Edwin A. Winckler  Chinese reproductive policy at the turn of the millennium

John Bongaarts  The end of the fertility transition in the developed world

Heather Joshi  Women, children, and work in a British perspective

Ronald D. Lee and Karen L. Kramer  Children’s economic roles in the Maya family life cycle

Notes and Commentary  S. J. Olshansky, B. A. Carnes, and J. Brody on a biodemographic interpretation of life span

Data and Perspectives  S. P. Morgan et al. on Muslim and Non-Muslim differences in female autonomy and fertility; M. Singer on uncertainties in the composition of world population in the twenty-first century

Archives  Pierre Bourdieu on marriage strategies

Book Reviews  by J. C. Caldwell, C. Ipsen, E. van de Walle, A. J. Cherlin, S. Bianchi, N. Keyfitz, and others

Documents  China’s law on population and birth planning; demographic data on World Trade Center victims
**Information for Subscribers**

*Population and Development Review* is available on a paid subscription basis at the following rates:

- One year (4 issues)    US$40.00
- Two years (8 issues)   US$64.00

To enter a subscription, send payment by check or money order drawn on a US bank, payable to the Population Council, or by American Express, MasterCard, or Visa (provide card number and expiration date), together with mailing address to:

**Population and Development Review**  
Population Council  
One Dag Hammarskjold Plaza  
New York, New York 10017 USA

Credit card orders may also be placed by phone to (212) 339-0514, by fax to (212) 755-6052, or by e-mail to pubinfo@popcouncil.org

**Automatic renewal**

For credit card payment only, standing orders are available at US$32.00 per year, with automatic renewal each year until subscription is cancelled by subscriber. Subscriber’s credit card will automatically be charged annually in December for the next year’s volume.

**Complimentary subscriptions**

Complimentary subscriptions are available to qualified applicants residing in developing countries. Individuals and institutions wishing to apply for complimentary subscriptions should send requests on letterhead stationery to the above address stating the nature of professional involvement in development- and population-related issues.

**Back issues**

Casebound (hardcover) volumes are available at US$45.00 each.  
Single back issues are available at US$10.00 per issue.  
Please designate copies desired by volume and issue number. Orders may be placed by mail, phone, fax, or e-mail as indicated above.  
Complimentary copies are available to qualified individuals residing in developing countries.  
A twenty-year cumulative index to Volumes 1–20 (1975–94) is available at no charge to subscribers to the *Review*. 
ARTICLES

Chinese Reproductive Policy at the Turn of the Millennium: Dynamic Stability
EDWIN A. WINCKLER

The End of the Fertility Transition in the Developed World
JOHN BONGAARTS

Production, Reproduction, and Education: Women, Children, and Work in a British Perspective
HEATHER JOSHI

Children’s Economic Roles in the Maya Family Life Cycle: Cain, Caldwell, and Chayanov Revisited
RONALD D. LEE
KAREN L. KRAMER

NOTES AND COMMENTARY

A Biodemographic Interpretation of Life Span
S. JAY OLSHANSKY
BRUCE A. CARNES
JACOB BRODY
DATA AND PERSPECTIVES

Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence from Four Asian Countries

S. PHILIP MORGAN
SHARON STASH
HERBERT L. SMITH
KAREN OPPENHEIM MASON

Uncertainties in the Composition of World Population in the Twenty-First Century

MAX SINGER

ARCHIVES

Pierre Bourdieu on Marriage Strategies

BOOK REVIEWS

Angus Maddison, The World Economy: A Millennial Perspective

JOHN C. CALDWELL

Anna Treves, Le nascite e la politica nell’Italia del Novecento

CARL IPSEN

Carol Blum, Strength in Numbers: Population, Reproduction, and Power in Eighteenth-Century France

ETIENNE VAN DE WALLE

James Q. Wilson, The Marriage Problem: How Our Culture Has Weakened Families

ANDREW J. CHERLIN

Sylvia Ann Hewlett, Creating a Life: Professional Women and the Quest for Children

SUZANNE BIANCHI
In 2000 and 2001 the People’s Republic of China (PRC) issued two major documents on reproductive policy that further institutionalize and further reform China’s state birth planning. One was a once-in-a-decade central Decision on future program direction, the other was a long-delayed national Law on state planning of population and births. These two policy documents and accompanying regulations culminate demographic and regulatory developments during the last several decades of the twentieth century and set the framework for any remaining struggle over reproductive policy for the first several decades of the twenty-first century. By the late 1990s some combination of socioeconomic change and party-state effort had reduced China’s once high fertility to below-replacement levels (Feeney and Wang 1993; Lavely 2001). As a result, the joint party and state Decision in March 2000 did not just reaffirm the need for the state to plan population and births. It also authorized a significant change in program methods and goals, from state-centric birth planning toward client-centered health services. The December 2001 Law further legitimated institutions and policies that have been operating for decades. However, it also finally brought the PRC’s state birth planning into line with an overall post-Mao regime shift from party fiat toward “rule by law.” These reforms are far from complete in principle and far from completed in practice. Nevertheless, they do constitute a significant change and they do chart likely future program development.

Both the 2000 Decision and the 2001 Law represent political and practical compromises between stability and change. Ostensibly the main theme of both was “stability”: maintaining China’s recently achieved low birth rate by reaffirming existing birth policy and improving its implementation. National political leaders are determined to continue to limit population growth, and any apparent wavering of policy or sudden change in methods could
cause the program to falter. Stability of policy is important because the public tends to overreact to any signs of relaxation (Greenhalgh 1986). Zhang Weiqing, the minister of the State Birth Planning Commission (SBPC), stressed that the new national Law represented “neither a tightening nor a loosening” of policy (2001.12.30—see news service items in References). Improvement of implementation, too, has proceeded cautiously, in order to maintain morale within the birth planning system. The ongoing shift from state demands toward client service is a fundamental change to which the program’s many personnel need time to adjust. Thus there is a great deal of stability in recent Chinese reproductive policy. Stringent birth limitation remains obligatory, the program remains omnipresent, and noncompliance remains costly (payment of a substantial “social compensation fee”). Both the Decision and the Law stress citizens’ rights, but those rights are mostly to receive services, not to reject them.

Nevertheless, the program’s stability is quite dynamic, as the program adapts to low fertility, a market economy, political reform, rising expectations, and deepening globalization. National political leaders are determined to shift China from the chaotic “rule by policies” of the Maoist era to an orderly “rule by law” in what they regard as a socialist democracy. Strengthening citizens’ rights against misgovernment not only protects citizens but also improves administration. Thus the 2000 Decision called for “strengthening” the work of administering population and birth planning, but what it wished to strengthen were not requirements and enforcement on citizens but the professionalism and coordination of state agencies. The 2001 Law placed many legal constraints on the program and omitted many objectionable practices found in earlier provincial legislation, which will be required to omit them as well when the national Law goes into effect in September 2002. Both documents authorized an already ongoing shift in the definition of the program from simply limiting births toward delivering reproductive health services in which birth planning is one item among many. These documents and their implementing regulations incorporate many recent international ideals of quality care, informed choice, and women’s empowerment, even though these ideals are given restrictive Chinese interpretations.

This article reports and discusses these policy developments. The first part provides background. Thus the first section reviews recent program reforms from which the Decision and Law emerged and recent population trends to which they respond. The second section discusses how regime transition and leadership succession are changing the birth program. The second part treats policy formulation. Thus the third section summarizes the 2000 Decision and legislative issues as the immediate background of the 2001 Law. The fourth section assesses stability and change in the 2001 Law, and a fifth section identifies some progressive and problematic silences in it. The third part illustrates policy implementation. Thus the sixth sec-
tion reports recent program activities in birth planning and reproductive health, while the seventh section outlines the program’s mass organizations and international relations. The eighth section notes organizational constraints and environmental processes that will condition the actual impact of policy on citizens. The conclusion briefly sketches debate over how to evaluate the program. The complete text of the 2001 Law is translated in the Documents department of this issue.

In this article, “reproductive policy” identifies a particular nexus between population policy and health policy that has emerged in China at the turn of the millennium. On the basis of “Marxist population theory,” the PRC continues to identify economic production and social reproduction as the two basic development processes and to address them equally through “economic and social” development plans (White 1994b; Yu, Lu, and Liu 2001). On the “social reproduction” side, the PRC is now attempting both to continue to limit population quantity and to further improve population quality. China’s most basic measure to improve population quality is to raise the “standard of health” of newborn infants, through premarital and post-pregnancy screening and through maternal health care. These Chinese formulations readily accommodate many elements of the shift from national population limitation toward women’s reproductive health that has occurred in international population thinking since the 1994 Cairo International Conference on Population and Development. Accordingly, in this article the term “reproductive policy” refers both to regulating reproductive behavior and to providing reproductive health services. In China the latter now includes relevant services not only to married adults but also to infants, adolescents, and unmarried young people who are sexually active.

Background

1990s program reforms and population trends

ennial censuses and five-year economic-and-social development plans. Policy rationale was elaborated to connect the national goal of coordinated development of population, resources, and environment with the international slogan of “sustainable development” (elaborated for China in Yu 1999). Policy promulgation progressed from administrative edicts to provincial legislation. Policy implementation benefited from increases in political priority, financial resources, professional personnel, and mass organization. In 1980 national leaders set a goal of one child per couple, and in 1991 they made lower-level party and state leaders personally responsible for achieving population targets (Commentator 2000; Greenhalgh 1994; Winckler 1999). However, in the course of the 1990s, in order to improve the program’s effectiveness and increase its popularity, program leaders began a series of progressively deeper reforms (Ming 1999; Greenhalgh and Winckler 2001: Chapter 3, Part C).

