '47 and Beyond: The Great Irish Famine in History, Economy, and Memory

Princeton, NJ: Princeton University Press, 1999. xii + 302 p. \$35.00.

This is the kind of book that tragic historical events need but seldom get. It provides a sensitive appreciation of the personal and cultural significance of the Irish famine of the 1840s, with the measured attention of the economic historian. The lines of inquiry are fresh and lively, as Ó Gráda carefully steers us through a political minefield. There are no easy political points to be scored in this book.

The topic is vast and this book covers many aspects of it in its seven chapters. The first chapter provides the context and the chronology of the famine by introducing us to the economic value that the potato had given the Irish economy before the famine and the nature of the recurring potato harvest failures of the 1840s. Ó Gráda surveys the available quantitative data on potato production, by year and by region, along with the annual data on potato prices. He extends the earlier regional econometric study carried out by Joel Mokyr (*Why Ireland Starved*, 1985), by using more detailed baronial data instead of county-level data, and adopts what he describes as a “loosely Malthusian perspective on the crisis.” He writes that “the famine struck hardest in the poorest baronies, and the increase in living standards that followed was greatest where population loss was greatest. Moreover, population growth before the famine was associated with poverty in 1841” (p. 33). Ó Gráda’s account of the chronology of the famine is based on a whole series of sources and local reports. Curiously the price data referred to earlier are not mentioned here.

The rest of the book contains discussion on the demography of the famine, on its political economy, and on its cultural history and legacy. The political economic and demographic discussion is interspersed throughout the book, while the cultural aspects are treated at the end. One chapter on the famine in Dublin city covers both political economic and demographic aspects.

The first of the political economy chapters on “Relief” addresses a number of enduring questions. A section on agency and voice contrasts the examples of two very different inspecting officers of public works, the Irish Poor Law, and the appropriateness of England’s response to the crisis. Ó Gráda argues that “the inadequacy of funds and ideologically constrained policies rather than agency were the real problems facing those seeking to stave off famine in Ireland” (p. 59). The regime established by the Poor Relief (Ireland) Act of 1838 could not cope with the burden of famine relief and was overwhelmed. Ó Gráda estimates that about £50 million (US\$240 million in 1840 exchange rates) would have been required to provide full assistance to make good the shortfall in the potato harvest and to have avoided mortality increases. The sum actually spent by the British exchequer

on famine relief between 1846 and 1852 was less than £10 million (US\$48 million). Ó Gráda notes that in terms of the proportion of GDP, this sum “compares poorly” with the amount “spent by the tsarist authorities during the much less threatening Russian famine of 1891–92” (p. 83). But he fails to elaborate on this comparison.

Chapter three on the demography of the Irish famine addresses such questions as the toll in lives, the role of medicine, gender, and emigration. Ó Gráda provides a masterful survey of the available demographic data and evaluates the problems involved in estimating population losses from such data. These sources include the 1841 and 1851 censuses, Dr. William Wilde’s retrospective surveys of inter-census mortality (Tables of Death), poor law and prison records, a few scattered parish registers, and the records of the Glasnevin Catholic cemetery in Dublin. He agrees with the generally accepted figure of just over a million excess deaths (p. 85) and notes that the limited quantitative evidence “supports the claim that men were worse hit than women, though by a narrow margin” (p. 101) and that “Wilde’s flawed data” suggest that the very young and very elderly were not more vulnerable during times of famine (p. 90). Given that these groups normally had high mortality rates, this result is perhaps not so surprising as it may at first appear.

Ó Gráda contends that famine mortality came predominantly from epidemic diseases, whose etiology and means of transmission were little understood at the time, and he suggests that if the famine had occurred a generation later the medical profession would have known better how to restrict its consequences. Such knowledge would have greatly reduced the spread of high mortality to more privileged groups, but probably would not have greatly altered the outcome for the poor.

Concerning emigration, Ó Gráda notes that “A key feature of the Irish famine was that well over a million people left Ireland for good between the mid-1840s and the early 1850s” (p. 105), and that it was “push migration with a vengeance.” Nevertheless, he argues that, apart from those unfortunate migrants on the unregulated Canadian route, “fewer perished in transit than might have been expected.” Consequently, the popular reference to the “coffin ships” is “a myth” (p. 106). “It was not the poorest who left,” but rather those with some modest means to afford the cost of passage (p. 107); and levels of mortality were higher on ships leaving from German ports in those years than from Irish ports or London. Finally, Ó Gráda suggests that mass emigration should be seen as a form of disaster relief, and, after surveying the constraints on assisted passage, concludes that “the assisted migration of even one hundred thousand destitute famine victims in 1847–48 would almost certainly have saved thousands of lives in Ireland itself” (p. 121). He asserts that an outlay of public money of some \$4.8 million would have covered the cost of such an endeavor.

Chapter four returns to the major political economy questions of who were the winners and the losers. Ó Gráda looks at the influential “entitlement approach” of Sen and Drèze without fully embracing it. The foreign trade data clearly show that “during the famine years, food imports dwarfed food exports” (p. 123), although there were a few seasonal anomalies. The decline in production from

prefamine levels that had reached 12 to 15 million tons of potatoes annually, of which half went to human consumption, was clearly not going to be greatly compensated by the transfer of the 430,000 tons of grain exports in these years to those in need, even if their calorific value were in fact four times that of potatoes. The shortfall was always going to be immense. But given this shortfall, some were going to fare better than others regarding their entitlements. Ó Gráda considers at length the fate of landlords, traders, and moneylenders and shows that the picture was mixed. Some landlords did well; some did badly; and most traders and moneylenders did badly, despite popular images to the contrary.

Chapter five focuses on conditions in Dublin city, which was certainly less severely affected than other areas, but not as lightly affected as some other commentators have argued. Better records were kept in Dublin than in most other areas. Chapter six considers “famine memory,” where Ó Gráda’s knowledge of Gaelic enables him to extend his examination to Irish ballads and songs. But it is his knowledge of the history of the famine that enables him to make such good sense of this esoteric folk material.

The final chapter on the legacy of the famine is really a set of conclusions, since Ó Gráda warns that he does not intend a serious study of the long-term impact of the famine. Nevertheless, he emphasizes that Irish history was massively changed by the famine. The potato never regained its previous position; as late as the 1890s potato yields per acre remained little more than half of prefamine levels. And of course emigration continued to assume enormous significance.

Ó Gráda provides us in *Black '47 and Beyond* with surveys of different aspects of the Irish famine. These cover a broad range of important and often new topics, which place the famine within a sharper social, economic, and demographic perspective without dehumanizing it. This is an outstanding book, which brings together in a very sensible way more important material on the social history of the Irish famine than is available elsewhere. It also provides a refreshingly new survey of the politics of the famine, which outflanks on several fronts any sectarian approach.

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JOSHUA COLE

The Power of Large Numbers: Population, Politics, and Gender in Nineteenth-Century France

Ithaca: Cornell University Press, 2000. xi + 252 p. \$39.95.

Power of large numbers has a double meaning. First, the phrase alludes to the realization by scientists of the eighteenth and nineteenth centuries that statistics on large aggregates revealed regularities of human behavior, despite the vagaries of individual happenings. The second, literal sense gained special urgency when the French, after their defeat in the war of 1870 with Prussia, came to the conclu-

sion that their political and military weight on the European scene was shifting because of slow population growth. Although Joshua Cole ends his book by considering various consequences of the fear of depopulation, including the imposition of a particular duty of reproduction on women, he devotes the early chapters to the history of French statistics, at both the conceptual and the administrative level. His leading light is Dr. Louis-René Villermé, who used data on rents, taxation, and deaths by *arrondissement* (district) of Paris in the 1820s to demonstrate the close relationship between wealth and longevity, and defined social classes “in terms of a few shared characteristics such as health, wealth, or geographical proximity” (p. 68). Adolphe Quetelet introduced the concept of the average man, which seemed to personify a norm that deserved to be maintained by public policy. This notion encountered severe opposition from some physicians, who stressed the need to understand individual cases of disease in order to cure them. In contrast with other studies of the nineteenth century that have focused on the discussion of population by economists, or of collective behavior by sociologists, Cole devotes much attention to a debate at the Académie de médecine, where the view of individual uniqueness was powerfully defended by physicians steeped in a prestatistical mode of thinking. Unfortunately only half of the story is told, and the author does not discuss later developments: the domination of public health and hygiene by the medical establishment and the triumph of strong causal models of mortality (once the germ theory of disease gained acceptance and the specificity of disease (namely, that the same disease is always caused by the same micro-organism) was recognized by Pasteur and Koch. Despite the contrary opinion expressed on pp. 105 ff., where Cole observes that Villermé’s studies on differential mortality elicited few followers, statistics on causes of death have proven to be of lasting interest.

The last chapters of the book become increasingly focused on the issue of gender. In discussing mid-nineteenth-century industrial statistics, the author notes that little scientific attention was given to working women, a shortcoming he blames on a conscious design among political economists and public administrators to confine women to a status of dependency and subordination in the family: “Since their vision of the economic individual excluded women by definition, they found it difficult to see female laborers as anything but an anomaly...” (p. 147). There was an unspoken consensus, Cole argues, that women’s employment would jeopardize their reproductive function, which was of paramount importance for the welfare of the state.

He pushes his conspiratorial views to a climax when he attributes dark intentions to the inventors of the general fertility rate, which relates births to women in the childbearing ages because they are the ones exposed to the risk of giving birth. “The very notion of ‘childbearing age’ or ‘reproductive years’ places individuals in a tightly defined life-cycle trajectory that presumes motherhood as the biological destiny of women. Furthermore, the bearing of children could be conceived of as a ‘risk’ to which women alone are ‘exposed’ only in a culture that assumed that women have little or uncertain control over their reproductive lives and that men play no measurably responsible role in the process that produces children for demographic observation” (pp. 187–188). In his conclusion, Cole alludes darkly to the various social policies oriented toward the family, such as child

labor legislation, family allowances, and maternity leaves, opining that they “harnessed gendered obligations to a politics of national renewal and collective definitions of well-being” (p. 214).

The book is a thought-provoking deconstruction of writings and policies in the area of population. It covers a great deal of ground, examines in detail selected landmarks in data collection and analysis, and connects them in a coherent narrative to show how they influenced policy. There is much here that is interesting or provocative for the historian of the period. The book was unfortunately not blessed with the services of a French-reading copyeditor. The text is riddled with irritating mistakes in the spelling of French words or phrases; for example, seven spelling errors appear just on the first page of the bibliography.

My main problem with the argument itself is that it recreates the nineteenth century as the time when the family and reproduction were assigned as the domain of women. Cole cannot repress his moral indignation at a populationist logic that deprived women of their right to autonomy and market participation. He evaluates statistics and its intellectual background with criteria that would have been meaningless at the time, being instead a product of a later era when female equality, autonomy, and participation in the labor force have become the norm. Today it is difficult to remember how recently that change occurred. Women in the nineteenth century *were* dependent upon husbands and other providers, and women working outside the home *were* the exception. Prescriptive literature and even fiction took for granted the subordinate position of women; the statisticians neither created nor promoted this situation. The doomsayers of the time, who saw the end of Western civilization as a result of declining fertility, were eventually proven wrong. In hindsight, the fertility transition turned out to be a triumph of popular wisdom, achieved against the views of the supposedly better minds, and it probably resulted in happier families, more viable nations, and a higher standard of living. The demonstration came out of the dialectics of history, but the outcome would have been difficult to predict from the perspective of the late nineteenth century.

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RONALD WALTER GREENE

Malthusian Worlds: U.S. Leadership and the Governing of the Population Crisis

Boulder, CO: Westview Press, 1999. xi + 273 p. \$65.00.

Ronald Walter Greene presents a novel analysis of the post-World War II depictions of a global population crisis and of attempts by the United States government to deal with it. He is interested less in the demographic foundations of the crisis than in the forms of “practical reasoning” that have been used to define and explain it, and, most importantly, to mobilize action. “I examine how Malthusian forms of practical reasoning activate the United States and a host of other institu-

tions as agents responsible for disarming the population bomb” (pp. 2–3). Successive chapters deal with Malthus, the population and development debate, the role of containment in US population policy, environmentalism, and the shift in policy from the administration of Ronald Reagan to that of Bill Clinton.

The author’s approach is resolutely theoretical, drawing inspiration from Michel Foucault’s work on the art of government, where “government” is broadly defined to include any institution regulating the conduct of individuals. Greene’s main theoretical construct is that of a “governing apparatus,” comprising populations, discourse strategies, technologies, and institutions. “A governing apparatus,” he writes, “is an ensemble of practices, technologies, discourses, programs of action, institutions, and procedures dedicated to improving the security of a population” (p. 4). It is through discourse strategies that population problems are identified, their causes and effects examined, and prescriptive norms established. “To judge a population through how well it lives up to a discourse strategy makes a population visible and in possible need of calibration” (p. 6). Because discourse strategies are always held accountable to prevailing moral-political traditions, “rhetorical practices saturate a governing apparatus” (p. 7). Meanwhile a technology, in Greene’s lexicon, is “a practical logic that allows a particular type of work to be done on a specific object” (p. 8). Birth control is one example, but so is rhetoric since it “makes possible the work of a governing apparatus by helping to distribute discourse strategies, institutions, and populations onto the terrain of a governing apparatus” (p. 8). Finally, Greene maintains, it is important not to reduce these considerations to the roles of individual actors. “A fourth force occupying the terrain of a governing apparatus is a series of institutions activated as agents responsible for managing a population” (p. 8).

The substantive analysis using this theoretical construct begins with Malthus. It is Malthus, argues Greene, who “invented” the reproductive couple as an object of government interest or, in other words, a population in need of regulation. For Malthus the healthy body is no longer an uncontested basis for a healthy society but is seen as a potential threat to national prosperity. Malthusian couples who regulate their fertility helped “build the bourgeois body, transforming the ‘number and quality’ of children into a mark of cultural and biological distinction” (p. 49), and are a “constitutive force in the emergence of modernity” (p. 20). The problematization of segments of the population during the nineteenth and early twentieth centuries focused on the working classes and, in the United States, on those immigrants who allegedly did not regulate their fertility.

After World War II this cultural and biological distinction dividing modern populations from less developed problematic ones was given a more dynamic application. Greene discusses how the discourse of economic development and modernization theory intersected with the discipline of demography and problematized the high growth rates of third world countries. Demographic transition theory divided the countries of the world into three groups depending on their vital rates. Population growth in the third world was problematized as a threat not only to the economic and social welfare of those nations, but also, in the context of an emerging world economy, to the advanced countries as well. In the United States in particular, international objectives were linked with goals of domestic policy.

Population growth was a “crisis in need of management” (p. 100), and the “family planning industry” soon emerged with a solution. Discourses of political containment and environmentalism were added in due course, further contributing to the deployment of family planning programs targeting the reproductive practices of the poor. Greene’s analysis becomes progressively more complicated and convoluted at this point. “The intersection of the discourse strategy of environmentalism through the logics of the population apparatus was a significant vector in the construction, consolidation, and direction of the population apparatus” (p. 195). Most of the actors and institutions appearing in these pages will be familiar to demographers and population specialists—Lothrop Stoddard, the Population Association of America, the UN population conferences, Coale and Hoover, Bucharest, Walt Rostow, Planned Parenthood, Henry Luce, USAID, William Vogt, Paul Ehrlich, and so on—but in Greene’s narrative they are recast as regulators of the “population apparatus,” his term for the structures created for governing the population crisis.

Many readers will, I am sure, not find Greene’s use of language easy to comprehend. *Malthusian Worlds* is replete with terms like “vectors,” “traversed,” “articulation,” and “grid of intelligibility,” and is peppered with mixed metaphors. Reading sentences such as, “The major claim advanced is that the interrogation of the welfare state through the prism of the population crisis contributed to the use of family planning as a technology of empowerment” (p. 58), I found myself wondering whether Greene says more than he means or means more than he says. This is not a difficult book to put down.

Language aside, I have serious reservations about Greene’s approach. In effect, he analyzes a series of interrelated discourse strategies responsible for “worlding” Malthus (p. 168)—“the articulation of family planning as a solution [that] served to transport Malthus to the (third) world”—without asking who is promoting such strategies or why. There is little sense of the conflicts of interest, confrontations, and negotiations that underlie the texts he analyzes. This is presumably a deliberate move on Greene’s part, but he nowhere justifies it or tells us what we can hope to gain by adopting such an approach. He keeps the historical narrative moving by constantly reifying the population apparatus: “[M]aterial forces exist less as interests to be satisfied than as the ‘reality’ that a governing apparatus attempts to capture and use for the purpose of improving the welfare of a population” (p. 11).

The most annoying flaw, alas, is the book’s lack of a clear purpose. What precisely is Greene, an assistant professor of communication studies at the University of Texas-Austin, trying to accomplish and why? Early in his introduction he writes, “The primary difference between the approach of this book and that of apologists for U.S. population policy and/or others who identify the population crisis as an expression of capitalist and/or patriarchal white supremacy is my emphasis on the population crisis as a field of practical reasoning” (p. 3). A little later he describes his work as “a cartography of how the elements of a governing apparatus come together” (p. 11). Maybe it is not the cartographer’s responsibility to teach us how to navigate, but at least some idea of how this cartography of Malthusian practical reasoning can be used and to what benefit would help motivate the reader. Greene’s

own discourse strategy reads as if it emanates from a realm of its own, removed from the claims and counterclaims of other approaches. As a result it appears to challenge nothing.

To return to Foucault, his work opened up new and important questions about the administration of life in the modern nation state and drew attention to the way instrumentalities of power govern citizens through regulating the human body in the domains of madness, health, and sexuality. Greene, it appears, wants to add reproduction and demography to the list of such instrumentalities. His book is a serious attempt to bring Foucault to bear on the "government" of population, and he has drawn upon an impressive array of sources. Nevertheless, the analysis might have been more fruitful had he addressed the discussion more explicitly to the "absolute problematization of the body" (p. 27), as Foucault himself might have done.

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PETER SKERRY

Counting on the Census? Race, Group Identity, and the Evasion of Politics

Washington, DC: Brookings Institution Press, 2000. x + 261 p. \$25.95.

Strident controversy about adjusting the United States census of 2000 for net undercount will continue for several more years as courts wrestle with seemingly conflicting Constitutional requirements. The Supreme Court in 1999 called for a head count for purposes of reapportioning seats within the House of Representatives of the US Congress but left open the question of using adjusted census data for all other purposes. Since 1950, the net undercount rate for African Americans has been at least twice that for whites. Because census counts determine representation in every elected governmental body and are used by Congress to distribute federal grants (totaling some \$185 billion in fiscal year 1998), the undercount of minorities shortchanges them.

Developments in sampling and statistical methodology make it possible to conduct postcensal enumerations of a large sample of the housing units included in the census itself. On the basis of this reinterviewing, estimates of net census undercount may be determined for specific groups and for broad geographic areas. Many demographers and statisticians and almost all spokespersons for minority groups strongly advocate adjustment and believe that it will minimize a substantial and long-standing racial inequity. Often they portray those who oppose adjustment as unsympathetic to minorities and driven by narrow partisan goals.

Peter Skerry, a senior fellow with the Brookings Governmental Studies program, offers a stimulating and fresh view of the politics of adjusting the census. His book is an important and thoughtful addition to this debate. He challenges widely held but unexamined assumptions and lays out the controversy and statistical issues with exceptional clarity. He stresses that the Census Bureau made Herculean efforts to count everyone and that the undercount issue became salient only because of the enduring significance of race in the American political system.

If undercount rates were similar for all groups, they would be of little concern since no minority could then claim a special disadvantage.

Skerry argues persistently that census data should not be adjusted for undercount. He gives us an array of reasons.

Leaders of minorities who are interested in greater political power for their group might gain, in the short run, from adjusted census data; however, the gains would be very small: a seat or two in several state legislatures. A greater participation by minorities in elections themselves would be, in his view, much more powerful than would the adjustment for undercount.

He observes that while many of the earliest and most vocal assertions about the need for adjustment came from activists for minority groups, in recent years central city mayors have pushed the issue most forcefully. The populations of their cities are undercounted because many residents are among the minorities most likely to be missed. Here Skerry points out that federal disbursement programs have allocation clauses mentioning census counts, but the formulas typically place much greater weight on other factors. An adjustment for undercount would result in a minuscule increase in federal allocations to most local governments, often equaling a small fraction of one percent of the annual budget.

At times, proponents of adjustment suggest they have science on their side. A head count employs an ancient and flawed technique, whereas conducting a post-enumeration survey and using those results to adjust the census seems much more scientific and modern. Skerry points out that a great deal of scientific knowledge is in fact required to take the traditional census itself and that scientific decisions about sampling, choice of strata, and the statistical "smoothing" of sampling error are certainly involved in developing adjustments for undercount. But there is no one "scientific" estimate of undercount. Even the most rigorous procedures will never determine exactly what the population was at any one point. Demographic analyses and adjustments based on large postenumeration samples will produce national totals that are closer to the real but unknown population than will a simple head count. The postenumeration adjustments will also produce more accurate estimates for larger states and the most populous cities. But even their advocates recognize that adjusted totals will often be less accurate than actual head counts for small local areas such as those used to form election districts. If there were an almost limitless budget to conduct a postenumeration survey and ensure its accuracy, one could improve the count down to local levels but such resources are not available. If we advocate adjustment, we have to choose among a variety of scientific estimates.

Skerry contends that if agreement were reached between Congress and the administration that the census should be adjusted for undercount, cooperation with the actual enumeration would decrease. He admits that he does not have convincing evidence to support this assertion but argues that the future of traditional census taking would be in doubt if people realized that it made no difference whether or not they filled out their census form. Incorporating an adjustment for undercount, Skerry believes, would lessen civic engagement with the census.

Race, at first glance, seems to be an obvious and measurable characteristic of persons but it is not. Because there is no easy way to classify people by race, the census of 2000 gave respondents the opportunity to identify themselves with more

than one race. Pretests suggest that a significant fraction—for example, more than 5 percent in Sacramento, California—elected to identify themselves with two or more races. Counting people by race and adjusting for net undercount has been, up to now, based on the premise that each individual has a single well-defined racial identity. Because the mixed-race population in the United States is now large and growing rapidly, an adjustment based on the assumption that everyone is a member of only one race will be misleading.

Finally, Skerry reminds us of the limits on the ability of any agency to produce estimates of undercount as quickly as they are needed. State legislatures begin the redistricting process less than one year after the actual enumeration date, so they need census results rapidly. The Census Bureau's first estimate of the aggregate net undercount in 1990 was 2.08 percent, but one year later officials found errors in their estimating procedure and concluded that the true undercount rate was only 1.58 percent. Had the original undercount rate been used, at least one seat in the House of Representatives would have been erroneously shifted.

Skerry's most important contribution is to emphasize the political nature of the census. Demographers and statisticians, I believe, often view the census as a scientific endeavor and presume that if Congress and the administration would appropriate an adequate amount of money and leave the Bureau alone, we would have an excellent census. It may appear this way, but such is not the case. A political compromise led to the original Constitutional mandate for the enumeration over two centuries ago; Congress and the administration have always superintended the census closely and, to a greater or lesser degree, specified what questions might be asked and how the results may be tabulated.

In no way is this book a diatribe against the Census Bureau. Skerry frequently compliments the Bureau's staff for their professionalism, diligence, and innovations. He understands—and describes lucidly—the problems of census taking, the inability to count the entire population, and the substantial improvements in methods of enumeration made over the years. Indeed, it appears that the mail-back response rate in 2000 was higher than in 1990, reversing a three-census trend.

Despite the freshness of his approach and the clarity of his writing, this is a book by a census insider. While Skerry recognizes that few members of Congress or the administration fully understand what is meant by sampling to complete the count or sampling to adjust for net census undercount, he assumes that many American citizens know about the decennial enumeration and are concerned about its accuracy. I believe, to the contrary, that the census is almost invisible except to demographers, some statisticians, members of Congress (whose future employment may depend upon the count), and spokespersons for various interest groups who seize the opportunity to emphasize an apparently grievous violation of justice. I spent a month this summer employed as a follow-up interviewer of nonrespondents in a neighborhood of Ann Arbor, Michigan, where most adults had college educations. I found almost no resistance to the census but almost no awareness of it either. I wish Skerry had kept in mind that the census is a low-profile governmental activity in the eyes of most citizens.

The arguments presented in this book should be considered by the minority-group advocates, civic activists, and members of the bench who will decide about the use of adjusted census counts. It is likely that many of them will retain their

previous views on adjustment, but Skerry's excellent volume should help to raise the quality of discussion about this vexed issue.

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ONN WINCKLER

Demographic Developments and Population Policies in Ba'athist Syria

Brighton: Sussex Academic Press, 1999. xv + 218 p. \$100.00.

This is the second book on an Arab country by Onn Winckler, who has written previously on population growth and migration in Jordan in the second half of the twentieth century. This new book derives from the author's Ph.D. thesis in Middle Eastern history at the University of Haifa and bears many marks of this origin. It is organized into six chapters, covering, in turn, sources of demographic information, population growth, spatial distribution, migration abroad, the demographic policies of the Syrian authorities, and demography and politics under President Hafiz al-Asad. "The starting point for the period under discussion," Winckler writes (p. 8), "was chosen for its strong impact on Syrian demographic developments, namely, the implementation of the socialist policy in Syria after the Ba'ath revolution of March 1963." The author, given his base of operations, has had access only to published and widely available documents and reports; thus the analysis is enriched neither by contacts with Syrian and other Arab researchers nor by the experience of original fieldwork inside Syria.

The central theme is that of the demographic transition, old style. On pp. 3–5, Winckler insists that rapid population growth produced open and undisguised unemployment and pressure on natural resources. This is hard to support without some reference to the special nature of the centrally planned, socialist economy that has been a feature of Syria for decades. On sources, the author is dismissive of the value of the Ottoman documents—a view easily refuted by reference to the recent work by Fargues and others on the data from nineteenth-century Egypt, for example. Further, the results from more recent official reports are presented without adjustments and corrections, leaving readers to wonder whether the basic demographic rates presented can be regarded as definitive and the most reliable available.

In the attempt to link national policies to population growth, Winckler fails to draw out the salient conclusions from the analysis, prepared by the Central Bureau of Statistics under Dr. Farid el-Boustani and the Planning Ministry, of the 1976 census. At that critical moment in Syria's demographic history, large fertility and mortality differentials were identified and key conclusions were reached about the importance of promoting higher educational attainment among younger cohorts. This was a clear illustration of how demographic analysis had an impact on public policy, leading to a subsequent sharp reduction in overall fertility in Syria.

Also omitted from Winckler's list of factors affecting public policy on population are the consequences of the 1982 Israeli invasion of Lebanon and the subsequent long-term involvement of Syria in the region. Iraq's invasion of Kuwait had a pronounced effect on remittances from Syrians in the Gulf, and, of course, the absence of a Syrian–Israeli peace treaty has a direct impact on domestic expenditures in the social sector as well as on Syria's receipt of foreign aid.

In summary, this book is little more than an annotated bibliography of published sources and is notable more for its omissions than for the strength or novelty of its analyses and insights into the development of this intriguing country.

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SHORT REVIEWS

by Susan Greenhalgh, Geoffrey McNicoll, Michael P. Todaro

SARAH ANDERSON AND JOHN CAVANAGH WITH THEA LEE

Field Guide to the Global Economy

New York: The New Press, 2000. x + 145 p. \$16.95 (pbk.).

In the past year the debate about the benefits and costs of globalization has become increasingly strident. Despite the overwhelmingly pro-globalization positions of mainstream media and the major political parties, grassroots opposition has emerged from a variety of heretofore unlikely allies—environmentalists, labor unions, academics, and anarchists. Protests in Seattle against the World Trade Organization and in Washington, DC against the IMF and the World Bank pushed their way into the media spotlight, even though mostly in the form of dismissive commentary. And yet, the dissent appears to be gathering momentum and beginning to infiltrate, if only on the margin, the 2000 US presidential campaign by way of Ralph Nader and his Green Party candidacy.

Beyond the rhetoric about the evils of corporate-led globalization and the provocative street theater of youthful protesters lies a serious factual and intellectual challenge to the “free trade” orthodoxy of the so-called Washington Consensus. The outlines of that challenge made intelligible to the nonspecialist reader are con-

tained in this informative, well-written, and well-argued book. It is designed to provide a fact-based response to advocates of globalization and the Washington Consensus by sketching the history and status of global flows of goods and services, money, and people and explaining what is new about today's globalization. Its core chapter then addresses ten common claims of those who back globalization and provides statistics and arguments to counter those claims. Examples include the claim that increased trade means more jobs at higher wages, that foreign investments in developing countries automatically raise living standards, that free trade is the consumer's best friend, that globalization "lifts all boats," and that immigrants are a drain on the US economy. Later chapters describe the major institutions and policies driving globalization, including those in the private sector such as corporations, business associations, international banks, pension funds, mutual funds, foundations, and universities; and those in the public sector, particularly the three international institutions that anchor each of the three pillars of global economic activity: production (World Bank), finance (International Monetary Fund), and trade (World Trade Organization). The concluding chapter highlights various efforts to stop, slow, or change the course of globalization. An appendix listing the names, addresses, and web sites of the many organizations involved in the opposition to corporate-led globalization is included for those wishing to learn more about or become involved in the ongoing debates.

Like much that is written in support of the mainstream view of globalization's benefits, this critique, too, suffers from oversimplification, selective anecdotes, and some questionable statistics. Nevertheless, it is a valuable contribution to the globalization debate, offering a perspective that is too easily dismissed by the mainstream media and the economics profession. Sarah Anderson is a fellow at the Institute for Policy Studies while John Cavanagh is its current director. Thea Lee is assistant director for international economics in the Public Policy Department of the AFL-CIO.—M.P.T.