_1990s program reforms._ On the one hand, the program continued to perfect its statist approach to limiting births. From around 1993 program leaders redoubled efforts to reduce reliance on periodic crash campaigns by ordinary cadres and to replace campaigns with continuous implementation by trained professionals (“routinization” and “professionalization”). From around 1995 national program leaders vigorously combated lower-level administrative abuses (“rectification”). These abuses included coercion in the form of too-heavy-handed enforcement of birth planning rules and corruption in the form of misappropriation of funds from fines levied on citizens for noncompliance. The program made some attempt to combat demographic distortions, particularly unintended gender effects of birth planning such as sex-selective abortion and the resulting imbalanced sex ratios at birth (“normalization”). From around 1995 the program also increasingly supplemented its reliance on educational propaganda and administrative enforcement with material benefits (“incentivization”). Some of these were direct rewards such as leave or money for postponing marriage and childbearing, for undergoing contraceptive procedures, or for promising to have only one child. Other incentives were indirect benefits from related programs whose benefits were contingent on complying with birth planning (“collateralization”). Examples include combating poverty, helping women, and providing social insurance and retirement pensions. A generation of demographic change began to soften the program’s impact, opening a glide-path toward a “soft landing” sometime in the early twenty-first century. The main change is that declining fertility aspirations have reduced tensions between program and society (but, even according to the program, have not eliminated them: Jiang and Zhao 2001). Even under existing program rules, couples in which both spouses are only children can have two children and the number of such couples is growing.
On the other hand, in the late 1990s the program began to move beyond state-centric birth limitation by broadening its goals and liberalizing its methods (Yu, Lu, and Liu 2001). The program quickly incorporated goals stated by the 1994 Cairo conference and reinforced by the 1995 Beijing World Conference on Women. It soon accepted international advice and assistance in experimental projects for pursuing those goals (“internationalization”). The Cairo population conference shifted international attention from limiting population growth to providing reproductive health care and empowering women. Accordingly, the Chinese program added questions on reproductive health to its 1997 quinquennial survey, and from 2000 the program began adding more reproductive health care to the services it delivers (“medicalization”). The Beijing women’s conference further highlighted the need to minimize the costs and maximize the benefits of birth planning to women. Accordingly, the program began experiments with projects to raise women’s status, promote their education, and increase their economic participation, particularly for poor women in poor areas (“feminization”). In some advanced areas with already low birth rates, the program even began experimenting with ways to make itself more client-centered and less intrusive (“liberalization”). Thus after a few years of experiments starting in 1995, “quality of care” quickly became a popular concern in service delivery: clients received better counseling and some choice of contraceptive method, and program workers were managed and evaluated to provide them (Gu 1998, 2000; SBPC 27 July 2000). Population targets became less mandatory and more indicative, particularly below the county level. Experiments began with allowing newly married couples to have their first child whenever they wanted, without applying for permission. These late-1990s experiments will be propagated nationwide in the early 2000s (ALP 2000; interviews—see Notes, introduction and note 1).

**Recent population trends.** The main factual cornerstone for policy reorientation has been the assessment by Chinese demographers that during the 1990s China achieved a below-replacement fertility rate (Yu et al. 2000b). The SBPC’s best estimate is that starting in 1992 China’s total fertility rate has been about 1.8 (SBPC 19 August 2001, based on figures from the National Bureau of Statistics, or NBS). A 2001 survey found the average total lifetime fertility of women to be 1.81 children (1.22 urban and 1.98 rural—SBPC 4 March 2002). According to program leaders, fertility remains “unstable” because in backward areas the policy remains somewhat ahead of economic development and reproductive culture. Meanwhile, China has kept within government targets for population growth rate and total population size. In the late 1990s annual population growth fell below 1 percent as planned (2001.3.6; 2001.3.28). As of the November 2000 decennial census China’s population was 1.266 billion, well under the 2000 target of 1.3 billion (2000.7.19; Lavely 2001).
These numbers probably reflect social reality well enough to provide an adequate basis for policymaking. Nevertheless, despite strenuous efforts by the NBS and SBPC, Chinese statistics on population and birth planning have problems that significantly affect program content (Greenhalgh and Winckler 2001: 60–61). The greater the policy pressure from above for particular results, the greater the falsification from below of indicators for measuring those results. These problems worsened in the course of the 1990s as national political and program leaders demanded that successive provinces improve their performance. Within a few years each targeted province achieved remarkable increases on indicators of public compliance with policy (Greenhalgh and Winckler 2001: 105–126). Despite fears of some birth planning officials, the 2000 census largely confirmed the claimed changes, but it had reliability problems of its own (Lavely 2001). Moreover, the statistical problems of the birth planning and census systems become linked when, as they are not supposed to do, census takers identify birth planning violators (2000.11.16). Meanwhile, for monitoring and adjusting its own activities, the birth program relies on a system of indicators for evaluating lower-level political leaders and program administrators that has many of the same reliability problems. (For countermeasures, see SBPC 2 November 2000 and SBPC 25 November 2000.) As in other policy areas in China, one does not really know the extent to which statistics reflect reality and to which policy affects society (e.g., Solinger 2001).

Thus another factual cornerstone for policy reorientation has been the program’s measurement of its own performance (Greenhalgh and Winckler 2001: 67–72). In 1997 and 2001 the program conducted surveys of birth planning and reproductive health that showed the program’s impact as of the late 1990s. (For the tables and figures cited below from the 1997 survey see Jiang 1997 and SBPC and CPIRC 1997.) As a comparative baseline, note that in developing countries only about one-third of couples practice contraception, in the United States about two-thirds. In China over 85 percent of the married women in the 1997 survey practiced contraception, with the urban and rural rates virtually identical (Figure 2-90). As the program had long prescribed, 85 percent of women used an IUD after the birth of their first child (urban 76 percent, rural 91 percent—Figures 2-98 to 2-100). Also as the program prescribed, 66 percent turned to female sterilization after the birth of a second child (urban 52 percent, rural 68 percent—ibid.). Cumulatively, about 49 percent of couples had one partner sterilized (40 percent of women and 9 percent of their husbands—Figure 2-91). By comparison, in the United States about 38 percent of the population choose sterilization (27 percent of women and 11 percent of men). Most of the sterilizations in China had occurred in the countryside (47 percent of rural women and 11 percent of their husbands, versus 14 percent of urban women and only 2 percent of their husbands—Figure 2-91). However, dur-
ing the 1990s sterilizations declined drastically (from 9.1 million and 24 percent of birth planning clinical procedures in 1991 at the height of enforcement to 2.0 million and 11 percent in 2000—Ministry of Health 2001: 493). 4

Despite all this contraception, by 1997 one-third of these women had had one or more abortions, averaging 0.46 per woman (Table 2-3-16 and Figure 2-45). By comparison, in the United States an estimated 43 percent of women have at least one abortion during their lifetimes, and the worldwide average is about one abortion per woman. In China the two main reasons that women gave for their last abortion were contraceptive failure (40 percent) and that the child was “not allowed by policy” (36 percent). Women with only one child had experienced an average of 0.61 abortions (Figure 2-48). Urban women—much more strictly subject to the one-child limit and much less likely to have been sterilized—were three times as likely as rural women to have experienced an abortion (Figure 2-51). Roughly corresponding to the severity of the program, in successive decades the ratio of abortions to live births had climbed steadily (from 0.10 in 1960–79, to 0.26 in 1980–89, to 0.30 in 1991–95, and to 0.34 in 1996–2000—Figure 2-51 and SBPC 4 March 2002). However, at the end of the 1990s the number of abortions fell sharply (from 14 million and 37 percent of birth planning clinical procedures in 1991 at the height of enforcement to 6.7 million and 31.5 percent in 2000—Ministry of Health 2001: 493). 5

As regards the past costs and benefits of the program, a 1999 SBPC report to the party central committee and state cabinet was emphatically positive (China Birth Planning Yearbook 2000: 90–91 and 184–197, hereafter just Yearbook). On expert advice, the analysis assumed that between 1971 and 1998 economic and social change had accounted for 46 percent of the reduction in fertility; the program had accounted for 54 percent of the fall in fertility and had reduced births by 338 million. The SBPC surveyed the cost of childrearing and estimated that the 338 million reduction in births had saved the nation 7.4 trillion yuan (14 percent in state costs, 86 percent in family costs), close to China’s entire gross domestic product in 1997. The return was 82 yuan of national savings for each 1 yuan of program expenditure (which was 90 billion yuan, 42 percent from the formal state budget and 58 percent from community sources). Without the program, in 1998 population would have been somewhat more than 20 percent higher and per capita availability of many resources would have been somewhat less than 20 percent lower. Among the study’s more striking claims were that, without the program, in 1998 population would have grown by 30 million not 10 million, that surplus rural labor would have been 300 million not 200 million, and that foodgrain production would have been roughly 300 kilograms per capita (below self-sufficiency) not roughly 400 kilograms per capita (above self-sufficiency).
Nevertheless, reviewing program performance during the Ninth Five-Year Plan (1996–2000), a report by the SBPC’s Planning and Statistics Division was unprecedentedly critical (Wang, Wang, and Guo 2001, the first author having since become a vice chairman of the SBPC). Under pressure from national political leaders for realistic numbers, the new young national program leaders writing this report were hard-nosed. Not only did they not accept the data reported upward within the SBPC system, they did not accept the usually more realistic calculations by the NBS. Instead they substituted still more skeptical estimates of their own. For example, as regards progress toward the one-child goal, both SBPC and NBS data showed the proportion of births that were first children as rising significantly between the Eighth and Ninth plan periods and reaching very high levels (SBPC 74 percent and NBS 69 percent). In contrast, the report’s estimate was that the proportion had remained stable at a much lower level (about 55 percent). Both SBPC and NBS data showed a large decrease in the proportion of “multiple” children (three or more, reduction of which was a key target during the 1990s). In contrast, the SBPC estimate showed only about half that decrease, at a much higher level (about 10 percent of all births, five times the level reported to the SBPC and twice the level calculated by the NBS). The report went on to criticize both statistical misreporting and lax implementation. For example, it complained that some married women still remain outside the system and that too many “two-daughter households” go on to have unauthorized third children.