REGINALD APPELYARD (ED.)

Migration and Development

Geneva: International Organization for Migration, 1999. 354 p. \$35.00.

This volume of 12 articles is an offprint of a special issue of *International Migration* edited by Reginald Appleyard. The papers were selected from those first presented at the Technical Symposium on International Migration and Development held in The Hague in mid-1998. The symposium itself was a follow-up to the 1994 Cairo Conference on Population and Development as part of a broad United Nations effort to focus technical assistance aimed at poverty reduction.

The articles cover a broad range of topics with contributions from a variety of disciplines. After an opening essay by Stephen Castles explaining the nature and purpose of the UN symposium, Hania Zlotnik provides an informative survey of trends in international migration from 1965 to 1996. She argues that observed changes are less striking than usually claimed, although the end of the Cold War has had a pronounced effect on shaping many of the key migration movements during the last decade. (See Zlotnik's article on this theme in *PDR* 24, no. 3.)

Before commenting on the principal economics article in this volume, by J. Edward Taylor, I briefly mention three other contributions of interest. First, Robyn Iredale contends that while the relevant data are poor, policies, both national and regional, to control or promote the movement of skilled migrants have proliferated. In particular, receiving countries have become increasingly receptive to the influx of skilled workers and have adjusted immigration policies accordingly. On the other hand, sending countries (mostly LDCs) have worried that this brain drain is depriving them of opportunities to develop a viable professional class. Second, Augustin Escobar-Latapi presents a useful review of the current situation, prospects, and government policies related to emigration of low-skilled workers from Mexico to the United States. He outlines the growing nature of the problem from both a Mexican and US perspective and argues that, because of the large volume of illegal migrants and the spread of social networks in the 1980s, contemporary migrants respond rapidly to changing conditions of demand and supply as well as alterations in government policies. Third, Gregor Noll focuses on rejected asylum seekers and the problem of their return to countries of origin. He examines the increasing concerns of major asylum states in the industrialized world and the various political and legal approaches taken by unreceptive nations within the constraints of human rights laws.

Finally, given my long-time interest in the economics of migration, I was naturally drawn to an article on the so-called new economics of labor migration and the role of remittances by J. Edward Taylor. In the first paragraph the author asserts that “The best-known economic model of migration decisions (Todaro, 1969; Harris-Todaro, 1970) has no place for income remittances from migrants to their areas of origin.” This is patently incorrect, and the self-proclaimed “new economics” of migration is not new. Even a cursory reading of the Harris-Todaro paper reveals that it is a two-sector internal trade model in which households in the rural agricultural sector maximize their income by “exporting” their labor to the urban manufacturing sector in return for that sector’s consumer goods. Where do rural households get the income to purchase their manufactured goods? Clearly, from remittances from their migrating members. International trade economists have understood this process for many years and have employed the Harris-Todaro model in many different and modified forms. Just as clearly, there is nothing new about the new economics of migration—only the extension of the analysis into investigation of the specific impacts of remittances on labor-exporting areas. The remainder of Taylor’s article is sound in its analysis of what governments in migrant-origin countries can do to increase the development potential of remittances.—M.P.T.

RICHARD J.F. DAY

Multiculturalism and the History of Canadian Diversity

Toronto: University of Toronto Press, 2000. xvi + 263 p. \$55.00; \$19.95 (pbk.).

Among the thorniest social policy issues in many countries is management of ethnic and cultural diversity. Insistent claims for autonomy or self-determination are made on behalf of culturally distinct regions within a state. Countries secure in their believed homogeneity confront increasing ethnic diversity as their fertility

collapses and immigration assumes a larger share of population recruitment. Canada has long experience with such issues: Québécois nationalism, Aboriginal territorial claims (realized in the new territory of Nunavut), and, since the 1970s, an explicit state policy of multiculturalism. In this historical and sociological study, Richard Day explores the evolution of Canadian official thinking on national identity and diversity from the time of earliest French and British settlement and the origins of views of “otherness” in older European thought. He pays particular attention to the practice and pretensions of the policy of multiculturalism, taking issue with the views of the prominent theorists of liberal pluralism, Charles Taylor and Will Kymlicka. He is scornful of multiculturalism seen as a nation-building project, requiring rational bureaucratic management (for example, through a points system to qualify for immigration), and aimed at achieving a unified community in the form of a postmodern “nation(s)-state”—a “complex fantasy of fullness and harmony.” In contrast, Day sees the policy as a cynical shift in management style from the former position in which the state “simulated a unity and dissimulated its multiplicity” to one in which it “dissimulates its unity and simulates a multiplicity.” He calls instead for a “more critical and radical multiculturalism,” in which the state’s role is not as guardian of an emerging perfected order but as “providing a minimal field of structure out of which almost *anything* might emerge.” “The project of Canadian unity must be abandoned.” The book is based on the author’s doctoral thesis at Simon Fraser University.—G.McN.

KARIN EVANS

The Lost Daughters of China: Abandoned Girls, Their Journey to America, and the Search for a Missing Past

New York: Putnam, 2000. xi + 270 p. \$23.95.

In the past decade or so, somewhere on the order of 18,000 Chinese infants, the vast majority girls, have been adopted into American families. That number is growing fast; in 1998 alone, 4,000 such adoptions were completed. While population specialists ferret out the causes of the “missing girls,” and China specialists probe the local practices of birth planning, abandonment, and adoption, adoptive parents with no scholarly background or even interest in these subjects are struggling with more personal preoccupations. They are trying to come to grips with the enormous, almost incomprehensible forces that brought them their treasured child. And they are working against time to create a narrative they can tell their daughters when they ask, as they surely will: “Mommy, Daddy, why am I here?” For the scholar, the writings of these adoptive parents are of considerable interest, for they provide access to the human dimensions of, and organizational responses to, trends the population specialist sometimes can describe only in bare numbers.

Lost Daughters represents one such an attempt at sense- and narrative-making. Finely crafted and deeply felt, the book is tied together by the joy and gratitude the author feels for the “gift” of having a “lost” daughter of China in her life. In the process of chronicling the emotional journey she and her husband traveled in quest of a baby, Evans, a Caucasian writer in her 40s based in San Francisco, tells us much about the lengthy, costly, and bureaucratically convoluted process of adopting from China. She describes the group trip to China, the fun-filled days touring Guangzhou, the

camaraderie with other anxious parents-to-be, the seemingly perfect matching of American parents to Chinese babies (some even bore a resemblance), the long-awaited moment of meeting their new babies, and the tiny pearl necklaces the girls are given on the eve of their departure from the orphanage. Evans writes: "Could that child have been handed to us with any more love or good intentions? I think not." In the social domain, Evans describes the growing number of organizations that have arisen to fill the needs of this emerging subculture: the Chinese-American Half the Sky Foundation, the single parents' Our Chinese Daughters Foundation, and others.

While Evans's book is a moving welcome for these new little Americans, it is also a romanticized portrait that attends closely to the emotional needs of the participants in the adoption process, while whisking from view the behind-the-scenes political dynamics that allowed the transfer of Chinese child to American parents to appear as a gesture of generosity and love. The author presents the pearl necklace incident as evidence of "love" and "good intentions," ignoring the local staging and larger national image management being engineered by Chinese officials keen on shaping American opinion toward China by creating an appealing narrative about "love" and "family" to replace the entrenched "coercion" narrative that has long guided American thinking about the one-child policy and its human consequences. While the brief discussions of the policy that filled the orphanages with adorable girls are fair and accurate as far as they go, Evans evinces a will not to know too much, a desire to keep the subject in the realm of "love" where uncomfortable politics cannot intrude. Yet despite the effort to keep politics away, this book *is* political, for the words we choose to describe our experiences have political effects. One wishes the author had been more aware of, and reflexive about, her own discursive-political praxis. Why was "lost daughters" the preferred term? Because they were "found" by loving American parents? What about the majority, who were "lost" but not lucky enough to be "found" by such parents? And what about the Chinese mothers who "lost" their daughters? Why are they largely absent? Evans talks often about the "gift" of a little girl. Gifts obligate. One wonders: how will the author (and other adoptive parents of Chinese girls) repay their gifts?

Evans is surely right that the issue of China's "lost and found" babies will grow in cultural and political significance as the number of adoptive families in the United States rises. Adoption from China is now a cultural phenomenon, if not obsession—one that requires more reflection and research, both from parents of those children and from scholars with different interests and narrative frames. A compelling story, *Lost Daughters* is highly recommended to anyone curious about the subject. Notes, bibliography, resources.—S.G.

SHARON K. HOUSEKNECHT AND JERRY G. PANKHURST (EDS.)

Family, Religion, and Social Change in Diverse Societies

New York and Oxford: Oxford University Press, 2000. xiv + 395 p. \$45.00; \$27.50 (pbk.).

Contrary to what modernization theory predicts and many of us think, religion is thriving in today's globalizing world. So too is the family. This densely (at times tediously) theorized book combines "interinstitutional" approaches—those focus-

ing on the connections between familial and religious institutions as well as their ties to the larger context—with market-based rational actor theory, giving weight to the former. Edited by two sociologists, one based at Ohio State University, the other at Wittenberg University, the book presents a comparative view of family–religion interconnections in 14 countries on five continents. The individual chapters are arranged in five sections: societal conflict and accommodation, dramatic societal transformation, the context of innovation, economic factors as a force for change, and gender and social change. The contributors, mostly sociologists but with a handful of anthropologists, legal scholars, and communications specialists, explore a wide range of issues, including entrepreneurial networks in South Africa, funereal practices in Cameroon, divorce reform in Indonesia, religious florescence in Belarus, and the rapid growth of Mormonism in France. Together, the authors argue that it is the intimate connections between religious and family life, and the ability of both to provide meaning and connection in a world increasingly bereft of them, that contribute to their longevity. In this account, families and religions are flourishing not only in the “private” sphere, but in the “public” realm of the economy and polity as well, a dichotomy the authors find artificial in any case. In all, this collection is a fascinating, in-depth look at some of the ways in which the oldest institutions known to humankind are adapting to the newest trends. Recommended to students of changing societies throughout the world, especially those with appetite for self-conscious theory building (explicit listing of variables, recitation of hypotheses, and the like). Chapter-end references, index.—S.G.

BRIAN NICHIPORUK

The Security Dynamics of Demographic Factors

Santa Monica, CA: RAND, 2000. xxi + 52 p.

Demographic trends bearing on international security, according to this report, are the “bifurcation of developing world fertility patterns,” the low fertility of developed nations, and mass migration and urbanization. Such conditions affect both the sources of military power and the nature of conflict. Low fertility brings increasing difficulty in military recruitment as youth cohorts shrink, and it puts pressure on defense budgets as health care and pension costs rise. Together these impel a shift from quantity to quality of troops and armaments and, where feasible, greater reliance on multinational force structures and procurement. In contrast, high-fertility states tend to maintain large but poorly trained standing armies—mainly for internal security and regime protection, and perhaps to lessen youth unemployment—but with a small elite force representing their “real combat power.” Current demographic change is influencing the nature of modern conflict in several respects. Both high- and low-intensity conflicts increasingly take place on urban terrain. Existing tactics and weaponry seem poorly suited for confronting insurgencies located within large urban populations—as witnessed by the battle of Grozny in the first Chechen war. Age effects may compound the problem: large youth cohorts faced with a stagnant economy are at particular risk of being mobilized in a radical cause. “Ethnic diasporas,” sometimes the result of forced migra-

tion, can create security problems for the migrants' home country and for the host country. And population growth diminishes the supply of renewable resources. Water is the prime example, with a strong potential for conflict over allocation rights between upper and lower riparian states (Turkey vis-à-vis Syria and Iraq; Sudan vis-à-vis Egypt). The study concludes with a discussion of the implications of "demographically-driven challenges" to US security interests. Appropriate policy responses include greater attention to demographically oriented indicators of emerging conflict and increased aid for programs that directly or indirectly reduce fertility. The report is available online at www.rand.org/publications/MR/MR1088.—G.McN.

RAYNA RAPP

Testing Women, Testing the Fetus: The Social Impact of Amniocentesis in America

New York: Routledge, 1999. xiii + 361 p. \$30.00; \$19.95 (pbk.).

In this extraordinary account of the role of genetic counseling and technology in American society, the well-known feminist anthropologist Rayna Rapp takes us on a culturally incisive, politically engaged tour of the various sites through which amniocentesis is negotiated in New York City. In visits with genetic counselors, geneticists, laboratory diagnosticians, pregnant women, families of children with various disabilities, and disability support groups, she guides us through the points where reproductive rights intersect with disability rights to produce complex, morally fraught dilemmas. Herself a former recipient of a "positive diagnosis" of genetic disorder in an unborn child, Rapp, who is a professor of anthropology at the New School for Social Research, is ultimately most interested in the ways individual women manage what she refers to as the geneticization of their lives, as well as those of their families and communities. "Moral pioneers" is her term for women who are forced to decide whether to abort their fetuses or become mothers of disabled children. These women, Rapp writes, are "moral philosophers of the private" who must "judge the quality of their own fetuses" and then "adjudicate the standards guarding entry into the human community." A central theme of the study is the stratified nature of the reproductive process, in which the cultural capital and social resources women bring to their difficult decisions vary by language, ethnicity, and religion, as well as by class, gender, sexuality, and age. As Rapp puts it, "reproductive futures are embedded in other forms of hierarchy." Rapp's broad-ranging interests are suggested by some of her provocative titles and chapter headings: "imaging the baby," "the disabled fetal imaginary," "the calendar of grief," "emergent epistemologists," "laboratory labor," and many more. Rapp has produced an experimental ethnography in which "methodology bleeds into everyday life." It is a superbly written, deeply moving study in which the people who are making American genetic history never disappear from view. This book will surely change the way the ongoing technological transformation of American reproduction is talked about and understood. References, index.—S.G.

The Council of Economic Advisers on the Changing American Family

The 2000 Annual Report of the US Council of Economic Advisers (a document exceeding 300 pages, formally an Annex to the Economic Report of the President Transmitted to the Congress February 2000, Washington, DC: US Government Printing Office) devotes considerable space to a discussion of the demographic and economic changes affecting families in the United States. Excerpts reproduced below from the first part of Chapter 5, titled "The Changing American Family," examine the relevant trends in a broad historical perspective, drawing on data in some cases spanning the entire twentieth century. The second part of this chapter discusses the "money crunch": financial constraints "that still burden many families despite the remarkable growth in the American standard of living," and the "time crunch": shortage of time devoted to family needs "that results from the increased participation of parents, especially mothers, in the paid labor market." Policies designed to address these problems are also discussed in the second part of the chapter.