Looking ahead into the twenty-first century, a late 1999 national birth planning conference formulated China’s population dynamics as the “one stability and four highs”: a relatively stable low fertility rate accompanied by peaks in the numbers of fertile women, active workers, elderly retirees, and rural migrants (2000.1.7). Policy planners warned that population would continue to increase by 10 million a year for the next ten years, precluding “optimism” and requiring vigilance (2000.4.14; 2000.12.19). The PRC’s goals are to keep population under 1.33 billion in 2005, under 1.4 billion in 2010, and under 1.6 billion in the middle of the twenty-first century, when it should peak (2000.12.19; White Paper 2000; section 11). The main preoccupations of the Tenth Five-Year Plan for population and birth planning work in 2001–05 are stabilizing low fertility, limiting population growth in western China, strengthening local service networks, and raising the quality of their technical services (Yearbook 2000: 92–93).

Regime transition and leadership succession

The balance between stability and change in China’s reproductive policy reflects China’s incremental transition from communism and a gradual succession in national leadership.
Regime transition. Several processes in China’s transition from communism affect the birth program. First, the Chinese party-state has been gradually contracting the scope of its control over economy and society. During the post-Mao period economic production “grew out of the plan” (Naughton 1995). By the late 1980s marketization had weakened the birth program’s control over citizens (White 1991). In the early 1990s the national leadership officially embraced marketization and instructed the program to adapt to it, which it did starting in 1995 by emphasizing economic benefits (“incentivization” and “collateralization”). Social reproduction retained micro-management longer than most other policy areas (Winckler 1999). Nevertheless, by the late 1990s the birth program too finally began shifting toward merely indicative planning and more indirect regulation (“liberalization”). Second, the Chinese party-state is not simply contracting, but rather is selecting some strategic policy areas for more effective intervention. The fact that the birth program is being routinized and professionalized is part of the rebuilding of state capacity. Third, the post-Mao state has devolved many functions downward from the center, particularly in social policy. As a result the birth program must rely on provinces, counties, and communities (townships and villages) for most of its funding. This reduces national influence over local programs and limits the services that localities can provide. The center wishes to promote national standards of reproductive health care, but it must do so without making such services into either national or local entitlements.

A second transition process affecting birth planning is a change in the institutional nature of the Chinese party-state. From 1949 to 1978 China oscillated between different proportions of revolutionary mobilization and bureaucratic socialism. The Maoist party-state relied heavily for policy implementation on periodic campaigns by generalist cadres. Even into the early 1990s the dual party-state nature of the PRC regime continued to produce the mixture of mobilization and institutionalization with which the national leadership enforced birth planning (White 1990; Winckler 1999). Party and state remain intertwined, but the post-Mao PRC has invested heavily in modernizing the state. In birth planning this has meant both a local network of technical services (in collaboration with the health system for most surgical operations) and a local mass organization for persuasion and monitoring (the Birth Planning Association, or BPA).

A third transition process affecting reproductive policy is a post-Mao shift from reliance on party fiat toward “rule by law.” The Maoist party-state had no administrative law: it had reduced law to administration, had reduced government administration to party policy, and had reduced “rule by policies” to “rule by persons” (Lubman 1999; Lin 1996). From 1978 post-Mao leaders began using law to rebuild and legitimize impersonal public administration, and from 1989 they began using law to discipline public administration as well. The idea of a regime shift to “rule by law”—and
perhaps even a transition to “rule of law”—emerged incrementally at successive party congresses. Nevertheless, compared to Western legal development, the overall process has been remarkably quick. By 2000 birth planning was the last national policy area—and the last of the “basic national policies” on population, resources, and environment—that did not have national enabling legislation. A basic reason for the delay may have been too great a gap between the constitutional ideals that “rule by law” represented and the way in which birth planning was actually being implemented. By the late 1990s all agreed that a national law was imperative and that the program had been sufficiently reformed to permit passing one. Even so, passing the Law required still more reformulation of national program principles, and implementing the Law will require still more reform in local program practice.

In sum, until the turn of the millennium, birth planning was mostly a lagging not leading sector in China’s transition from communism. Relative to other policy domains it retained more planning, ran more campaigns, and relied more on administrative edict. Nevertheless, reproductive policy could not only catch up with but even leapfrog other policy domains to become a leading sector in some aspects of regime transition. So far these aspects include appointing nonparty and female ministers, using meritocratic methods of personnel selection, stressing quality care in service delivery, and emphasizing public satisfaction in performance evaluation. In addition, changes in reproductive policy constitute an important test of the capacity and flexibility of the personnel evaluation systems that the center uses to maintain control over subnational political leaders and to steer subnational policy implementation. In birth planning, in the course of the 1990s national political and program leaders used the same top-down “responsibility systems” for opposite purposes: in the early 1990s to tighten enforcement on citizens and in the late 1990s to correct abuses by implementers (with much success in both cases, according to the SPBC). Finally, reproductive policy should also provide an important experiment in state–society relations. Will the Birth Planning Association remain largely an instrument of top-down control even as it provides bottom-up monitoring of administrative behavior, or will the BPA and other social organizations gradually assume some independence and even begin providing some services privately?

Leadership succession. Several aspects of leadership succession affect Chinese reproductive policy. At the level of national political leaders, the main process is the declining power of successive generations of Chinese communist leaders over both the party-state and Chinese society. The first-generation leader Mao Zedong assumed that he could transform society toward his ideals. The second-generation leader Deng Xiaoping assumed that the Chinese party-state could still impose on the Chinese people whatever de-
mographic sacrifices the party leadership deemed essential. Third-genera-
tion leader Jiang Zemin has firmly supported limiting births. To emphasize
the importance of this and the other “basic national policies” on sustainable
development, every year he addresses a Forum on Population, Resources,
and Environment, attended by the entire Politburo standing committee and
the top party and government leaders of all provinces (2000.3.12; 2001.3.11).
However, Jiang has wished to avoid antagonizing the public by clumsy en-
forcement or associated corruption. Moreover, he has set as a future target
that the population and birth planning undertaking “can truly become one
that brings benefits to the people” (in his speech at the March 2000 annual

As part of their struggle over political succession, new Chinese leaders
advance new ideologies that support new policies. In February 2000, in or-
der to project a vision of the future, Jiang Zemin stipulated that policy in
any area should represent three things: the development of the most ad-
vanced productive forces (in the economy), the practices of advanced cul-
ture (communist, Chinese, or otherwise), and the fundamental interests of
most of the Chinese people (not just the working classes). This formulation
uses classical Chinese communist concepts to rationalize progressive reforms
such as admitting businessmen to the Chinese Communist Party, raising
standards for party and government, and aligning policies with popular pref-
erences (Fewsmith 2001: 229–230). Program leaders quickly applied Jiang’s
formulation to birth planning (SBPC 2 June 2000). Explaining that the 2000
Decision constitutes the practical manifestation of Jiang’s “three represents”
in the population field, SBPC Minister Zhang noted the program’s contri-
bution to economic development, its unremitting ideological assault on tra-
ditional reproductive culture, and its current emphasis on client satisfac-
tion as “a main criterion for judging our work” (Zhang 2001).

At the level of national program leaders, the main succession process
is the continuing “technocratization” of the Chinese state (Li 2001). With
the inauguration of the new Zhu Rongji administration in early 1998, long-
term SBPC Minister Madame Peng Peiyun graduated to a vice chairman-
ship of the National People’s Congress (NPC). Some SBPC vice chairmen
also moved on, two of them to positions in the NPC. In order to find the
right replacement leaders for its new tasks, since 1998 the SBPC has been
implementing a new method for appointing leading personnel through
competition, the first central ministry to do so (interviews; Yearbook
2000: 189). The method involves a sophisticated combination of previous per-
formance, competency tests, and face-to-face interviews with future sub-
ordinates. As a result, vice ministerships and department directorships are
gradually being taken over by smart younger people eager to advance pro-
gram reforms.
Policy formulation

The 2000 Decision and legislative context

The immediate antecedents to the 2001 Law are the guiding principles expressed in the 2000 Decision and the legislative context of the drafting process.

The 2000 Decision. The March 2000 Decision provides a comprehensive rationale for Chinese birth planning and a pointed analysis of what the program must do to adapt to the circumstances it faces at the turn of the millennium. It was drafted concurrently with the 2001 Law and provides the “guiding thought” for current Chinese reproductive policy. The first two parts concern population, asserting the need to continue to limit population growth and stating the goals for the decade 2000 to 2010. The second two parts concern the process of regulation, discussing the requirements for improving it and for adapting it to marketization. The last part concerns the need for party and state leaders to continue taking personal responsibility for meeting population goals and the need to further increase spending on birth planning by governments at all levels. (See Decision 2000 and White Paper 2000.)

The 2000 Decision appears to be a political compromise that synthesizes stability and change while remaining silent on some issues. Among stable goals, the Decision reaffirms the program’s historic mission: party-led state intervention to save China from overpopulation by limiting births. A large population remains China’s most basic national condition, with a fundamental impact on development. A “sharp contradiction” will persist between population on the one hand and economy, society, resources, and environment on the other, continuing to make birth planning difficult. Limiting population growth requires policy that is comprehensive, stable, and discriminating (emphasizing rural areas, particularly in the western and central regions). Birth limits must be particularly strict in developing the relatively “backward” western region. Among stable methods, the Decision calls for strengthening program capacity and interagency coordination. Cities should take primary responsibility for birth planning among migrants. The birth planning and health systems should cooperate to establish a local “service network.” Only in the very long run will economic, social, and cultural modernization make political regulation unnecessary.

Among changing goals, the Decision adds new content to the program’s longstanding mandate to improve population quality, while downplaying any “eugenic” element. For the birth program, better population quality still includes premarital health checks and “genetic counseling,” but now means also better maternal and child health care (see White Paper 2000: section 16). By noting the need “to perfect” the leader responsibility sys-
tem, the Decision authorizes the adjustment of performance evaluation criteria toward such progressive goals as lawful administration and client satisfaction. Among changing methods, the Decision stresses the need for positive economic incentives, thereby acknowledging that the program’s classic reliance on voluntarism and mobilization is no longer appropriate. The Decision incorporates the operational upshot of many critical assessments and cleanup campaigns during the 1990s. The Decision demands “lawful administration,” thereby obliquely acknowledging the vigorous housecleaning that the program required in the 1990s to combat abuses. The Decision notes the need to improve sex balance and provide pension programs for an aging population, thereby implicitly acknowledging that the program itself may have aggravated or accelerated some demographic distortions.6

Despite its comprehensiveness, the Decision remains silent on some matters. On the one hand, it does not contain the ringing calls for citizen sacrifice and citizen discipline of its 1980 and 1991 precursors. On the other hand, it ignores some new issues. It does not address some additional program-induced distortions, such as the program’s inadvertent creation of a “black population” of unauthorized “out-of-plan” children not entitled to government benefits (Greenhalgh 2003). It does not explicitly acknowledge, let alone endorse, any of the foreign philosophies and feminist critiques that advocate a genuinely client-centered approach that truly empowers women (Greenhalgh 2001). Finally, not surprisingly, the Decision does not reexamine any of the program’s basic assumptions, such as the extent to which mandatory birth planning has accelerated China’s fertility decline and whether it has been worth the cost in state resources and social suffering.7

Legislative context. The content of the 2001 Law was affected by issues that surrounded previous, unsuccessful attempts to pass a national birth planning law and by measures to implement the Law that accompanied its successful passage this time around. The legislative history of the 2001 Law is a long one, reflecting the controversial position of state birth planning even within China. From 1978 central political leaders wanted a national birth planning law, and in the course of repeated attempts such a law has gone through several major drafts and many minor revisions (Yao 1999; Zhang Yuqin 1999). Success was prevented by legislative dilemmas concerning how much of what kind of detail to include. A first issue concerned uniformity. In continental-scale China, communist policymakers learned from experience to give diverse treatment to diverse circumstances, such as urban versus rural and Han versus minority. However, legal scholars argued that a national law should treat all citizens equally. A second issue concerned contraceptive methods. Some favored specifying which methods people should use at what stage of childbearing, to make sure that contraception would be effective. However, lawyers and sociologists objected that
China lacked the necessary medical facilities and that it was not proper to make something mandatory in law that was not feasible in practice. A third issue concerned number of children. Some thought a national law should specify the number legally permitted under particular circumstances. Others thought this infringed on citizens’ rights and at most should be no more than a recommendation (Zhang 1998: 119–125; Yao 2000; interviews).

For more than 20 years the solution to these legislative dilemmas was to postpone passing a national law while relying on successive revisions of provincial legislation to enforce policy and gain experience. In the mid-1990s national political leaders authorized further rounds of research on a national law, and in 1998 they ordered another round of drafting. During 1998 and 1999 the SBPC consulted the main relevant national agencies, convened national work conferences on birth planning legislation, and asked the opinions of various provinces and localities (Yao 2000; Yearbook 1999: 116; Yearbook 2000: 64–67). During 1998–2001 the old issues that reemerged were again those of how uniform and explicit national policy should be, particularly about the number of children permitted (interviews). In general the solution appears to have been to keep the national law as general as possible and leave details to national regulations and subnational legislation. The main new issue was how to guarantee that during implementation a program originally dedicated to limiting births would actually deliver reproductive health services (interviews; 2001.12.24). The solution was to mention this in principle in the Law while having the State Council issue detailed regulations on “Managing birth planning technical services” (interviews; 2001.6.30). Another State Council regulation will specify details of the “social compensation fee.”

Thus the 2000 Decision and 2001 Law are not the only policy instruments at work. Some reforms are occurring through implementing regulations issued by the State Council and SBPC. Others are occurring simply through changes of procedure and reinterpretation of terms within existing policies and regulations. Still others are occurring through progress in related policy areas. Implementing regulations do much more than just relieve a law of technicalities; they can determine the exact extent and nature of reform (Tanner 1999: 10–11). For example, the State Council “technical services” regulations further define the rights of citizens in the area of reproductive health, including a quite rigorous definition of “quality of care” that requires informed choice and safe treatment. Basic contraceptive services should remain free of charge (i.e., even if reproductive health services are not). The regulations map how the birth planning system and health ministry should cooperate to form a “birth planning service network.” Reportedly, State Council regulations on the “social compensation fee” will instruct that all receipts be transferred into the state treasury and be incorporated into the general budget of the local government (interviews; Yearbook 2001: 87–89).
Of course, implementing regulations from the SBPC itself are also important. In the case of the 2001 Law, a crucial implementing instruction long preceded the Law and helped clear the way for it. In the mid-1990s the program cracked down hard on maladministration, strengthened internal organs for monitoring it, and ordered local governments to remove overly harsh provisions from their local regulations. In particular, on 10 July 1995 the SBPC issued a “notice” (tongzhi) listing “seven don’ts” (chige bujun) for dealing with citizens who violate birth planning regulations. Judging from the violations mentioned in various sources, implementers were not permitted to arrest or harm violators or their family members, to destroy property, to impound property without due process, to add fees and levy fines at will, to detain associates or retaliate against complainers, to refuse permission for a legal birth in order to meet population plans, and to organize pregnancy checks of unmarried women. National political and program leaders instructed the Birth Planning Association to help monitor compliance with these new restraints (Yearbook 2001: 42–43).

The SBPC’s handling of the “seven don’ts” illustrates not only its determination to curb abuse by cadres but also the delicacy of doing so. When the new rules were announced to provincial officials, reportedly many were in anguish over how they could implement the birth policy under so many restrictions (interviews). Nevertheless, the “seven don’ts” were added to the performance evaluation criteria for officials in most localities, though serious problems persisted in some (Yearbook 2000: 65). Both the existence and content of the new rules remained confidential, in order to protect the morale of grassroots personnel. During the late 1990s both the country and the program made much progress toward “lawful administration,” and the public began accepting birth planning more readily. Citing those reasons, in April 1999 the SBPC finally issued another notice partially declassifying the first one. Community birth planning workers should post the “seven don’ts” at township and village offices and should take the initiative in receiving relevant oversight from the public. However, they still should not publish the “seven don’ts” in their local newspaper, and the SBPC notice still did not reveal the new rules themselves (Yearbook 2000: 82).

The 2001 Law: Stability and change

The 2001 Law legalizes institutions for the state planning of population and births and at the same time places legal restraints on them. The Law proceeds systematically from general principles (Chapter One) to macro-demographic population planning (Chapter Two) to micro-demographic regulation of reproduction (Chapter Three). Continuing at the micro level the Law specifies program incentives, health services, and legal responsibilities (Chapters Four, Five, and Six). Each chapter balances state power and citi-
zen protection. Most of the rewards specified are to citizens for compliance, and most of the penalties specified are against officials for maladministration. The full text of the Law is worth examining (see the Documents department in this issue and Law 2001a and Law 2001b in the References). The SBPC officials who supervised drafting have provided authoritative explanations of the legislative intent of most chapters and the legal meaning of most articles (Jiang and Zhao 2001; Jiang 2002; Zhang et al. 2002; Commentator 2001). The following summary highlights issues that have concerned foreign observers. Like the 2000 Decision, the 2001 Law appears to represent a political compromise that combines stability, change, and silence.

**Stability.** The 2001 Law reaffirms an existing policy that already includes some slight qualifications to state demands, as regards number of children, methods of contraception, and penalties for noncompliance. On numbers, citizens have a constitutional duty to limit their childbearing, but they do have a right to reproduce (Article 17). Nevertheless, according to supplementary explanations, people who suffer from hereditary disease should refrain from having children (Jiang 2002: item 55). The state encourages (guli) late marriage and late childbearing and advocates (tichang) one child per couple, but does not absolutely legally require it (Article 18). Couples who meet the conditions specified by subnational legislatures may apply to have a second child (Article 18). Ethnic minorities must practice birth planning, but subnational legislatures specify the details (i.e., sometimes allowing more children, Article 18).

As to methods, couples must limit their childbearing, but the main method should be contraception (biyun, in order to minimize abortion, Article 19). It is recommended (tichang) that husbands and wives who already have children adopt long-term contraceptive measures (Article 34). Fertility-limitation measures should be “safe, effective, and appropriate” and personnel should protect the safety of all clients undergoing relevant clinical procedures (Article 19). Couples practicing birth planning should be able to obtain, free of charge, the technical services that the state stipulates as basic items (Article 21). The state should “establish systems for premarital health care and for health care during pregnancy and childbirth, [in order] to prevent or reduce birth defects and improve the standard of health of newborn infants” (Article 30). This implements the state’s longstanding objective of improving population “quality” while delivering much-needed services.

The Law does not explicitly mention either sterilization or abortion. Sterilization is implicitly included as a voluntary option under long-term contraceptive measures (changxiao biyun cuoshi, literally “long effective,” which in past program usage primarily meant sterilization but now evidently includes IUDs and subdermal implants as alternatives, Article 34, second clause). According to supplementary interpretations of the Law, abortion is not a method for promoting birth planning (Zhang et al. 2002: 66, on Article...
On grounds of safety the Law is intended to “strictly forbid” unsafe abortions (ibid.: 67, on Article 19, second clause). Abortion is implicitly included as a last resort under “measures for preventing pregnancy and controlling birth” (biyun jieyu cuoshi), after contraception has failed (ibid.: 71, on Article 20, first clause). As noted above, in 2000 sterilization accounted for 11 percent of all birth control clinical procedures and abortion accounted for 31.5 percent. Many of the latter may have been at the initiative of couples rejecting unwanted girls, not at the insistence of the program limiting births, though of course in response to those limits (Chu 2001).