For most of the 20th century, the prototypical American family was a married couple with children in which the wife did not work for pay. But for decades now this traditional one-breadwinner, one-homemaker family has made up a declining share of families, as more wives have entered the paid labor force and as single-parent families have become more widespread. At the beginning of the 21st century, fewer than a third of all families are married couples in which the wife does not work outside the home. This means that a majority of American families face—and in consequence the Nation faces—different opportunities and different challenges from those of a society of "traditional" families.

The changes in the American family, viewed over the entire span of the 20th century, have been dramatic (Table 1). In 1900, for example, about 80 percent of children lived

in two-parent families with a mother or stepmother who worked on the farm or at home. Fewer than 10 percent of American children lived in one-parent families. The typical home had few of today's conveniences (only 8 percent of dwelling units had electricity in 1907), and many women sewed their own clothes and gave birth in the home rather than in a hospital. Women early in the century married younger, had more children, and died younger than women today. Ten percent of children died in infancy, and average life expectancy for both men and women was less than 50 years. The average household had close to five members, and a fifth of all households had seven or more. Job opportunities for women who did not live on farms were limited as much by custom as by physical demands: only a fifth of all women worked for pay, and those who did were mainly single and poor.

TABLE 1 Contrasting American families then and now

Item	1900 ¹	1950	1998 ²
Households by type (percent)			
Family households	(3)	89.2	69.1
Married couple	(3)	78.2	53.0
Male householder, no wife present	(3)	2.7	3.8
Female householder, no husband present	(3)	8.3	12.3
Nonfamily households	(3)	10.8	30.9
Average household size (persons)	4.8	3.4	2.6
Households with seven or more people (percent)	20.4	4.9	1.2
Living arrangements of children by family status (percent) ⁴			
Two-parent farm family	41	17	(5)
Two-parent nonfarm family			
Father breadwinner, mother homemaker	43	56	24
Dual earner	2	13	44
Single-parent	9	8	28
Not living with parent	5	6	4
Males and females by marital status (percent)			
Males aged 15 and over			
Married	54.6	68.9	58.0
Divorced	.3	2.0	8.2
Widowed	4.6	4.2	2.5
Never married	40.3	24.9	31.2
Females aged 15 and over			
Married	57.0	67.0	54.9
Divorced	.5	2.4	10.3
Widowed	11.2	12.0	10.2
Never married	31.2	18.5	24.7
Median age at first marriage			
Men	25.9	22.8	26.7
Women	21.9	20.3	25.0
Life expectancy at birth (years)			
Men	46.3	65.6	73.9
Women	48.3	71.1	79.4
Infant mortality rate (deaths per 1,000 live births)	99.9	29.2	7.2
Labor force participation rate of women (percent)	20.0	33.9	60.0
Women in the labor force by marital status (percent)			
Single	66.2	31.9	26.8
Married	15.4	52.2	53.1
Widowed, divorced, or separated	18.4	16.0	20.0

¹Infant mortality rate is for 1915.²Labor force participation rate of women is for 1999.³Not available.⁴Data for 1900 and 1950 are from Donald J. Hernandez, *America's Children*, The Russell Sage Foundation, 1993.⁵Less than 2 percent and included in nonfarm totals.

SOURCES: Department of Commerce (Bureau of the Census); Department of Labor (Bureau of Labor Statistics); and Department of Health and Human Services (Centers for Disease Control and Prevention), except as noted.

The average family today enjoys many advantages that its counterpart of a century ago did not. As we have seen in earlier chapters [of the report], the material standard of living of the average family is much higher now than it was then. People are more likely not only to live longer but to remain healthy into retirement as well. It is partly because of these very advances, however, that families today face a different set of challenges than did families 100 years ago. In particular, the expansion of opportunities for women to work for pay, and the greater desire of women to seek such work, have added a new challenge to the perennial one of having adequate resources to meet family needs. That new challenge is how to balance the material gains from more hours of paid employment against the desire to reserve time for the responsibilities and enjoyments of family life.

This chapter examines these two challenges. It begins with an overview of some of the key trends that have created the modern American family: the rise in female labor force participation, changes in family formation and dissolution, and improvements in health and longevity. It then explores the emergence of a diverse set of family types, focusing on differences in incomes and in time spent at work. The remainder of the chapter [not reproduced here] explores the challenges these different kinds of families face—and their policy implications.

. . .

Key trends shaping the American family

Among the many trends that have affected the American family over the course of the century, three have been particularly important. The first is the rise in female participation in the labor force as more opportunities have opened up for women to work and as more women have taken advantage of those opportunities. The second is not a single trend but a set of related changes in how families form and dissolve, which have contributed to the growing prevalence of single-parent families. The third is improvements in health and life expectancy that have made

care for older relatives—and providing for their own retirement—increasingly important issues for heads of families today. Many other kinds of households—including people living alone—are also part of American society and face challenges of their own, but this chapter focuses primarily on those challenges that affect families with children.

Female labor force participation

Women have always worked, whether on the family farm, in the home, or in the paid labor force. What distinguished the 20th century was the enormous increase in the proportion of women who work for pay. In 1999 about three-fifths of the female population aged 16 and over were in the labor force (either employed or looking for work). This is three times as high as the female labor force participation rate in 1900. And the participation rate of women aged 25–44—those most likely to be balancing work and child rearing—has risen severalfold, from less than 20 percent in 1900 to over 75 percent today (Figure 1). The participation rate of women in this age group with children under age 18 has been somewhat lower than the overall rate but has shown a similar pattern of increase. Over the past 25 years the share of working mothers in this age group who were employed full-time has been roughly 71 percent.

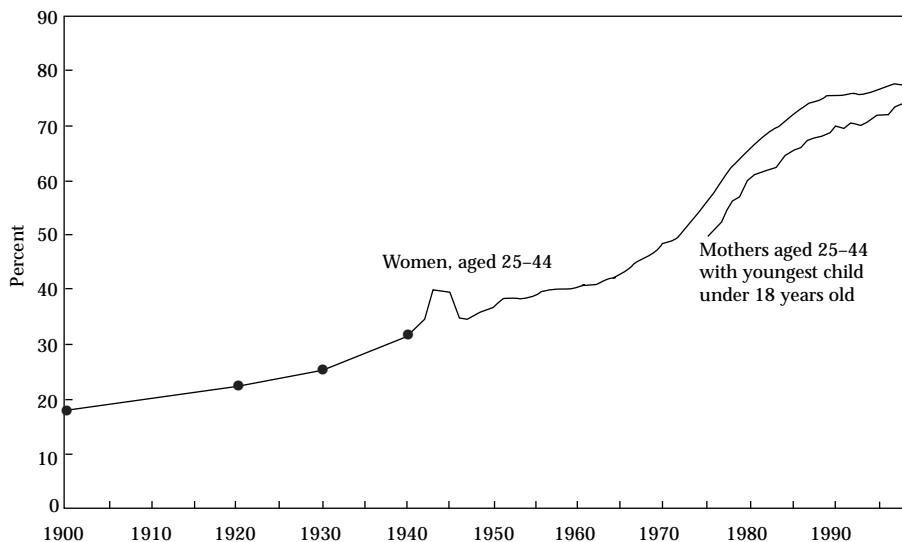
Many factors have contributed to this growth in women’s participation in the paid labor market, including increases in education and wages for women, the opening up of more opportunities for women to work, and changes in family structure. As a result of higher labor force participation rates and later marriages, a larger proportion of women than ever before experience a period of independent living and employment before marriage. This gives them greater attachment to the labor force and increases the chances that they will continue to work, or return to work, after they marry and start a family.

Family formation and dissolution

Marriage remained a fairly universal experience throughout the 20th century. Among the population 15 years old and over, the proportions of both men and women who are married are roughly the same today as a cen-

FIGURE 1 Labor force participation of women

Roughly four-fifths of younger women are in the labor force today, whereas roughly four-fifths were not in 1900. Women with children are also working in greater numbers.



NOTE: Annual data are available only since 1942. Dots indicate decennial census data.

SOURCES: Department of Commerce (Bureau of the Census) and Department of Labor (Bureau of Labor Statistics).

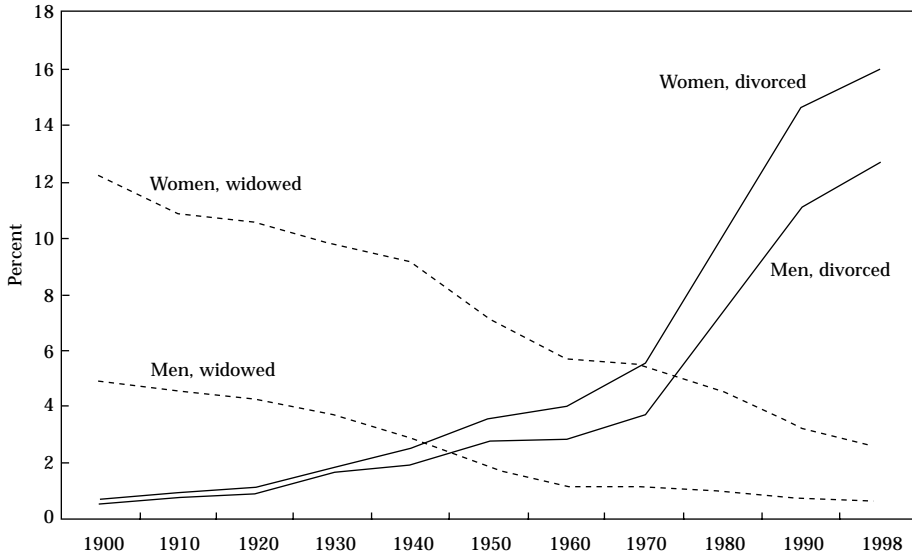
tury ago, although lower than in the 1950s and 1960s. Only 6 percent of women aged 45–64 in 1998 and 12 percent of women aged 35–44 had never been married. However, one study found that women today are spending a smaller fraction of their adult lives married than did their counterparts a few decades ago. A much larger proportion of children are being born to unmarried mothers. As a result, the share of children living in one-parent families increased from 9 percent in 1900 to 28 percent in 1998.

Several strands of evidence suggest that people are spending a smaller fraction of their lives married than in 1900. First, people are marrying slightly later. In 1900 the typical first marriage was between a woman of 22 and a man of 26; now the typical bride is 3 years older and the groom nearly a year older. Second, divorce rates are much higher today than at the beginning of the century. In 1900, among those aged 35–54, widowhood was far more common than divorce. Over the century, the probability of being a widow in this age range declined markedly, while the probability of being divorced rose

(Figure 2). The divorce rate, which jumped from around 10 per 1,000 married females per year in the mid-1960s to more than 20 per 1,000 in the mid-1970s, has drifted down slightly since then but remains high. A third reason why people spend a smaller fraction of their lives married is that life expectancy is longer today relative to the typical duration of a marriage. The net result of all these forces is that only 56 percent of the population aged 15 and over are married today, rather than 68 percent as in 1960. Thus it is probably not surprising that the proportion of children living in single-parent households has risen dramatically.

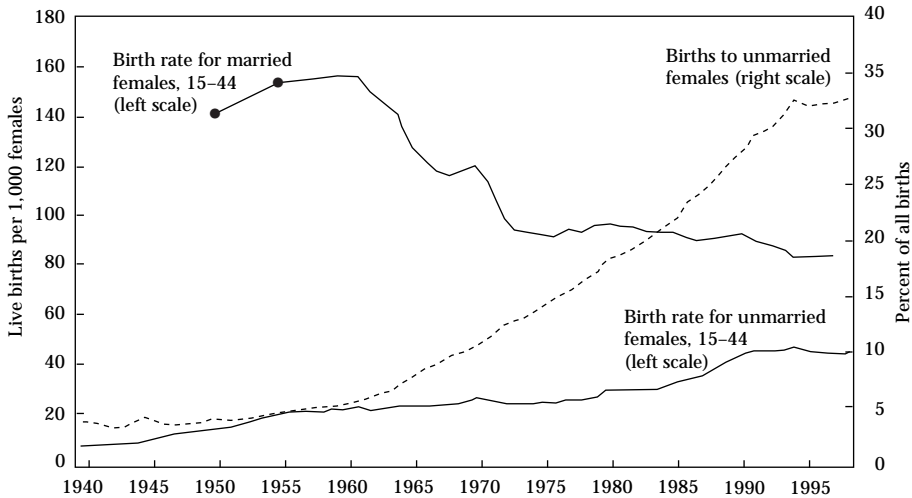
The increased prevalence of single-parent households is also related to the rise in out-of-wedlock births. For unmarried females aged 15–44, the number of births per 1,000 women increased dramatically from 7.1 in 1940 to 46.9 in 1994, but it has since stabilized and begun to decline, reaching 44.3 in 1998 (Figure 3). In contrast, this measure of the birth rate among married women has been dropping since the baby-boom of the 1950s and 1960s, although it remains nearly

FIGURE 2 Shares of population aged 35–54 who are widowed or divorced
A smaller share of middle-aged Americans, men and women, are widowed now than in 1900, but far more of both sexes are divorced.



SOURCE: Department of Commerce (Bureau of the Census).

FIGURE 3 Birth rates for married and unmarried females
The share of out-of-wedlock births soared after 1960 but have recently stabilized. Meanwhile the birth rate for married females has fallen to about twice that for unmarried females.



NOTE: Annual data for birth rate for married females are available only since 1960; dots indicate previous years with available data.

SOURCE: Department of Health and Human Services (Centers for Disease Control and Prevention).

twice that of unmarried women. As a result of these trends, the share of all births that were to unmarried women of all ages increased eightfold, from 4.0 percent in 1950 to 32.8 percent in 1998, although this figure has begun to level off in recent years. Some of this increase reflects lower marriage rates generally, and some reflects the rapid increase in the late 1980s and early 1990s in out-of-wedlock births, including those to teens.

Life expectancy and health

The life expectancy and health of Americans increased dramatically over the 20th century. Major public health initiatives (such as immunization campaigns, better sewage systems, and education about hygiene) as well as medical advances (from antibiotics to pacemakers to bone marrow transplants) have led to the virtual eradication of numerous diseases and conditions that once contributed to high death rates and low life expectancy. For example, technological innovations, better obstetrical care and nutrition, more widespread access to prenatal care, and greater use of antibiotics all contributed to tremendous improvements in the health of mothers and infants. The infant mortality rate dropped by more than 90 percent over the century, from 99.9 per 1,000 live births in 1915 to 7.2 per 1,000 in 1998. The maternal mortality rate dropped similarly: whereas in 1900 more than 80 women died from pregnancy-related complications for every 10,000 live births, by 1997 this rate had fallen to less than 1 death for every 10,000 live births—more than a 98 percent decline. Advances also have been seen in other areas. Death rates from coronary disease have declined by 51 percent since 1972, improved sanitation has dramatically reduced typhoid and cholera in the United States, and the widespread use of vaccines has eliminated smallpox and polio.