On penalties, the Chinese state constitution lists the duty (yiwu) to practice birth planning along with other citizen duties such as raising children and caring for parents, serving in the military and paying taxes (Constitution, Article 49; Edwards 1986). All of these duties are clearly compulsory, but in principle citizens are expected to comply voluntarily. According to the still-relevant Maoist ideal of “voluntarism,” noncompliance calls for more educational persuasion, not coercive enforcement or criminal penalties (Milwertz 1997). Market-oriented post-Mao policymakers have often supplemented persuasion with economic incentives and disincentives. Accordingly, on the disincentive side, the 2001 Law stipulates that citizens who bear an unauthorized child must pay a “social compensation fee” (Article 41, shehui fuyang fei, literally “social bringing-up fee”). The 2001 Law couches this fee less as a negative sanction intended to secure compliance and more as compensation to society for the extra cost of raising extra children. This may seem like a distinction without a difference, but it does mean that—even though the fee can amount to several times a couple’s annual income—citizens should not be subject to criminal penalties simply for having an extra child.9

However, the penalties escalate as citizens go from merely having an extra child to actively resisting the program. Citizens who do not pay the social compensation fee incur an additional monetary penalty (Article 41). Those who persist in nonpayment can be taken to court (Article 41). Citizens who “refuse” (jujue) birth planning officials should be given “criticism-and-education,” evidently for not complying themselves; citizens who obstruct (zu-ai) birth planning officials should be “stopped,” evidently from interfering with efforts to secure the compliance of others (Article 43). Those who violate public security regulations or criminal law may be prosecuted (Article 43). State employees are subject to additional administrative penalties; other personnel are subject to additional disciplinary measures by their employers (Article 42). (Nationally such “staff and workers” amount to about 17 percent of the population—Yearbook 1999: 530–531.)

Change. Some of the progressive changes that the Law introduces are intended to reduce abuses, increase incentives, and foster women. About abuses, the Law says that officials “should conduct administration strictly
in accordance with the law, should enforce the law in a civilized manner, and must not infringe upon citizens’ legitimate rights and interests” (Article 4, hefa quanyi, literally “legal” or “lawful” rights and interests). During review of the 2001 Law, members of the NPC noted that the problem of cadre abuse was not yet solved in some localities and slightly emphasized it by separating one clause into two (2001.6.26; interviews; Article 39, clauses one and two). The Law contains punishments for doctors guilty of performing illegal operations, for anyone guilty of forging documents, and for service providers guilty of negligence (Articles 36–38). State officials should be punished for maladministration, including abusing citizens, diverting funds, or falsifying statistics (Article 39). Citizens who think that a government agency has infringed on their legitimate rights and interests may appeal for administrative reconsideration or may initiate administrative litigation (Article 44, as authorized by other laws).

On incentives, Chapter 4 authorizes rewards for compliance (Article 23), but arrangements and funding are left to local governments and employers (Articles 27 and 29). People should be rewarded for postponing marriage and childbearing, for undergoing birth planning surgical procedures, and for volunteering to have only one child (Articles 25–27). Households that practice birth planning, particularly poor households, should receive preferential treatment (Article 28). Relevant insurance plans and pension systems are encouraged, but again the details are left to localities (Article 24). According to commentaries, preferential treatment of strict compliers is regarded as a way of making their chances for personal development equal to those of less strict compliers (Dang and Yao 2000). According to a 2001 survey, 71 percent of one-child families have received a one-child allowance, but less than 10 percent have received educational, medical, or old-age benefits, and less than 5 percent have received house sites, labor reduction, or employment (the last only 0.4 percent—SBPC 4 March 2002).

As for women, birth planning should be linked to their education and employment and to improving their health and raising their status (Article 3). Implementation should include measures not only to control the quantity and improve the quality of population—the program’s classic goals—but also to strengthen maternal and child health care (Article 11). There must be no discrimination against female children and their mothers (Article 22). Sex selection through ultrasound and abortion is strictly prohibited (Article 35).

The 2001 Law: Progressive and problematic silences

As with the 2000 Decision, it is important to note what is missing from the 2001 Law, for good or ill.
**Progressive silences.** The good side is that the new Law omits many things that many Chinese and foreigners consider objectionable. Evidently national policymakers do not want to put details of a severe birth limitation program into national law, at the very least so that goals and methods can be relaxed by localities as their changing conditions permit. The national Law adopts a much milder tone than existing provincial regulations and omits many specific prohibitions and penalties on citizens that many provincial regulations include. These omissions are highly significant because, at least in principle, they oblige provincial legislatures to remove “inconsistent” provisions from provincial laws before the national Law goes into effect on 1 September 2002. The national agencies that drafted the Law met with the provinces in spring 2002 to discuss these issues. In practice central reformers do not expect all provinces to achieve complete consistency immediately (interviews).

Examples of provincial prohibitions and penalties omitted from the national Law include the following. The national Law (Articles 9–11) requires population and birth plans down to the county level but does not call for them to be disaggregated into population targets or birth quotas at the community and individual level (as, for example, the Fujian provincial regulations seem to imply in their Articles 23–24; see Greenhalgh and Winckler 2001: Appendix Three). The national Law does not “forbid” early marriage or out-of-plan births (Fujian Article 5). It does not prescribe what form of contraception citizens must practice at particular stages of childbearing (e.g., an IUD after one child and sterilization after two, long a major program slogan and included in most provincial regulations—Zhang Yuqin 1999: 232). It does not explicitly mention the termination of out-of-plan pregnancies (Fujian Articles 13 and 40). The Law does not prescribe fines for refusal of sterilization, a procedure that is supposed to be voluntary (interviews). It does not require the sterilization of one member of couples in which hereditary disease is a problem (Fujian Article 12). For ordinary citizens, it does not supplement the “social compensation fee” with “administrative restrictions and penalties,” although these apply to state employees (Fujian Articles 37–38; national Law, Article 42).

**Problematic silences.** As for possible ill effects, some of the omissions in the 2001 Law provide grounds for concern. First, the fact that the new Law does not provide strong legal enforcement mechanisms might tempt some local political leaders, program officials, or program workers to resort to extralegal means of enforcement in order to avoid being penalized themselves for not meeting birth planning goals. The deterrent effect of the “social compensation fee” may not be adequate to ensure compliance in areas where birth limits remain difficult to enforce, particularly among very rich couples who can afford to pay the fee and among very poor couples who cannot be forced to pay anything. The program hopes that extralegal enforcement can
be avoided by further revising the evaluation criteria for local political leaders, program administrators, and program workers in order to further emphasize lawful implementation and public satisfaction (interviews; SBPC 23 March 2000; SBPC 10 April 2000).

Second, the new Law still leaves local program representatives with the contradictory jobs of trying to secure compliance on behalf of the state while trying to deliver services in the interest of the client. It is community birth planning workers who do much of the education and persuasion that are supposed to be the program’s major means of obtaining compliance (Article 13). It is they who conduct much of the necessary monitoring and mobilization, and they who dissuade “refusal” and enjoin “obstruction” (Article 43). It is local program officials who levy the “social compensation fee” on noncompliers and take nonpayers to court (Article 41). Implementation has been somewhat facilitated by the election of village officials (O’Brien and Li 1999; Alpermann 2001). In the future, implementation may be further eased by giving villagers a role in the selection of their birth planning worker. This procedure began as an experiment in some communities in Heilongjiang in 1999 and should spread to the rest of that province and the rest of the country in the next few years (interviews).

Third, the 2001 Law does not fully define citizens’ “legitimate rights and interests” in the reproductive area. In large part this is because they are defined by other legislation to which the 2001 Law implicitly refers (Zhang 1998: 122–125). Some of these rights are procedural, such as administrative review and redress, and some are substantive, such as rights of women and infants to reproductive health care (Lin 1996; Keith 1997). Some ordinary Chinese have used such nationally defined rights to resist local government actions (O’Brien 1996). Nevertheless, most ordinary Chinese probably have little idea of their “legitimate rights and interests” in the area of reproductive policy. As the program itself recognizes, such awareness requires an educational effort by both the birth program and nongovernmental organizations, particularly the Birth Planning Association (Yearbook 2001: 42–43; BPA 1999). Fully defining these rights may require some court cases.

Policy implementation

Birth planning and reproductive health

Recent concrete measures for promoting birth planning and reproductive health provide the practical context for the Decision and Law and illustrate continuity and change in policy implementation.

Birth planning. In 2000 and 2001 vigilance continued against program abuses such as coercive implementation and pecuniary corruption by local
cadres. Recent evidence of abuses derives mostly from Chinese media reports of successful prosecutions of errant local officials, which are intended both to warn officials against misconduct and to inform citizens of their rights (2000.11.16; 2001.5.19). Some coercion has occurred because of cadre zeal: over-eagerness not to be punished for failing at birth planning (2001.1.2). To combat this, in 2000 program leaders held a conference on lawful administration and issued circulars on establishing a permanent system for inspecting enforcement and on including lawful implementation in performance evaluation (Yearbook 2001: 85–86, 106–108). Other coercion has occurred because of cadre greed: local extortion of fees and fines using birth planning as an excuse (2000.11.24). To combat this, the program began experiments with having noncompliers pay fines directly to county finance offices and issued implementation rules for a crackdown on corruption (Yearbook 2001: 87–89, 114–115). To combat misreporting, the program issued “Methods” for managing program statistics and surveys and issued a circular on their implementation (ibid.: 116–118, 123–124).

The program continued working to extend birth planning to all of China. According to the 2001 program survey of birth planning and reproductive health, 93.5 percent of the townships surveyed had birth planning “service stations” with an average of 3.4 technical service providers; 80 percent of villages had a birth planning clinic, and 99 percent of villages had at least one professional birth planning worker (SBPC 4 March 2002). Emphasis shifted toward bringing the most populous provinces into compliance with birth limits, particularly in central China. Poor rural areas in central and western China became a priority (Yu et al. 2000a). In 2000 program leaders held a workshop and issued instructions on birth planning in western China, which national political leaders wish to develop, with birth planning playing a significant role (Yearbook 2001: 81 and 119–120). The national political consultative congress organized research on establishing an old-age security system for families practicing birth planning in rural western areas (ibid.: 94–95). Attention to western China in turn entails attention to minority nationalities, on which in 2001 the program held a conference and issued “Comments” (Yearbook 2001: 85 and 120–123; 2000.8.17). The program is reiterating the principle that national minorities should practice birth planning, and it is putting the necessary regulations in place. However, these regulations remain more lenient than those for Han Chinese, particularly in rural areas.10

Reproductive health. Meanwhile the program turned increasing attention to reproductive health, starting from health services most closely related to birth control (2000.7.10; Yearbook 2001: 84). The program proceeded cautiously, partly because of limitations of program personnel and equipment, partly because of competition with the Ministry of Health over man-
date and revenues. According to the 2001 survey, only 6 percent of the
program’s township service stations had gone beyond birth limitation to
provide reproductive health services (SBPC 4 March 2002). By 2000 the
“quality of care” initiative had been adopted by about a third of China’s
roughly 2,100 counties, mostly in more developed eastern China. Localities
themselves chose which aspects of quality care to implement (Yearbook
2001: 100; interviews). In 2000 the program convened a work conference and
issued “Comments” on extending quality care from east to west (Yearbook
2001: 100–102, 112–114). The Comments called for “informed choice” be-
tween contraceptive measures, but the workshop defined quality care only
as high-quality services that served clients’ needs. According to the 2001
survey, one-third of village clinics offered a choice of between three and six
methods of contraception, and another one-third offered a choice of be-
tween five and seven types. (One-tenth could provide no method—SBPC 4
March 2002). Meanwhile, the program continued efforts to raise women’s
educational levels (2001.11.30) and to help impoverished women improve
economically (2000.7.20). Attention continued also to improving the “qual-
ity” of children. Some earlier efforts had consisted mostly of negative “eu-
genics” efforts to prevent reproduction by people with hereditary defects.
However, a new five-year “eugenics” project is to follow international guide-
lines and evidently consists mostly of positive measures to foster maternal
and child health (2001.3.28).

Reproductive health measures included largely new attention to sexual
health. This included a new program of sex education for adolescents, re-
peatedly attempted in the past but never widespread (2000.7.11; 2000.9.22).
Sexual health even included some attention to the topic of men’s health,
previously seldom-mentioned: 28 October was declared Men’s Health Day.
Evidently one target was erectile dysfunction, said to affect half of Chinese
men over age 40 (2000.10.28). Most important, in December 2000 the SBPC
conducted a survey on AIDS, finding alarmingly little public understanding
of this lethal disease (2001.4.9). The release of the SBPC survey contrib-
uted significantly to opening discussion of China’s increasing AIDS prob-
lem and perhaps foreshadowed a future role in education and detection for
the birth planning system’s extensive grassroots network (interviews). Fi-
ally, the program continued to computerize recordkeeping and communica-
tion, both within the birth planning administration itself and between
the program and society. At both levels, computerization increases both ser-
vice and control. On the one hand, it enables the program to deliver in-
creasingly complex services to an increasingly complex and mobile society.
On the other hand, it enables superiors to inspect subordinates’ records and
enables the program to monitor individuals’ reproductive health status (Year-
Mass organizations and international relations

Recent developments in mass organizations and international relations illustrate the program’s internal and external organizational reach.

Mass organizations. The PRC has long used “mass organizations” to help implement policy but recently also has begun using them to monitor administration “from below.” So far, the PRC has allowed little space for organized groups in “civil society” to take independent initiatives but they may play a larger role in the future. The Birth Planning Association (BPA) is one of the PRC’s largest mass organizations, with more than a million branches (covering China’s roughly one million village settlements) and more than 83 million members. The BPA was established in 1980 specifically to help implement birth planning, originally through propaganda and mobilization. Since the 1980s the BPA has assumed some additional functions. It has participated in significant program innovations such as linking birth planning to individual advancement (literacy and income) and to community development (economic ventures, nursery schools, old-age homes). The BPA has provided an upward channel for public demands for quality care and fair administration (BPA 1999). On the instruction of national political leaders, the BPA has helped monitor “lawful administration” and has been upgrading its branches to perform both old and new functions more effectively. The BPA’s “strategic vision” for the future is “to fill the gap in China between a shrinking public sector and a profit-seeking private sector” and “to position itself as China’s major social development NGO” (BPA 1999; Peng 2000).

In 2000 the BPA celebrated its twentieth anniversary (2000.5.29) and convened its fifth national congress (2000.12.6). The BPA issued “Opinions” on its future work that were endorsed and circulated by the general offices of the party central committee and government cabinet. The Opinions reiterated the BPA’s classic mission of community-level propaganda and mobilization, but also called upon it to help solve citizens’ practical difficulties and to participate in the construction of community-level democracy (Yearbook 2001: 42–43). A BPA survey found only 30 percent of its branches to be highly effective and fully 30 percent to be largely ineffectual (ibid.: 43). In 2001 BPA chairman Jiang Chunyun called on BPA branches to “perform competently” (2001.5.27) in “real terms” (2001.5.27). A BPA council meeting emphasized building grassroots organizations in rural areas in central and western China (2001.12.6). In the future, the BPA hopes to help deliver reproductive health services to the most disadvantaged portions of the population: the poorer, younger, rural, or migrant. One BPA focus will be unmarried young people, whom the SBPC has largely ignored and whose reproductive health needs are growing as people mature early and marry late (BPA 1999; interviews).
Another relevant quasi-nongovernmental organization is the China Population Welfare Foundation (CPWF). It is much smaller and more independent than the BPA, and the two organizations collaborate where their activities are complementary. Both have many ideas for innovative projects but lack the money to conduct them. The 2001 Law encourages private contributions but the PRC’s tax and audit laws do not provide adequate incentive and oversight for philanthropy (interviews). In 2000 the CPWF received a significant grant from a Chinese entrepreneur operating from Hong Kong (2000.9.11). Meanwhile, the SBPC has turned to Internet websites to facilitate communication both between state agencies and between the state and the public. On World Population Day in 2001, at China’s first exposition on new technologies for birth control and reproductive health, the SBPC launched a new “China Population Net.” SBPC Minister Zhang said the new technology “indicates a change in both the concepts and methods concerning China’s family planning work...in the new century, which is heading for large-scale publicity, integration, opening up and development...” (Zhang 2001).

**International relations.** Internationalization became an increasingly significant theme in 2000 and 2001. As noted at the outset, international discourse has helped provide domestic discourse with both the rationale for maintaining a birth limitation program (e.g., “sustainable development”) and the rationale for reforming it (e.g., “quality of care”). The SBPC has long had relationships with foreign organizations, some of which have been criticized for involvement in a program that has included some mandatory abortion and sterilization. In fact, however, such organizations have contributed greatly to minimizing abortion by improving contraceptive technology, training Chinese professionals, and educating program leaders. The United Nations Population Fund (UNFPA) delayed beginning a fourth cycle of projects until the Chinese program began shifting toward a more health-oriented and client-centered approach. Thus in the late 1990s organizations and projects operating in China included the UNFPA (reproductive health/family planning and women’s empowerment), the Ford Foundation (male involvement), the Rockefeller Foundation (informed choice), and the Population Council (quality of care). From 1998 to 2001 the SBPC sent several delegations of national and provincial program leaders to the United States to expose them to foreign thinking and practice in reproductive policy. This exercise helped national and provincial program officials arrive at common concepts for pursuing program reform (ALP 2000).

The PRC’s entry into the World Trade Organization (WTO) in late 2001 was a milestone in China’s internationalization. The SBPC convened a conference on international cooperation at which Minister Zhang called entering WTO an opportunity for the SBPC to expand exchanges with foreign organizations (2001.10.23). At a seminar on the impact of WTO entry on birth...
planning. Chinese experts concluded it would help control population by further stimulating economic development, urbanization, and education (2001.11.16). In 2000 and 2001 the SBPC received visits from the US-based Program for Appropriate Technology in Health (PATH, on adolescent sex education, 2000.7.11), from a delegation of the International Planned Parenthood Federation (to assess the past three years—2001.4.7), and from the UNFPA (on reproductive health—2001.11.30; Yearbook 2001: 199–200).

In addition to receiving incoming influences, the PRC also wishes to project influence outward. A main part of this has been efforts to explain the Chinese program and its ongoing reform to foreign audiences, both to counter foreign criticism of coercion and to present the program as a successful model for emulation. In 1999 an SBPC vice minister participated in the international review of implementation of Cairo goals and the SBPC convened an international symposium on China’s implementation of “quality of care” (Yearbook 2000: 163–164; SBPC 2000). In December 2000 the State Council’s Information Office issued a White Paper on population and development conveying the gist of the 2000 Decision (White Paper 2000). The PRC regards limiting its own population as a significant contribution to limiting global population. The PRC also wishes to contribute to population programs in developing countries, both to help limit world population and to develop its relations with developing countries. Since 1997 China has belonged to Partners in Population and Development, a program promoting “South-to-South” exchange of experience; in 2000 the annual board meeting was held in Beijing (2000.11.2; Yearbook 2001: 198–199). In 2000 and 2001 China conducted bilateral exchanges with such countries as Egypt, Kenya, and Vietnam. However, the PRC’s state-centric program remains too mandatory and coercive to be a policy model for most developing countries.

Organizational constraints and environmental processes

The practical impact that the 2000 Decision and 2001 Law will have on China’s citizens will be conditioned by organizational constraints that the program faces within the Chinese bureaucracy and by processes within the program’s larger environment.