These improvements have meant longer life spans for most Americans. Over the century, the average life span in the United States increased by 30 years, and one study attributes five-sixths of that increase to advances in public health such as vaccinations and food safety. Life expectancy at birth for a woman rose from 48.3 years in 1900 to 79.4 years by 1998. For men it rose over the same

period from 46.3 years to 73.9 years. Older Americans now have longer remaining life expectancies as well. Whereas the average 60-year-old white man in 1900 could expect to live almost to age 75, by 1998 a man of that age could expect to live almost to age 80. Combined with the recent declines in fertility behavior, these changes in life expectancy have led to an increasing share of the population that is elderly—a trend that will continue as the baby-boom generation ages.

Increasing diversity across families

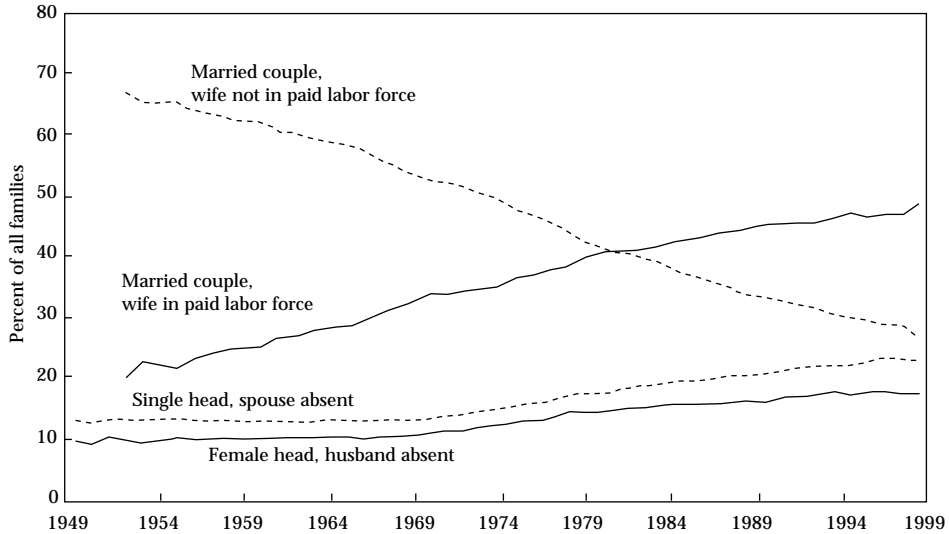
Income and the time to enjoy it are two key components of economic well-being. In principle, the strong growth in productivity and the resulting growth in real wages over the past century [described in Chapter 1 of the report] could have allowed material standards of living to increase while simultaneously allowing families to work shorter hours. But in fact, the substantial increase in female labor force participation and the increase in the proportion of households headed by single females mean that there are more families with working women, and many women are working more hours. These trends also mean that there is now a greater diversity in family structure as well as differences in incomes and hours of work among family types.

Diversity in family structure

Traditional one-breadwinner, one-homemaker married couples have been declining as a share of all families, from 67 percent in 1952 to 27 percent in 1999 (Figure 4). Rising female labor force participation has increased the proportion of all married-couple families in which the wife works, and these now account for roughly half of all families. Reflecting the trends in marriage and divorce discussed above, the share of all families headed by a single householder with no spouse present (predominantly single-parent families) increased from 13 percent to 23 percent between 1949 and 1999. Although most children living in single-parent families live with their mothers, the share of single-parent families headed by fathers has more than doubled since

FIGURE 4 Composition of families by family structure

The share of “traditional” families with a nonemployed wife has declined by more than half since 1950, whereas that of two-earner families has more than doubled.



NOTE: A family is two or more related individuals who reside together.
SOURCE: Department of Commerce (Bureau of the Census).

1975 and stood at 19 percent in 1999. It is estimated that more than a third of all children do not live with their biological fathers.

Increasing life expectancy has also changed the structure of the family. For example, over 70 percent of adults aged 30–54 in the early 1990s had living relatives who spanned three or more generations, and over 40 percent of adults aged 50–59 had living family members from four or more generations. In addition, nearly 2.4 million families now have more than two generations living under one roof. Longer life expectancy has meant that more grandparents are able to watch their grandchildren grow to adulthood. And younger generations are facing caregiving responsibilities for older relatives. A 1997 survey estimated, for example, that 22 percent of all U.S. households provide care for an elderly person.

At the same time, grandparents have also become more important as caregivers—including primary caregivers. Over the last three decades, for example, the share of children under age 18 living in a household headed by a grandparent has risen by more than 70

percent (Figure 5). Most of the increase in this share during the 1990s was from an increase in the share of children living in households with neither parent present. Between 1980 and 1990, by contrast, the increase came mostly from children living in grandparent-headed households with just a single parent present. The share of such households with a single father present, although small, continued to grow in the 1990s.

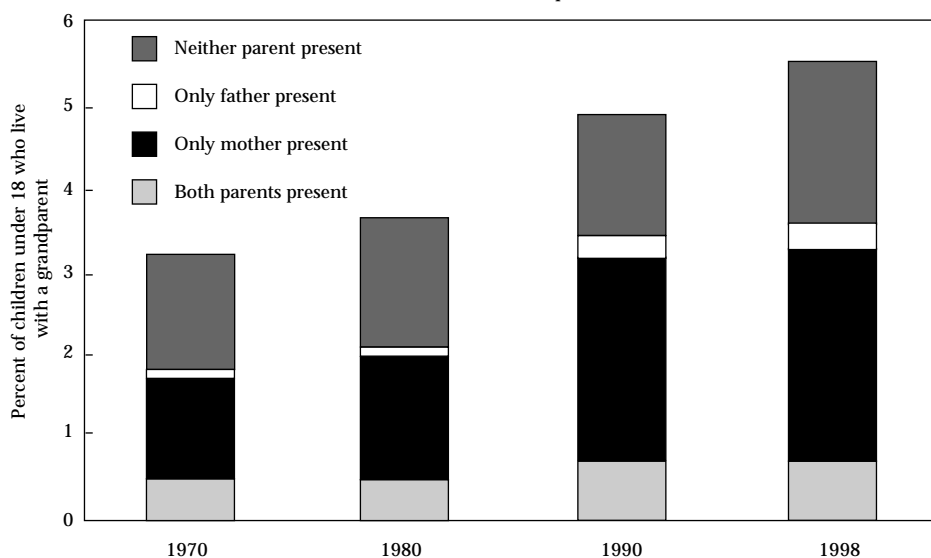
Consistent with the focus of the chapter, this discussion has emphasized family types likely to have children present. It is important to recall, however, that American households cover a much wider range of diversity than this.*

*The Census Bureau defines a family as two or more people related by birth, marriage, or adoption who reside together. A household, by contrast, is defined as any person or group of people who occupy a single housing unit. Thus households include single people and groups of unrelated people who reside together.

In 1970 the proportion of households fitting the traditional definition of a family (a husband, a wife,

FIGURE 5 Grandchildren in grandparents' homes by presence of parents

A larger share of children today live in households headed by a grandparent. The proportion of these children who share the home with neither of their parents has increased since 1990.



SOURCE: Department of Commerce (Bureau of the Census).

Diversity of income and hours of work

An examination of income growth among families with children by family type reveals important differences among two-earner married couples, one-earner married couples, and families headed by single females. To some extent these differences represent choices about

and their children) was 40 percent; by 1998 only 25 percent of households fit that definition. The number of Americans living in unmarried-partner households is large and growing rapidly. From 1994 to 1998 the number of married-couple households increased by 2 percent, while the number of unmarried-partner households increased 16 percent. In 1998 about 1.7 million, or 1.6 percent, of households were same-sex partnerships.

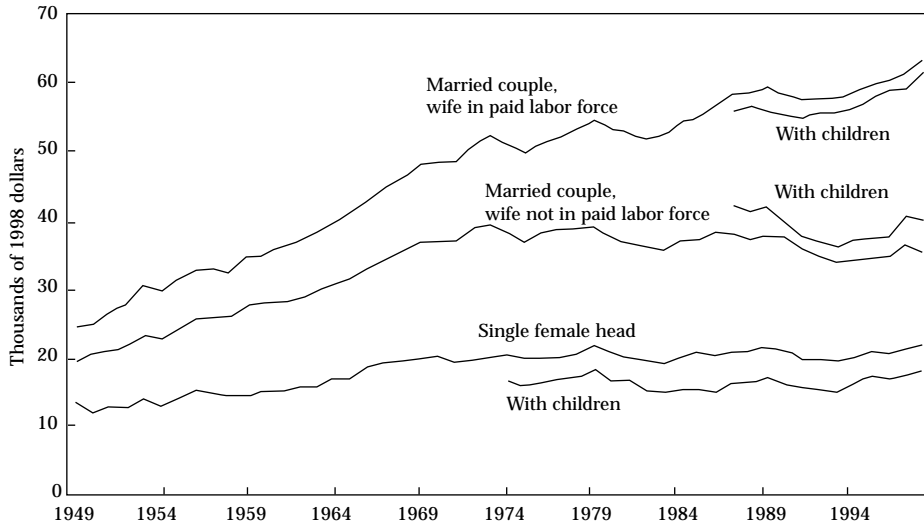
The fraction of individuals choosing to live together outside of a formal marriage rose dramatically in the second half of the 20th century. One study reports that only 3 percent of women born between 1940 and 1944 had lived in a nonmarital cohabitation by age 25, whereas for women born 20 years later, 37 percent had cohabited by that same age. In fact, despite lower marriage rates and a later age of first marriage now than several decades ago, evidence indicates that individuals are still forming coresidential relationships at about the same point in their lives.

how many hours to work and how many to leave free for other things. But they may also reflect underlying differences in education or other factors that affect earnings opportunities.

For the past 50 years, the median income of two-earner couples has been higher than that of one-earner couples, which in turn has been higher than that of families headed by a single female (Figure 6). Moreover, the gap between the median income of two-earner couples and that of the other family types has widened, both in absolute dollars and in percentage terms. Although many measures of income inequality have stopped rising in recent years, the real median income of married-couple families where the wife is not in the paid labor force is less than three-fifths that of married-couple families where the wife works for pay. Recent increases have brought the real median income of female-headed families in 1998 above its previous peak in 1979, although that income is only a little more than a third the median for two-earner couples. To a great extent, of course, these differences reflect factors other than family type. As emphasized below, wives in

FIGURE 6 Median family income by family structure

The median income of the typical two-earner married couple has exceeded that of other family types for at least half a century and continued to grow strongly after 1973.



NOTE: A family is two or more related individuals who reside together.
SOURCE: Department of Commerce (Bureau of the Census).

two-earner couples are likely to have greater earnings opportunities than wives in single-earner couples. And single mothers tend to be younger and less educated than married mothers, with the result that their earnings are likely to be lower as well.

Median incomes provide one perspective on differences in income by family type, but they necessarily conceal the extent of income variation within each family-type grouping. Among families with children, there is considerable overlap between the distributions of income for each family type, particularly in the lower income ranges (Figure 7). The distribution of female-headed families with children, however, is more concentrated in the lower income range.

The income differences across families shown in Figure 7 are due largely to differences in earned income from employment, not differences in wealth or transfer payments (such as welfare payments). In 1998, wage and salary earnings represented 87 percent of income for the average married-couple family with children and 69 percent for the average female-headed family with children.

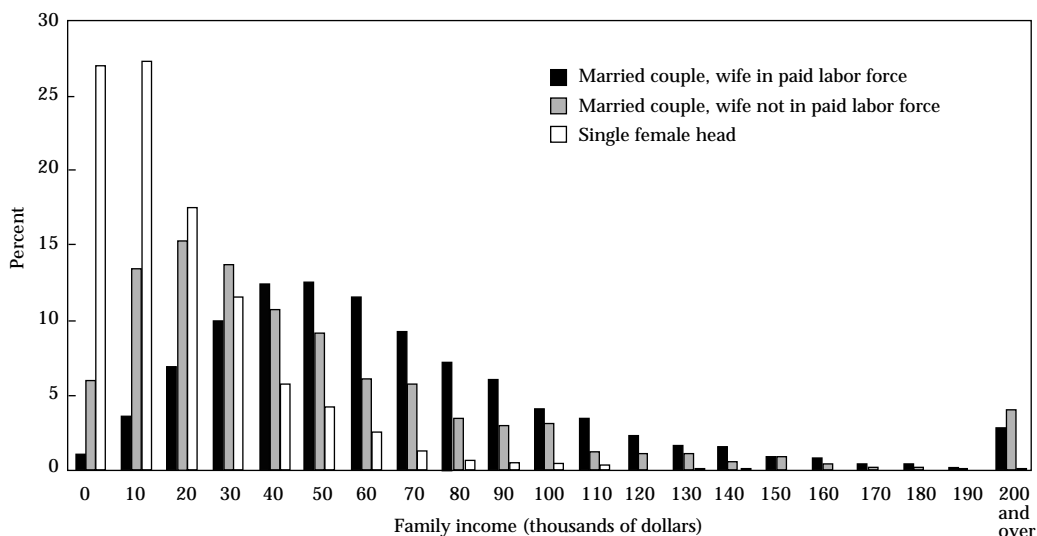
Differences in hours worked are a major factor accounting for differences in income across family types. Not surprisingly, dual-earner couples devote more total hours to work than the other family types, on average, and have the highest concentration of families in the portion of the distribution with the most hours worked (Figure 8). Among single-earner family types, husbands in single-earner couples work more hours on average than single mothers.

The rising earnings of women with children

The typical mother today now contributes significantly more earnings to family money income than did her counterpart several decades ago. The median earnings of single mothers with children rose from \$4,800 to \$12,000 (in 1998 dollars) between 1968 and 1998, and among working single mothers the median rose from \$11,300 to \$15,000. The median earnings of all wives with children rose from zero (more than half had no earnings) to \$10,400 during this same time pe-

FIGURE 7 Income distributions for families with children by family structure, 1998

A larger share of two-earner couples have high incomes, while the distribution of female-headed families is skewed toward lower incomes.

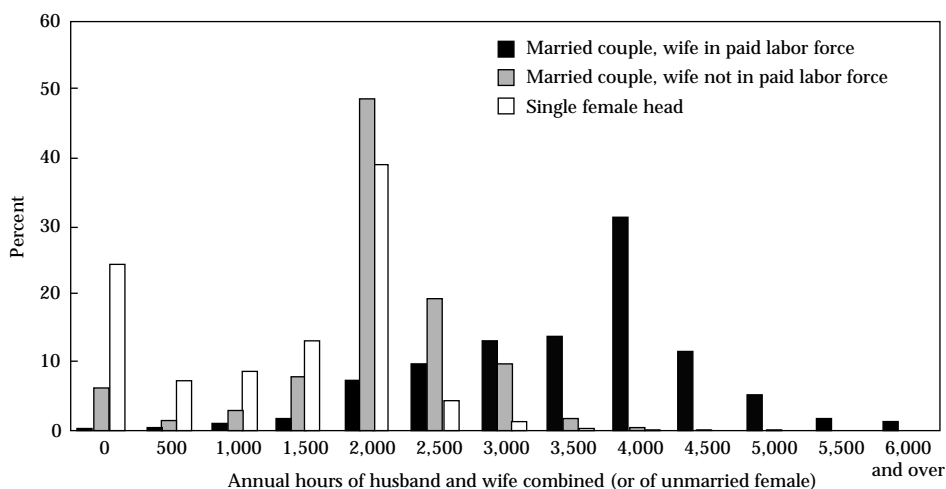


NOTE: Data are for a sample of civilian families with primary female aged 18–55 and children under 18. The incomes on the horizontal axis represent ranges of income (e.g. 10 is \$10,000–\$19,999). A family is two or more related individuals who reside together.

SOURCE: Council of Economic Advisers tabulation of Current Population Survey data.

FIGURE 8 Distribution of annual hours worked by families with children, 1998

Within each family type, the modal number of hours worked is about 2,000 per worker. Many two-earner couples work 4,000 hours a year or more, leaving limited time for other activities.



NOTE: Data are for a sample of civilian families with primary female aged 18–55 and children under 18. The hours on the horizontal axis represent ranges of hours (e.g. 0 is 0–499). A family is two or more related individuals who reside together.

SOURCE: Council of Economic Advisers tabulation of Current Population Survey data.

riod, and from \$7,600 to \$18,000 for working mothers. As a result, married working mothers' earnings today represent 30 percent of the couple's combined earnings, compared with only 15 percent in 1968. In addition to raising average family income, mothers' earnings have dramatically increased the proportion of families who are well off. The share of working wives earning more than \$20,000 rose from 14 percent to 43 percent between 1968 and 1998, and the share of single working mothers earning above \$20,000 rose a smaller (although still sizable) amount, from 21 percent to 37 percent. Among married couples, wives' earnings have had a big effect in increasing the proportion of wealthy families: in 1998 only 18 percent of all men earned more than \$60,000, but when wives' earnings are included, 37 percent of all married couples with children had combined earnings above \$60,000. In contrast, among families headed by single women, only 2 percent had earnings above \$60,000.

Thus, although most women now contribute to family income, there are pronounced differences across different types of families. These differences in mothers' contributions can be traced to differences both in wages and in hours of work.

As discussed in Chapter 4 [of the report], women's wages have risen over time, in part because of rising skill levels. But single mothers have experienced slower wage gains and have considerably lower wage rates, on av-

erage, than married mothers who work. The lower wages of single mothers are related in large measure to their lower average educational attainment than married mothers who work. Across all family types, about one-third of mothers have a high school diploma but no college. However, single mothers and wives who are not working are much less likely than working wives to have graduated from high school, although as a group each has made substantial strides in raising their educational attainment over the past three decades (Table 2). Furthermore, a smaller share of single mothers than of married mothers who work have at least some college, although the increase in the single mothers' share since the late 1960s has been large. In contrast, employed wives have strikingly higher levels of education than all others, so that a portion of the stronger growth in median incomes for these families shown in Figure 6 is due to their higher and rising educational attainment, which feeds into their higher wage rates.

The rising incomes of mothers are also a function of their rising hours of work, and here, too, single mothers differ from married mothers on average. Thirty years ago single mothers worked longer hours than married mothers, and thus their hours have risen less over time. For example, the share of single mothers working full-time rose 11 percentage points, to 67 percent, between 1968 and 1998, whereas the share of married mothers working full-time rose 18 percentage points, to 52

TABLE 2 Educational distribution of women with children (percent)

Item	Single women		Married women who have not worked in previous year		Married women who worked in previous year	
	1969	1999	1969	1999	1969	1999
Less than high school diploma	51	19	34	21	32	8
High school diploma, no college	35	35	47	33	46	32
At least some college	14	46	20	46	22	60
Total	100	100	100	100	100	100

NOTE: Data are for a sample of civilian families with primary female aged 18–55 and children under 18. Data for 1999 are based on highest diploma or degree received; data for 1969, on the number of years of school completed. Detail may not add to totals because of rounding.

SOURCE: Council of Economic Advisers tabulations of March Current Population Survey data.

TABLE 3 Share of women with children who worked in previous year, by education (percent)

Item	Single women		Married women		All women	
	1969	1999	1969	1999	1969	1999
Less than high school diploma	63	64	50	52	52	57
High school diploma, no college	74	82	51	75	53	76
At least some college	79	90	53	79	55	82
All	69	82	51	75	53	77

NOTE: Data are for a sample of civilian families with primary female aged 18–55 and children under 18. Data for 1999 are based on highest diploma or degree received; data for 1969, on the number of years of school completed.

SOURCE: Council of Economic Advisers tabulations of March Current Population Survey data.

percent. The increase in full-time work arose almost entirely from women entering the labor force in greater numbers, not from a switch from part-time to full-time work: between 1968 and 1998 the proportion of single mothers who worked rose from 69 percent to 82 percent (Table 3); that of married mothers increased from 51 percent to 75 percent. (The proportion of married mothers working part-time increased substantially less, from 17 percent in 1968 to 23 percent in 1998.) Married mothers have dramatically increased their hours of work, but they continue to work somewhat less than single mothers.

A portion of the higher average earnings growth for married mothers relative to single mothers arises from the positive correlation between education and hours of work: well-educated women work longer hours. Well-educated women have also increased their hours of work the most over time. From 1968 to 1998, the proportion of mothers with less than a high school education who worked increased from 52 percent to 57 percent. For mothers with at least some college, in contrast, the proportion increased from 55 percent to 82 percent. Several factors shape the decision to work for pay. On the one hand, the potential to earn a high wage makes work attractive, and thus the well-educated should have greater incentive to work. On the other hand, higher earnings and higher husbands' incomes tend to lessen the need to work long

hours—this “income effect” provides an incentive for women to consume more leisure or home time with their children. Highly educated women tend to be married to high-income men, and thus the husband's higher income induces the family to place a greater value on the wife's home time relative to paid employment. Over time, however, the effect of husbands' incomes on wives' hours of work has declined. Thus, highly educated women with children have increased their employment rate the most over time, and today they have the highest rate among women with children. The outcome is that highly educated women, working many hours and earning high wages, have contributed very significantly to the number of families in the upper tail of the income distribution. For these families, incomes are high, but so, too, are hours of work.

In sum, the growth of female hours of work and female earnings has had different effects on different family types. For married mothers, strong growth in wages and hours worked have been a primary source of family income growth over the last 30 years, even though married women's earnings on average still account for less than a third of the couple's earnings. The wages of female family heads have not grown as rapidly over time, so that, despite working many hours, their earnings lag behind those of married women.

The United Nations on the Demographic Impact of the AIDS Epidemic

A report prepared by the Joint United Nations Programme on HIV/AIDS (UNAIDS) and released in Geneva on 27 June 2000 (just prior to the XIIIth International AIDS Conference held in Durban, South Africa) updates estimates of the demographic impact of the epidemic. It characterizes AIDS in the new millennium as presenting “a grim picture with glimmers of hope”—the latter based on the expectation that national responses aimed at preventing and fighting the disease are in some places becoming more effective. According to the report, which emphasizes the considerable statistical weaknesses of its global estimates, the number of people living with HIV/AIDS in 1999 was 34.3 million (of which 33.0 million were adults and 1.3 million were children under age 15; slightly less than half of the adults affected, 15.7 million, were women). Deaths attributed to AIDS in 1999 amounted to 2.8 million, bringing the total since the beginning of the epidemic to 18.8 million. These figures represent moderate upward revisions of earlier UN estimates shown in the Documents section of PDR 25, no. 4. The revised estimate of the number of persons newly infected with HIV in 1999 is, in contrast, slightly lower: 5.4 million, of which 4.7 million were adults and 2.3 million were women. An excerpt from the 135-page Report on the Global HIV/AIDS Epidemic, focusing on countries in the worst-affected area, sub-Saharan Africa, is reproduced below. (Figures shown have been renumbered.)

The demographic impact of AIDS

The population chimney

It is now clear that the population structures of badly affected countries will be radically altered by HIV. And that can only mean massive changes in the way societies organize themselves, make a living and care for the needy.

In developing countries, population structure is generally described as a pyramid, reflecting the demographer's traditional depiction of populations according to age group, with men on one side of a central axis and women on the other. The shape of the pyramid is determined by both birth and death rates. When both are high, the pyramid has a wide base and

tapers off steadily with increasing age. As health improves and fertility falls, the older age groups grow larger than the younger age groups, and the pyramid becomes more of a column.

Now, AIDS has begun to introduce a completely new shape, the “population chimney”. The base of the pyramid is less broad. Many HIV-infected women die or become infertile long before the end of their reproductive years, which means that fewer babies are being born; and up to a third of the infants born to HIV-positive mothers will acquire and succumb to the infection. But the dramatic change in the population pyramid comes around 10 or 15 years after the age at which people first become sexually active, when those infected with HIV early in their sexual lives begin to die off. The populations

of women above their early 20s and men above their early 30s shrink radically. As only those who have not been infected survive to older ages, the pyramid becomes a chimney.

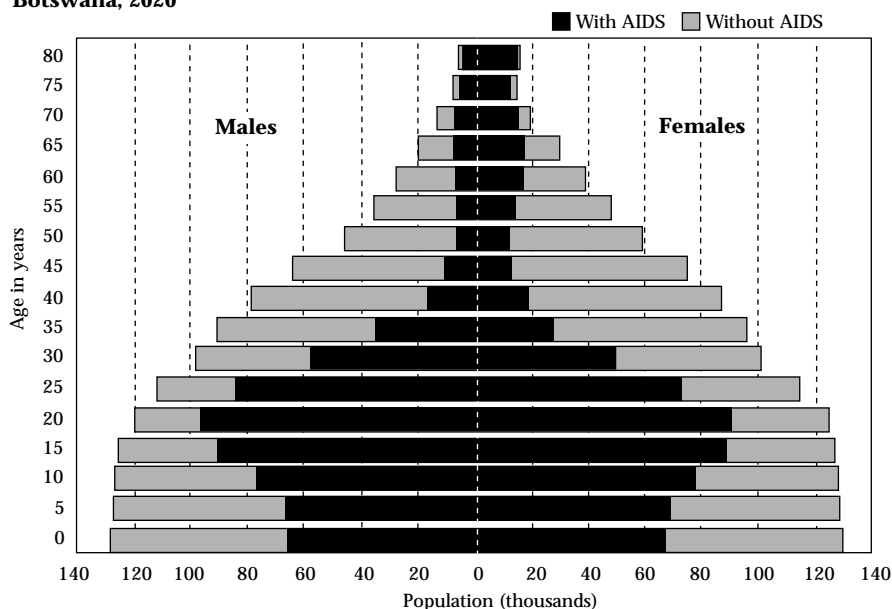
The chimney is illustrated in Figure 1, which shows the dramatic impact that AIDS is predicted to have on the structure of the population of Botswana, where over a third of the 775 000 adults are now infected with HIV. The light-shaded pyramid shows the population structure as it would be in the absence of an AIDS epidemic. More children would be born (because more mothers would survive and remain fertile throughout their reproductive years) and fewer would die because they acquired the virus from their mothers. Far fewer young adults would die before old age.

The implications of this change in population structure are truly shocking. According to the United States Census Bureau, there will be more adults in their 60s and 70s in Botswana in 20 years' time than there will be adults in their 40s and 50s. This projection is based on the assumption that patterns

of new infection will not change greatly over the next decade; however, as changes in future infection rates will principally affect men and women under 40 in 2020, the demographic chimney pattern for older adults is hardly affected by this assumption. The "missing adults"—men and women who should have reached their 40s and 50s in 2020—are now in their 20s and 30s, although some have already died. Many more are already infected with HIV, which will kill them before they reach their 50s.

What this means for society is hard to predict, since the world has never before experienced death rates of this magnitude among young adults of both sexes across all social strata. But there is one certainty: a small number of young adults—the group that has traditionally provided care for both children and the elderly—will have to support large numbers of young and old people. Many of these young adults will themselves be debilitated by AIDS and may even require care from their children or elderly parents rather than providing it.

FIGURE 1 Projected population structure with and without the AIDS epidemic, Botswana, 2020



SOURCE: US Census Bureau, World Population Profile 2000.

Increases in adult and child mortality rates are already being recorded

Even without analysing the data on death rates, countries with severe long-standing HIV epidemics know from the massive increase in funerals that deaths are on the rise. The data show the same rising trend. Demographers have developed techniques to measure death rates in developing countries by asking about recent household deaths or by studying the reports of surviving relatives in large-scale censuses and surveys. Recent analyses of these household-based data for countries with high HIV prevalence rates show clear increases in both adult and child mortality rates, which often appear after many years of a steady decline in death rates. It is worth noting that these data represent a “best-case” scenario and may underestimate actual death rates. Because AIDS may kill several members of a household, it can destroy households completely, with the result that some of the deaths will not be captured in subsequent household surveys.

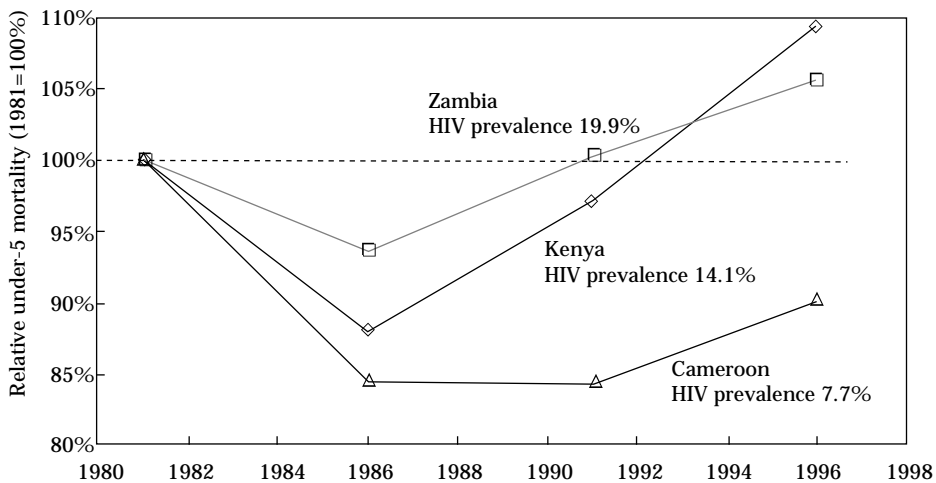
Figure 2 shows the decrease in under-5 child mortality achieved by three African countries between 1981 and 1986 and the subsequent upturn, which has been attrib-

uted to AIDS. Almost all AIDS deaths in young children can be traced back to mother-to-child transmission of the virus. This is why countries such as Zambia and Kenya, with their high adult HIV prevalence rates, have seen a particularly steep rise in child mortality.