**Organizational constraints.** The impact of policy will be affected most immediately by the complex and changing bureaucratic environment that the program faces. Around 1970 national political leaders extracted birth planning from the Ministry of Health in order to give it a much higher priority than it was likely to receive there. Since then the birth planning system has only gradually achieved the “stand-alone” administrative capacity to deliver the necessary contraceptive services. Even today what the SBPC can do depends heavily on cooperation by other levels and branches of government. Vertically, the SBPC has only an advisory relationship to provincial
and local birth planning commissions, which are under the authority of their respective provincial and local governments. The only way for the SBPC to bring administrative authority to bear on lower-level commissions is to persuade national party and government leaders to order lower-level party and government leaders to issue appropriate instructions to their commissions. Horizontally, the SBPC is only the equal, not the superior, of the many other ministries on which it must rely for cooperation. Again, the only way the SBPC can bring leverage to bear is to persuade the national political leadership to adopt policies that are binding on all the relevant ministries. Relative to some other ministries the SBPC is rather weak because, as the provider of a “social service,” it is a consumer not a generator of revenue.

Recently the SBPC’s main inter-organizational struggle has been to maintain the independent existence, administrative personnel, and operational funding of its lower-level administrative branches and service organs, in the face of drastic government-wide mergers of ministries, cutbacks in staff, and reductions in budgets (ALP 2000: 2–7). The Zhu Rongji administration ordered most ministries to cut their staff in half, but let birth planning off with approximately a quarter, from about 400,000 to somewhat more than 300,000 full-time employees (ibid.: 1; Yearbook 2001: 190). The struggle over resources is vertical because program funding and staffing are multilevel, including not only formal “state financial” (guojia caizheng) appropriations by the national, provincial, and county governments but also “non-state financial” (fei guojia caizheng) contributions from taxes, fees, and fines that villagers pay to the township and village (Yearbook 2001: 119). The struggle is also horizontal, because it involves a share-out of resources with the Ministry of Health and arrangements with the Ministry of Finance to maintain program funding.11

Program funding faces several major problems. A first is inflation. In the last 30 years per capita program funding increased significantly when measured in current currency, but in the last 15 years it has decreased significantly when measured in constant 2000 currency (Greenhalgh and Winckler 2001: 108, 138; ALP 2000: 2). In 1998 total allocations for birth planning fell 20 percent short of what was needed even to cover basic program expenses, with the shortfall made up through various expedients (Wei 2001: 196).

A second major funding problem is chronic underbudgeting by the formal state financial system, which from 1971 through 1998 paid for only about 40 percent of total birth planning expenditures (ibid.: 195–197, particularly Table 20). Non-state “community” sources paid for about 60 percent of program expenses. Out-of-plan birth fees transferred to the county have provided nearly 30 percent of birth planning expenditures by some counties and over 60 percent of birth planning expenditures by some townships (Sheng 2001: 245). The possibility of funding the birth program from fines has given local political and program leaders much incentive both to
allow out-of-plan births and to tax them heavily. One reason why the state pays less and the community pays more may be that the state pays for such basics as “technical services” and personnel, which cost relatively little, while the community pays for benefits, which cost a great deal. (According to an estimate for the late 1980s, within total birth planning expenditures, expenses for contraceptives and surgery constituted about 11 percent and personnel about 13 percent. Incentives to one-child families constituted about 72 percent. See Banister and Harbaugh 1994: 62.)

A third funding problem is ongoing attempts at local financial reform (2000.2.13). To reduce local exactions from farmers, the national government has ordered the conversion of many local “fees to taxes” (fei gai shui). This reform reduces local revenue, tempting localities to merge birth planning organs with health organs, to reduce birth planning personnel, and to cut benefits to citizens practicing birth planning (Yearbook 2001: 95–96, 118–119). An additional reform will establish separate channels for receipt and disbursement of birth planning funds (shouzhi liangtiao xian). This reform will direct “social compensation fees” to county finance departments, requiring them to fund county birth planning activities from general revenues (ibid.: 87–89). Given these reforms, at least one Chinese analyst believes that, to guarantee the correct functioning of the birth program, formal budgetary state input should rise to at least 80 percent of program expenses by 2010. He also believes that the 2001 Law should have included a quantitative target for birth planning expenditures, such as a percentage of government expenditures, which the Law did not do (Sheng 2001: 245–247).

Finally, a fourth major problem with program financing is structural change such as devolution and marketization. Devolution of government functions and funding is intended to shift social spending from center to localities. However, devolution places funding decisions in the hands of local governments that are even less motivated and less able than the central government to appropriate funds for birth planning and reproductive health. Marketization of the economy and medicine can help rationalize resource allocation, prices, and revenues, as in SBPC reform of its procurement of contraceptives (ALP 2000: 4). However, marketization can also worsen inequalities in the distribution of health services, as in the shift from collective provision of health care by employment units through community clinics to private purchase by individuals from private practitioners (Shi and Li 2000).

Environmental processes. More broadly, the actual impact of the 2000 Decision and 2001 Law on Chinese citizens will depend on several sets of processes. First is the outcome of continuing struggles over reproductive policy between rival agendas within China. The balance between stability and change in these documents is elusive, and the participants themselves may not know for sure which provisions or omissions may prove operationally most important. Clearly the program is no longer just administra-
tively enforced birth limitation, but equally clearly it is not yet entirely client-centered reproductive health care. Language is now in place authorizing much of both. How much of which prevails will depend on the power of rival policymakers and the vagaries of local implementation.

Second, the actual impact of reproductive policy will differ greatly across space. In economically developed and socially advanced areas, where fertility aspirations are low and program funding is high, couples may receive not only rewards for child limitation and help with childbearing but also an increasingly broad range of reproductive health services. In backward areas, where fertility aspirations are still high and program funding is low, couples may be limited to one or two children but still receive few rewards and only some basic reproductive health care. Transitional areas will fall in between. Within each kind of area, couples will differ in income and in access to such government rewards and services as are available. They will also differ in their fertility aspirations and the biological accident of whether their first and second children are male or female.¹³

Third, the actual impact of reproductive policy will depend on how it interacts over time with changes in state and society. Post-Mao China has been a race between institutionalization and disintegration involving a gradual transition in the state and accelerating transformation in the economy and society. This race creates a broad spectrum of possibilities for China’s future, with different implications for the birth planning program (Shambaugh 2000). At one extreme, most of China could develop successfully, with advanced areas expanding and backward areas contracting. As progressive reformers of the program hope, birth planning could give way to reproductive health care, and government services could be supplemented by non-governmental organizations and private providers. At the other extreme, China could disintegrate into poverty, insolvency, corruption, hooliganism, and disease. Medical expenses from chronic and catastrophic illnesses have already become the largest cause of impoverishment in China, causing President Jiang in late 2001 to order the Ministry of Health to make rebuilding a rural health system one of the ministry’s top three priorities (Lawrence 2002: 32). Nevertheless, the urban-based health system could collapse further and leave the birth system’s rural outreach as the barefoot doctor of the twenty-first century. Conservatives might tighten birth limits to deal with a crisis, or the birth program itself could collapse from underfunding or unpopularity. The likely prospect falls between these extremes and incorporates some of both, differently in different times, places, and policies.¹⁴

Conclusion

The 2000 Decision and 2001 Law are internationally significant because of the controversy that has surrounded the birth planning program, both abroad
and within China. Foreign views of the PRC’s recent reproductive policies range from scathing criticism to guarded approval. Recent American critics highlight stability and downplay change, usually as part of an argument that the United States should withhold funding from UNFPA because of its involvement in China, as a Republican administration has again done. These critics usually take for granted an American approach to human rights that emphasizes the rights of individuals not groups (Henkin 1986). In evaluating the Chinese program, international civil servants usually start from international agreements, which are designed to accommodate as many national philosophies as possible, but which in recent decades have been increasingly influenced by the individualistic American approach. International professionals tend to highlight change but acknowledge the considerable stability. Recently, for example, both outgoing and incoming heads of UNFPA have praised China’s progress toward complying with the Program of Action adopted at the 1994 Cairo conference (SBPC 11 January 2002; SBPC 22 January 2002). Nevertheless, the UNFPA does not consider China to be in full compliance; however, the UNFPA’s international board would rather continue working to improve things than to withdraw in protest.¹⁵

The PRC’s position is that it is willing to engage in a constructive debate on international standards but that its views should help shape those standards (Zhang and Sun 1999; Dang and Yao 2000; Jiang and Zhao 2001; Angle 2002). Those views, too, show both stability and change. On the one hand, demonstrating stability, the official Chinese approach to rights starts from modern socialist ideals, as influenced by traditional Chinese philosophy, both of which emphasize the need for a strong state to promote the collective welfare (e.g., Nathan 1986; Twohey 1999). The 1982 Chinese state constitution is neither rights-based (Western) nor duties-based (Soviet) but instead regards rights and duties as mutually interdependent. The Chinese approach to rights emphasizes individuals’ responsibilities to others, including later generations. The post-Mao approach to rights regards guaranteeing economic subsistence and achieving economic development—both for the Chinese race and for its individual members—as indispensable for the exercise of other rights (Kent 1993; Keith 1994; Wan 2001). The drafters of the 2001 Law started from the Chinese approach to rights (Jiang and Zhao 2001). They also studied the relevant international declarations, arguing that those declarations, too, regard rights as entailing duties and criticizing those Western approaches that overemphasize rights at the expense of duties. They found Chinese reproductive policy largely in conformity with human rights, except for some requirements, particularly in provincial legislation, about the number and spacing of children and about methods of contraception (Dang and Yao 2000: 212–213).

On the other hand, reflecting change, during the post-Mao period the balance in China’s legal system has shifted somewhat from duties toward
The 1982 constitution extended some social rights that had been limited to “workers” to all “citizens” (e.g., social security—Kent 1993: 114–117). Chinese reproductive policy has begun to define rights where previously there were mostly duties. The 2001 Law explicitly affirms the right to reproduce (albeit only within the limits of birth policy, Article 17). Rights to services for contraception and reproductive health are strongly implied by injunctions to local governments to provide them (albeit probably only to those practicing contraception, Article 31). The drafters of the 2001 Law addressed the question of how it should conform to the international human rights agreements that the PRC has already signed and urged that articles about obligatory contraceptive measures be crafted carefully to emphasize reproductive health and quality care (Dang and Yao 2000: 213).