Even more dramatic increases are seen in adult death rates. In Zimbabwe, a comparison of estimates based on registered deaths and data collected in different censuses and household surveys over the past two decades show remarkably consistent patterns of increasing mortality among young men (see Figure 3). Even though the data presented here have been adjusted for the under-reporting of deaths that is the norm in developing countries, the adjustments must be viewed as conservative, because the families most devastated by deaths may no longer exist to report such events. The true mortality rates could thus be even higher.

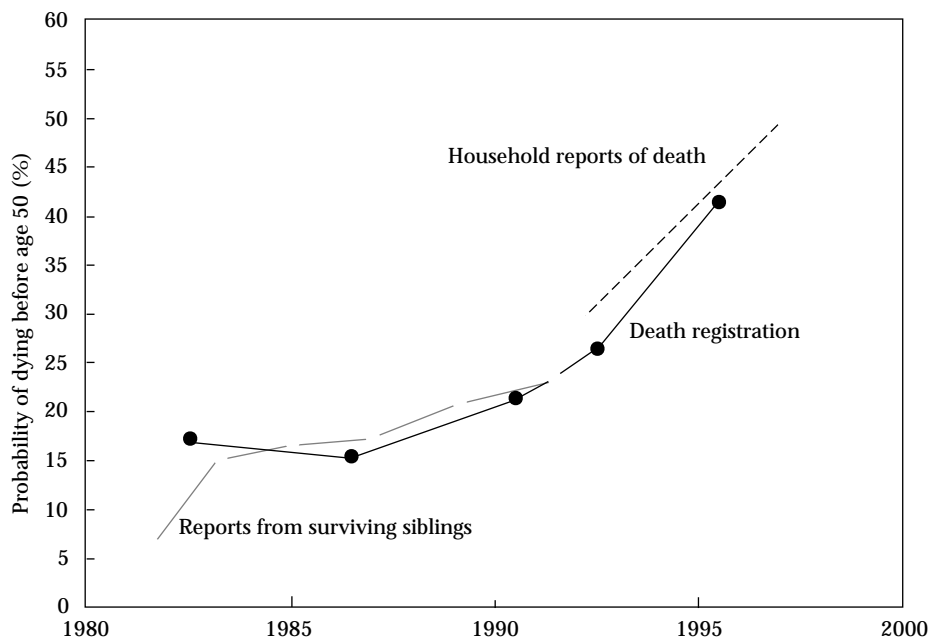
Given the death rates prevailing at the time in each age group, a man who was 15 in 1983 would have had just a 15% chance of dying before reaching his 50th birthday. By 1997, 15-year-old boys faced a much bleaker prospect: half could expect to die before the age of 50. The situation was just as bad for women: the likelihood of a 15-year-

FIGURE 2 Trends in mortality among children under five years old and end-1999 adult HIV prevalence rate, selected African countries, 1981-1996



SOURCE: Demographic and Health Surveys, Macro International, USA.

FIGURE 3 Probability of a Zimbabwean boy aged 15 dying before age 50, trends over time, various national surveys



SOURCE: Feeney G., 1999 (unpublished data).

old dying before the end of her reproductive years quadrupled from around 11% in the early 1980s to over 40% by 1997.

There is no phenomenon apart from the AIDS epidemic that could possibly explain this recent drastic rise in mortality after years of declining death rates. Indeed, smaller community-based studies with information on the cause of death show that in countries where just under 10% of the adult population has HIV infection, almost 80% of all deaths in young adults aged 25–45 are associated with HIV. The proportion of HIV-related deaths is likely to be even higher in areas with higher HIV prevalence rates.

In some countries, over a third of 15-year-olds may die of AIDS

High and stable HIV prevalence rates are bad news. But there is worse news. Prevalence rates do not reflect the true impact of the epidemic. The 15–49-year-old age group includes people who are not yet infected with HIV but who will be one day. And it excludes

men and women born 15–49 years ago who were infected with HIV but have already died. If the probability that a person will become infected at any time in his or her life is summed up, the cumulative figure is higher than the “snapshot” provided by current prevalence rates.

To give a better idea of the actual risk of dying of HIV-associated disease, researchers have built models to follow people throughout their lives, examining their exposure to risks of infection with HIV at each age. The risks are calculated from patterns of HIV infection at each age observed in African communities. In general, the rate of new infections peaks among women in their early 20s and among men slightly later, and tapers off at older ages. The rate of new infections at each age is determined by the current phase of the HIV epidemic in a country. In the model, men and women also face the competing risk of dying of other causes at rates similar to those recorded before the HIV epidemic.

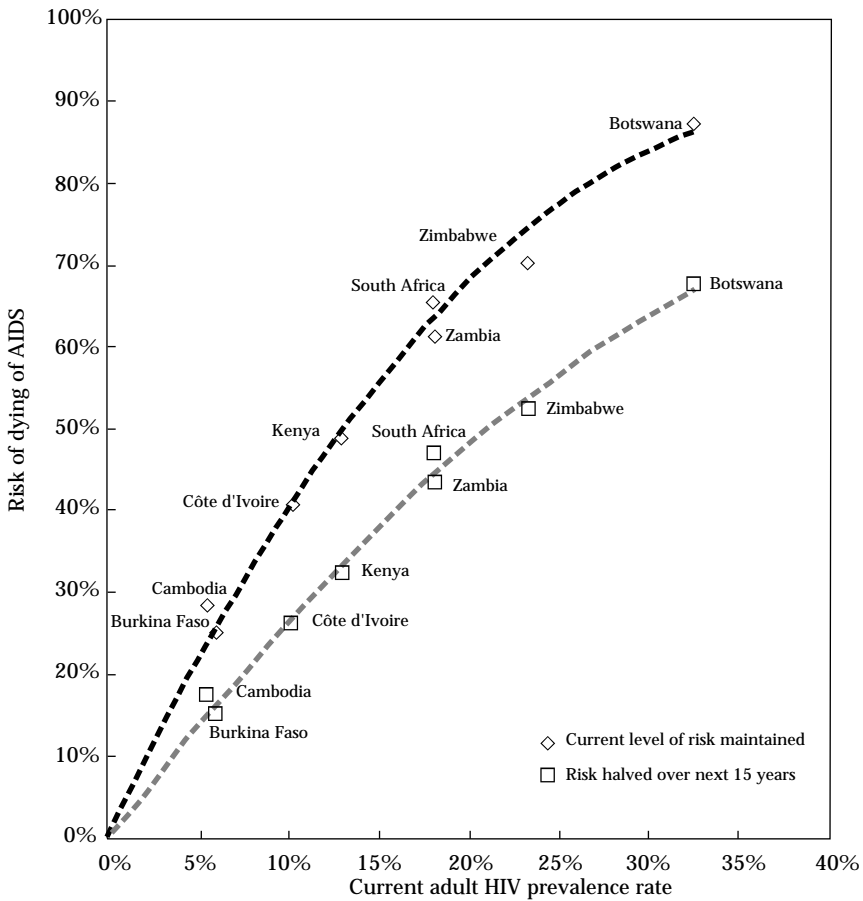
The results of this exercise are illustrated in Figure 4 for men. Along the bottom of the

graph is the current prevalence of HIV in adults aged 15–49. The vertical axis shows the probability that a boy who is now 15 years old will die of AIDS. Clearly, the likelihood that a boy now aged 15 will eventually die of AIDS is much higher than the likelihood that a man now aged 15–49 is currently infected with HIV. This sobering fact remains true even if the rates of new infection fall in the future. The top line shows the relationship between current prevalence and the risk of a 15-year-old eventually dying of AIDS if infection rates stay at current levels—a pessimistic scenario. The bottom line shows the relationship if the risk for new HIV infection

at each age drops by half over the next 15 years—in other words, if prevention campaigns are very successful. Even in this optimistic scenario, however, the proportion of young people who will die of AIDS is appallingly high in many countries: in virtually any country where 15% or more of all adults are currently infected with HIV, at least 35% of boys now aged 15 will die of AIDS.

In countries where HIV infection is concentrated in specific sub-populations—for example, men who have sex with men—there is a similar relationship between current HIV prevalence in that group and the lifetime risk of dying of HIV-related disease.

FIGURE 4 Lifetime risk of AIDS death for 15-year-old boys, assuming unchanged or halved risk of becoming infected with HIV, selected countries



SOURCE: Zaba B., 2000 (unpublished data).

Population in the UN Environment Programme's *Global Environment Outlook 2000*

Most specialized agencies in the United Nations system have taken to compiling a periodic status report on their field. The UN Environment Programme (UNEP) issued the first in a proposed biennial series in 1998, titled Global Environment Outlook-1 or GEO-1. The second in the series, Global Environment Outlook 2000, was published in 1999. GEO-2000 is described by the UNEP's Executive Director, Klaus Töpfer, in the foreword as "a comprehensive integrated assessment of the global environment at the turn of the millennium...[and] a forward-looking document, providing a vision into the 21st century." Its status, however, is rendered uncertain by the printed caution that "The contents of this volume do not necessarily reflect the views or policies of UNEP or contributory organizations."

GEO-2000 paints a generally bleak picture of environmental trends. It evidences a wide array of particulars ("In the Southern Ocean, the Patagonian toothfish is being overfished and there is a large accidental mortality of seabirds caught up in fishing equipment"), but perhaps of more import are its statements about the root causes of environmental problems and what must be done. The excerpts below reflect some of these general views as they pertain to population. They are taken from the section entitled "Areas of danger and opportunity" in Chapter 1 of the report, and from the section "Tackling root causes" in Chapter 5.

High resource consumption, fueled by affluent, Western lifestyles, is seen as a basic cause of environmental degradation. Cutting back this consumption will be required, freeing up resources for development elsewhere. Materialist values associated with urban living are part of the problem, given the concentration of future population growth in cities. And "genuine globalization" will entail free movement of people as well as capital and goods, thus optimizing "the population to environmental carrying capacity."

Some of these positions are at least questionable: the supposed "innate environmental sensitivity of people raised on the land or close to nature," or the aim of "globalization of population movements." The latter does not appear in the recommendations, perhaps because of an implicit assumption that the effect of open borders on environmental trends is unlikely to be favorable. (For an earlier statement of the same sentiment—from 1927—see the comments by Albert Thomas, first director of the ILO, reproduced in the Archives section of PDR 9, no. 4.)

Demographic changes

In parallel with these changes [in the international economic system] there have been profound demographic shifts, as people have

migrated, and continue to migrate, from rural to urban areas in search of work and new opportunities. Since 1950, the number of people living in urban areas has jumped from 750 million to more than 2 500 million

people. Currently, some 61 million people are added to cities each year through rural to urban migration, natural increase within cities, and the transformation of villages into urban areas. Urbanization creates new needs and aspirations, as people work, live, move and socialize in different ways, and require different products and services. Urban environmental impacts and demands are also different.

By 2025, the total urban population is projected to double to more than 5 000 million people, and 90 per cent of this increase is expected to occur in developing countries. Most of the world's children born in the 21st century will grow up in cities, with their perceptions and consumption behaviour shaped by an urban environment. The innate environmental sensitivity of people raised on the land or close to nature is being lost.

The demographic shift that has not been considered or allowed, because of its political sensitivity, is the globalization of population movements. The free movement of capital is now seen as normal, and the uninhibited free trade in goods and services is the goal of governments through WTO. However, genuine globalization should also imply a third condition: that all people should be able to move freely to live and work wherever they like. This is the one change that would allow optimization of the population to environmental carrying capacity, and a rapid reduction in the economic and social disparities between countries that are so destabilizing at present. Efforts in the European Union to eliminate barriers to internal population movements are a precursor of what will be required.

Consumer culture

The global market and the purchasing power of an increasingly wealthy and urban population are driving the homogenization of lifestyles and popular culture. The late 20th century 'consumer society' can be characterized by a growing emphasis on the individual, a search for wider opportunities and experiences, a desire for comfort and autonomy, and personal material accumulation. The advent of international advertising, electronic communications and wide access to the mass media have fed a worldwide public appetite for new and more products, and for travel. Rising affluence has fuelled the 'Western'

model of consumption, and its emulation all over the world. And, though developing countries still account for less than 20 per cent of global GDP, many of their people are joining the consumer society. Per capita incomes are rising, and habits of diet, mobility and resource consumption are changing to reflect industrial country patterns.

This consumer lifestyle as presently practised is environmentally wasteful and inefficient, requiring large quantities of resources per capita and generating wastes that create further environmental problems when they are disposed of and released into the environment. Yet this does not have to be the case. Technological change can reduce resource use many times without lowering the standard of living. Efforts to increase environmental efficiency, reduce waste and introduce recycling are growing and spreading. It is widely recognized, at least by many NGOs and the wealthiest governments in OECD, that a tenfold reduction in resource consumption in industrialized countries is a necessary long-term target if adequate resources are to be released for the needs of developing countries....

Alongside the consumer culture, the world has other value systems and lifestyles which may be less visible and invasive but which represent the rich diversity of human experience and fulfilment. Many of these are more respectful of the environment, and provide options worth considering in the move towards more sustainable forms of society. The poor are also cut off from the consumer society, which is still largely irrelevant to their struggle for existence. A lifestyle that excludes one-third of the world's population, however dominant it may appear at the moment, should not be regarded as the supreme achievement of 20th-century civilization.

. . .

Tackling root causes

Means must be found to tackle the root causes of environmental problems, many of which are unaffected by strictly environmental policies. Resource consumption, for example, is a key driver of environmental degradation. Policy measures to attack this issue

must reduce population growth, reorient consumption patterns, increase resource use efficiency and make structural changes to the economy. Ideally, such measures must simultaneously maintain the living standards of the wealthy, upgrade the living standards of the

disadvantaged, and increase sustainability. This will require a shift in values away from material consumption. Without such a shift, environmental policies can effect only marginal improvements.

Gender Equity in Theories of Fertility Transition

PETER McDONALD

Recent theoretical discussion has postulated that low fertility in advanced countries is attributable to low levels of gender equity. Low gender equity is evidenced in the lack of support for women to combine paid employment and childrearing; tax-transfer systems that remain based on the male-breadwinner model of the family; and the retention of gender-oriented roles within the family. Hence, it is argued that an increase in gender equity is a precondition of a rise in fertility from very low levels. At the same time, theorists argue that, in less developed countries, higher levels of gender equity are a necessary condition for achieving lower fertility. The article addresses this apparent contradiction by distinguishing two types of gender equity: gender equity in individual-oriented institutions and gender equity in family-oriented institutions. The argument is made that the transition from very high fertility to replacement-level fertility has been associated with a gradual increase in gender equity primarily within the family itself. In contrast, the further movement to very low fertility is associated with a rapid shift toward high levels of gender equity in individual institutions such as education and market employment, in combination with persistent low levels of gender equity within the family and in family-oriented institutions.

Protracted National Conflict and Fertility Change: Palestinians and Israelis in the Twentieth Century

PHILIPPE FARGUES

This article examines atypical trends of birth rates and fertility—their irregular time trends and relatively high levels—among Palestinians and Israelis in light of the protracted

conflict between them and related political developments. Migration, in itself a major dimension of the conflict, has been formative in contrasting evolutions of fertility: convergence among the Jews, originating from various countries but gradually coalescing in Jewish Israeli society, as opposed to divergence for the Palestinians, members of the same initial society but dispersed by the conflict and subjected to political and socioeconomic conditions varying with their place of residence. Demography is at stake in the conflict, and pronatalism becomes a dimension of nationalism, for Palestinians as well as for Israelis. Political and civil institutions influence fertility through redistribution of resources that subsidize procreation. For both sides, it seems that belligerence has produced excess fertility.

The Spread of Primary Schooling in sub-Saharan Africa: Implications for Fertility Change

CYNTHIA B. LLOYD
CAROL E. KAUFMAN
PAUL HEWETT

In 1980 Caldwell hypothesized that the time of the onset of the fertility transition in developing countries would be linked with the achievement of “mass formal schooling.” This article applies Demographic and Health Survey data to assess schooling patterns and trends for 23 sub-Saharan African countries, using the percentage of 15–19-year olds who have completed at least four years of schooling as an indicator of progress in education. As background to that assessment, the article includes a review of the sparse literature on the links between children’s schooling and fertility decline. The analysis strongly supports Caldwell’s hypothesis with empirical evidence of the much stronger negative relationship between fertility decline and grade 4 attainment in those countries that

have attained mass-schooling levels than in those that have not yet achieved such levels.

Does Female Disadvantage Mean Lower Access to Food?

LAURIE F. DEROSE
MAITREYI DAS
SARA R. MILLMAN

The literature on gender differentials in nutrition demonstrates that the calorie intake of females is generally as adequate as that of males at all ages. Female disadvantage in micronutrient intake is, however, frequent. Pregnant and lactating women are disadvantaged relative to both men and other women. In South Asia there is evidence that boys are advantaged over girls in food intake at some ages, but the evidence for male advantage in access to health care is far stronger. The authors argue that nutrition interventions are best targeted when the incidence of female disadvantage is better understood and, similarly, that interventions to improve women's status should be focused on objectives other than calorie intake in most communities. However, standards for measuring adequacy incorporate norms for female body

size and physical activity that may uncritically accept the notion that females are more physically passive. Maintaining adequacy by these standards could perpetuate low levels of female functioning.

The 1918 Influenza Epidemic's Effects on Sex Differentials in Mortality in the United States

ANDREW NOYMER
MICHEL GARENNE

The 1918 influenza epidemic had a marked and fairly long-lasting effect on the sex differential in mortality in the United States. After 1918 women lost most of their mortality advantage over men and the female/male gap did not regain its pre-epidemic level until the 1930s. An analysis of causes of deaths shows a link with tuberculosis. We conjecture the existence of a selection effect, whereby many 1918 influenza deaths were among tuberculous persons, so that tuberculosis death rates dropped in later years, disproportionately among males. Age- and sex-specific data by cause of death corroborate this hypothesis.

L'égalité des sexes dans les théories de transition de la fécondité

PETER McDONALD

La discussion théorique a postulé récemment que le taux faible de fécondité dans les pays avancés est imputable aux faibles niveaux d'égalité des sexes. Ceci est attesté par le manque de soutien envers les femmes qui allient un emploi rémunéré et l'éducation de leurs enfants; les systèmes de transfert fiscal sont toujours fondés sur le modèle de l'homme en tant que soutien de famille et le maintien des rôles assignés à chacun des sexes à l'intérieur de la famille. Une meilleure égalité des sexes serait-elle donc une condition préalable à une hausse du taux de fécondité jusque là très bas? Parallèlement, les théoriciens allèguent que, dans

les pays moins développés, des niveaux plus élevés d'égalité des sexes est une condition nécessaire à l'obtention d'un taux de fécondité plus bas. Le présent article se penche sur cette contradiction apparente en distinguant deux types d'égalité des sexes : l'égalité des sexes dans les institutions orientées vers l'individu et l'égalité des sexes dans les institutions orientées vers la famille. L'argumentation qui est mise de l'avant est la suivante : la transition d'un taux très élevé de fécondité à un niveau de fécondité de remplacement a été associée à une augmentation graduelle de l'égalité des sexes, principalement à l'intérieur même de la famille. À titre de comparaison, le mouvement subséquent vers un taux très faible de fécondité est associé à un virage rapide vers des niveaux élevés d'égalité des sexes dans les institutions individuelles, comme l'éducation et l'emploi, de

pair avec des niveaux constamment faibles d'égalité des sexes à l'intérieur de la famille et dans les institutions orientées vers la famille.

Conflit national de longue durée et évolution de la fécondité: Palestiniens et Israéliens au vingtième siècle

PHILIPPE FARGUES

Cet article examine dans quelle mesure le très long conflit qui oppose Palestiniens et Israéliens aide à comprendre le caractère exceptionnel de leur fécondité : son évolution accidentée et son niveau élevé. La migration, qui est en soi une dimension axiale du conflit, détermine des cheminements contrastés de la fécondité : convergence chez les populations juives d'origine différentes se retrouvant incorporées dans la même société en Israël; divergence chez les Palestiniens formant à l'origine une même société, mais dispersés par la guerre et soumis à des conditions politiques et économiques différentes selon les lieux. La démographie étant un enjeu du conflit, le natalisme devient une dimension des deux nationalismes qui s'affrontent. Les institutions politiques ou civiles, enfin, influent sur la fécondité par une action redistributive qui subventionne indirectement la procréation. D'un côté comme de l'autre, la belligérance semble avoir engendré la surfécondité.

L'élargissement de la formation scolaire primaire en Afrique subsaharienne : les répercussions sur le changement du taux de fécondité

CYNTHIA B. LLOYD
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PAUL HEWETT

En 1980, Caldwell conjecturait que l'apparition de la transition de la fécondité dans les pays en développement pourrait bien être liée à la mise en place de l'éducation formelle pour tous. À l'aide des données rassemblées lors des enquêtes démographiques et sani-

taires, le présent article évalue les tendances de la formation scolaire dans 23 pays d'Afrique subsaharienne, utilisant le pourcentage des 15 à 19 ans qui ont complété au moins quatre années de scolarité comme indicateur du progrès accompli en éducation. Comme toile de fond, l'article présente une analyse de la documentation clairesmée sur les relations entre la scolarité des enfants et la baisse de la fécondité. L'analyse appuie vigoureusement l'hypothèse de Caldwell à l'aide de l'évidence empirique de la relation négative entre la baisse de la fécondité et la réalisation de la quatrième année d'études qui est beaucoup plus forte dans les pays ayant atteint des niveaux de scolarité pour tous que dans les pays n'ayant pas encore atteint ces niveaux.

Être femme est-il un facteur de désavantage résultant en une nutrition plus faible ?

LAURIE F. DE ROSE
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SARA R. MILLMAN

La documentation sur l'écart entre les sexes en matière de nutrition démontre que l'apport calorique chez les femmes est généralement le même que celui des hommes à tous les âges. Cependant, les femmes enceintes et les mères allaitantes sont fréquemment désavantagées en ce qui a trait à l'apport en micronutriments par rapport aux hommes et aux autres femmes. En Asie méridionale, on a observé que les garçons sont avantagés par rapport aux filles quant à l'apport alimentaire à certaines périodes de leur croissance, et il est évident qu'ils ont l'accès beaucoup plus facile aux soins de santé que les filles. Les auteurs dénotent que les interventions en matière d'alimentation sont mieux ciblées lorsque ce désavantage par rapport aux femmes est mieux compris. Dans le même ordre d'idées, les interventions visant à améliorer le statut de la femme devraient être axées sur des objectifs différents que l'apport calorique dans la plupart des communautés. Toutefois, les critères qui évaluent la suffisance alimentaire incorporent des normes sur la taille du corps féminin et l'activité physique qui pourraient bien faire accepter sans réserves la notion que les femmes sont plus

passives du point de vue physique. Si l'on s'en tient à ces critères pour évaluer la suffisance alimentaire, on risque de perpétuer les niveaux faibles de fonctionnement féminin.

Les effets de l'épidémie de grippe de 1918 sur les différences des taux de mortalité selon le sexe aux États-Unis

ANDREW NOYMER
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L'épidémie de grippe de 1918 a eu des effets marqués et assez persistants sur les différences des taux de mortalité selon le sexe aux

États-Unis. Après 1918, les femmes ont perdu la majeure partie de leur gain en matière de mortalité par rapport aux hommes et il a fallu attendre jusqu'aux années 1930 pour que l'écart femme/homme retrouve son niveau pré-épidémique. Une analyse des causes de décès démontre un lien avec la tuberculose. Nous partons de l'hypothèse suivante : il existe un effet de sélection voulant qu'un grand nombre de personnes décédées de la grippe de 1918 auraient été atteintes de tuberculose, de sorte que les taux de mortalité attribuables à la tuberculose auraient baissé de façon disproportionnée chez les hommes au cours des années suivantes. Les données selon l'âge et le sexe par cause de décès corroborent cette hypothèse.

Equidad de género en las teorías de transición de la fecundidad

PETER McDONALD

Se ha postulado en discusiones teóricas recientes que la fecundidad baja en los países avanzados puede atribuirse a niveles bajos de equidad de género. Esta equidad baja de género puede evidenciarse en la falta de apoyo a la mujer en combinar un empleo remunerado y criar los hijos; en los sistemas de transferencia de impuestos que continúan basados en el modelo masculino de sostenimiento familiar; y, en el mantenimiento dentro de la familia de funciones orientadas al género. Por lo tanto, se sostiene que un aumento de equidad de género es una precondition para lograr un aumento de la fecundidad desde niveles muy bajos. Al mismo tiempo, teóricos sostienen que en los países menos desarrollados, los niveles más altos de equidad de género son una condición necesaria para alcanzar fecundidades más bajas. El artículo confronta esta aparente contradicción al diferenciar dos tipos de equidades de género: equidad de género en instituciones orientadas al individuo y equidad de género en instituciones orientadas a la familia. Se sostiene aquí que la transición desde una fecundidad muy alta a una fecundidad a nivel de reemplazo se ha asociado con un aumento gradual de la equidad de género principalmente dentro de la familia misma. En contraste, el movimiento adicional

hacia una fecundidad muy baja se asocia con un cambio rápido hacia niveles altos de equidad de género en las instituciones individuales, como ser la educación y el empleo en el mercado laboral, en combinación con niveles bajos persistentes de equidad de género dentro de la familia y en las instituciones orientadas a la familia.

Prolongado conflicto nacional y cambio de fecundidad: Palestinos e israelitas en el siglo veinte

PHILIPPE FARGUES

Se examinan en este artículo las tendencias anómalas de las tasas de nacimiento y de fecundidad—sus tendencias irregulares de tiempo y sus niveles relativamente altos—entre los palestinos e israelitas en vista del prolongado conflicto entre ellos y los desarrollos políticos relacionados. La migración, una dimensión en sí importante del conflicto, ha sido formativa en las contrastantes evoluciones de la fecundidad: convergencia entre judíos, originarios de varios países pero fundiéndose gradualmente en una sociedad israelita judía, en comparación con la divergencia para los palestinos, miembros de la misma sociedad inicial pero dispersos por el conflicto y sujetos a condiciones políticas y socioeconómicas que varían según su lugar de residencia. La demografía está en juego

en el conflicto, y el pronatalismo se convierte en una dimensión de nacionalismo, tanto para el palestino como para el israelita. Las instituciones políticas y civiles influyen la fecundidad a través de la redistribución de recursos que subvencionan la procreación. Para ambos lados, la beligerancia parece haber producido un exceso de fecundidad.

Expansión de escolaridad primaria en África subsahariana: Consecuencias para cambios de fecundidad

CYNTHIA B. LLOYD
CAROL E. KAUFMAN
PAUL HEWETT

En 1980 Caldwell presentó su hipótesis que el inicio de la transición de la fecundidad en los países en desarrollo estaría vinculado con el logro de una "escolaridad formal en masa". Datos de la Encuesta Demográfica y de Salud son aplicados en este artículo para evaluar patrones y tendencias de escolaridad para 23 países de África subsahariana, usando el porcentaje de jóvenes de 15-19 años de edad que han completado por lo menos cuatro años de escolaridad como indicador de progreso en educación. Como antecedente para esa evaluación, el artículo incluye un examen de la escasa literatura sobre los lazos entre escolaridad infantil y descenso de la fecundidad. El análisis apoya decididamente la hipótesis de Caldwell con evidencia empírica del relacionamiento negativo mucho mayor entre el descenso de la fecundidad y el logro de escolaridad de cuarto grado en esos países que han logrado niveles de escolaridad en masa que en aquellos que aún no han logrado tales niveles.

La desventaja femenina ¿significa un acceso más bajo a los alimentos?

LAURIE F. DE ROSE
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SARA R. MILLMAN

La literatura sobre los diferenciales de género en nutrición demuestran que el consumo de calorías de las mujeres es en general tan adecuado como el de los hombres en todas

las edades. La desventaja femenina en el consumo de alimentos de tipo micro-nutrición es, sin embargo, frecuente. Las mujeres embarazadas y lactantes están a la desventaja en relación tanto con los hombres como con otras mujeres. En Asia meridional hay evidencia de niños varones teniendo ventajas sobre las niñas en el consumo de alimentos en algunas edades, pero la evidencia de ventaja masculina en el acceso a la atención de salud es mucho mayor. Las autoras sostienen que intervenciones dirigidas a la nutrición serán mejor orientadas a metas específicas una vez que se comprenda mejor el efecto de la desventaja femenina y, del mismo modo, sostienen que las intervenciones para mejorar el estatus de la mujer deberían enfocarse en objetivos otros que el consumo de calorías en la mayoría de las comunidades. Sin embargo, el estándar para medir suficiencias incorpora normas para el tamaño del cuerpo femenino y actividades físicas que podrían aceptar sin crítica la noción que la mujer es físicamente más pasiva. Manteniendo suficiencias aplicando tales estándares podría perpetuar los niveles bajos de funcionamiento femenino.

Los efectos de la epidemia de influenza de 1918 sobre los diferenciales de sexo en la mortalidad de los Estados Unidos

ANDREW NOYMER
MICHEL GARENNE

La epidemia de influenza de 1918 tuvo un marcado efecto de bastante larga duración sobre los diferenciales de sexo en la mortalidad de los Estados Unidos. Después de 1918 las mujeres perdieron la mayoría de su ventaja de mortalidad sobre los hombres y la brecha femenina/varón no recobró su nivel pre-epidemia hasta la década de 1930. Un análisis de las causas de muertes muestran un vínculo con la tuberculosis. Se conjetura la existencia de un efecto de selección, por el cual muchas de las defunciones de influenza en 1918 fueron entre personas tuberculosas, por lo que las tasas de muertes de tuberculosis descendieron más tarde en forma desproporcionada entre los varones. Datos sobre causas de muerte específicos por edad y sexo confirman esta hipótesis.

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