The 2001 Law emerged from a vigorous 1990s domestic debate over how to implement the “citizens’ rights” granted by state law and over whether to add “human rights” deriving from some larger principles (Keith 1994). That struggle continues and is vividly reflected in remarks by some birth planning officials that their real concerns go beyond the legal rights of abstract citizens to the concrete needs of “real human beings.”

Notes

This article has benefited from conversations with Susan Greenhalgh, Jonathan Polansky, Sterling Scruggs, and Jason Wang, and from critical readings by Camilla Knapp. It has also benefited from conversations with members of the last five of the six delegations of high-ranking national and provincial Chinese birth planning officials who visited the United States from 1998 through 2002. Most of the national officials were immediately below the vice ministerial level: the directors or vice directors of the major departments within the SBPC or of organizations affiliated with the SBPC. All of the provincial officials were the directors or vice directors of their province’s birth planning commission. These are the people who are formulating and implementing the reforms discussed in this article, and the people to whom the national political leadership has entrusted the future of the program. They visited the United States under the Advanced Leadership Program (ALP) initiated by the State Birth Planning Commission and organized by the Public Media Center (San Francisco) and the Center for Health and Social Policy (San Francisco). I thank those organizations for the opportunity to participate in ALP, and I am grateful to the officials themselves for discussing with me their efforts to reform China’s birth planning system. I also thank the East Asian Institute of Columbia University and the libraries at Columbia, Princeton, and Cornell.

1 Parenthetic dates in the text refer to news items listed in chronological order at the beginning of the References. All references in the text to Yearbook are to the China Birth Planning Yearbook. All references to “interviews” are to conversations with the sixth ALP delegation in March 2002.

When I began this update in January 2002, the most recent Yearbook available in American libraries was the 2000 edition, which covers 1999. Therefore I started from more current official Chinese news releases translated into English by the Foreign Broadcast Information Service (FBIS) and available in the electronic database World News Connection (WNC). These are the news items listed at the beginning of the References. I later supplemented these news items through interviews with members of the March 2002 ALP delegation and with additional reading. Finally, as this article was being revised for publication, the 2001 Yearbook covering 2000 became avail-
able, confirming and elaborating many points from the interviews. The reader should note that all of these sources concern only central policy, which is what this article is about. These central sources do not reveal provincial or local policies, nor do they report what is actually happening on the ground. The last third of the article, on policy implementation, emphasizes the difficulties the center will face in achieving what its policies prescribe.

2 The pre-2000 background summarized in this article is based on Greenhalgh and Winckler 2001, which is in turn based on extensive interviews and documentary research.

3 The terms used in this and the following paragraph to identify reform processes are mostly mine, not the program’s. The most relevant program slogan in the late 1990s was the “two transformations” (liange zhuanbian), which basically referred to “incentivization” and “collateralization,” although the actual program formulation was more complex. On the program’s own recent formulations see Ming (1999) and Greenhalgh and Winckler (2001: 54 and Appendix One: Glossary). On incentivization see White Paper 2000: sections 40–43. On collateralization see White Paper 2000: sections 13–19 (on health), 20–24 (women), 25–27 (employment), and 28–33 (poverty).

4 The 1997 survey was of married women only, while the 2001 survey included some unmarried women. For English summaries of the 1997 and 2001 surveys see Li 1999 and SBPC 4 March 2002, respectively. According to the 2001 survey, 87 percent of married women practiced contraception, with 92 percent using long-term methods (46 percent each for IUDs and sterilization, with 38 percent of women sterilized and 8 percent of men—SBPC 4 March 2002). In the United States sterilization is an attractive option to women who are certain they want no more children, particularly if they cannot afford them (Godecker, Thomson, and Bumpass 2001). The same reasons should apply in China, so one cannot assume that all sterilizations there are involuntary.

5 I leave estimation and comparison of numbers of induced abortions in China to demographers. Chinese data can be inconsistent and probably undercount induced abortions. It is difficult to find comparable rates for China, the United States, and the world. One can say with some certainty that the Chinese program prefers contraception to abortion, that in recent years the program has emphasized reducing abortions, and that China has done a better job of reducing abortions than many other countries, possibly including the United States. According to some cross-national data, during the early 1990s the number of abortions per thousand women of reproductive age averaged 35 worldwide (AGI 1999), with both China and the United States falling through the 20s per thousand (Henshaw, Singh, and Haas 1999). By 2000 China claimed to have gotten under 20 per thousand (expressed as “under 2 percent”: interviews and Wang, Wang, and Guo 2001: 224). The 1997 survey estimated the number of abortions per live birth as 0.24 (0.61 urban, 0.20 rural—Li 1999: 4). The 1997 survey data suggest that the proportion of pregnancies ending in abortion was at least 31 percent (calculated from Tables 2-3-5, 2-3-6, and 3-23-1). In the 1990s that proportion was about 22 percent worldwide and about 24 percent in the United States (AGI 1999). A comparative source on abortion—and other contraceptive and demographic indicators—is the website of the Alan Guttmacher Institute: «www.guttmacher.org» or «www.agi-usa.org».

6 It is difficult to assess the contribution of the Chinese birth limitation program to demographic transition, and it is doubly difficult to assess its contribution to distortions in sex and age structure. All countries experience demographic transition and population aging sooner or later. These processes occur faster when governments advocate smaller families and help make contraceptives available, with or without coercion. Smaller family size and greater technology availability combine with persisting son preference to produce skewed sex ratios in a variety of contexts (e.g., not only in rural China but also in both rural and urban South Korea, where what lowers fertility is family mobility strategy not mandatory state birth limits). Clearly the Chinese program is partly responsible for the wide availability of reproductive health technologies—including equipment for sex determination and abortion—but it is not always responsible for the uses to which they are put.

7 As reported above, the program did do a major study of the economic costs and ben-
chinese reproductive policy

benefits of the program: see 2000.9.21 and Yearbook 2000: 90–91, 115–116, and 184–197. As that report assumes, much or even most of China’s fertility decline could have occurred for demographic and economic reasons (such as falling infant mortality resulting from better public health and improved nutrition), economic and social reasons (such as new economic and educational opportunities and resulting changes in family mobility strategies), and social and cultural reasons (such as rising education and cultural modernization, particularly among women). Moreover, as that report does not analyze, much or even most of the birth program’s contribution to fertility decline could have occurred not through coercive birth limits but simply through advertising and legitimizing “planned birth” and through producing and distributing technology for contraception and abortion.

8 The main national agencies relevant to the legislative process are the legislation bureau of the State Council, the legislation committee of the National People’s Congress (NPC), and the relevant specialized committee of the NPC (Education, Science, Culture, and Health). At the end of 1998 the Ninth Session of the National People’s Congress placed the population and birth planning Law on its multiyear legislative agenda, thus formally authorizing the resumption of research and drafting (Yao 1999). The SBPC submitted its draft of the Law to the State Council in January 2000 for interagency review and party approval. At the end of 2000 the NPC placed the Law on its 2001 agenda, and in January 2001 the State Council forwarded its final draft to the NPC. As required by law, the NPC reviewed the draft three times, in April, June, and November. On 29 December 2001 the Standing Committee of the NPC passed the Law and on the same day PRC President Jiang Zemin signed and promulgated it, to come into effect in on 1 September 2002. Unfortunately, Chinese news reports on this process are not detailed and interviews suggest that they are imprecise and unreliable.

9 The national Law is vague about the amount of assessment and method of collection because provincial laws have differed and the center intends to allow provinces to continue to implement the fee structure to which they have become accustomed. At the end of the 1990s, following central instructions, the most common fine in provincial regulations for a first “extra” child was a “one-time assessment” (yicixing zhengshou) equal to between 150 percent and 350 percent of average local net per capita income in the previous year (usually expressed as 30 to 50 percent of income over between five and seven years). In principle the whole amount of the assessment is due at the time that it becomes too late to terminate the pregnancy, but in practice those with “real difficulties” can be allowed to pay the fee in installments over time. Some provinces did not mention “one-time assessment” and instead allowed installment payments by all noncompliers. In all provinces, for additional “extra” children, the fine should be higher. See Yearbook 2001: 131.

10 Some minority-nationality autonomous areas have passed laws for their local circumstances, typically allowing pastoral households extra children. Provincial program leaders say they will allow local political leaders to decide how fast to proceed (interviews). Moreover, in Muslim areas the program will let local religious leaders make that decision. According to program officials, initially most Imams wrongly assumed that delivering reproductive services to women is forbidden under Islamic law, but they become enthusiastic advocates of doing so after rereading the Koran (interviews). In Muslim Xinjiang and Buddhist Tibet the governments have issued birth planning “management methods,” but the legislatures still have not passed them as laws. Tibet has set a limit of three children for rural Tibetans but does not yet enforce it (interviews; Goldstein et al. 2002).

11 Program personnel include three concentric circles. The inner circle is the 300,000 to 400,000 full-time employees, a large proportion of whom may be at the township level. Each of China’s more than 40,000 townships is supposed to have at least one full-time birth planning administrator, and more than 30,000 townships have a birth planning “service station” that, according to the 2001 survey, employs an average of 3.4 technicians. In the second circle, the program claims a professional representative in 99 percent of China’s villages (numbering 750,000 to one million, depending on how defined). Many village program workers are part-time and serve concurrently
as the head of the village women’s committee. It is unclear exactly where state employees shade into community employees, but most village personnel are mostly paid for by the village, directly or indirectly. It is also unclear where birth planning personnel shade into Ministry of Health personnel, because the MOH has its own hierarchy of rural Maternal and Child Health care organs that partially overlap with birth planning organs at the community level. The outer circle is the mass membership of social organizations, mostly the 85 million members claimed by the Birth Planning Association, most of them at the village level. It is unclear whether the birth planning system counts the full-time professional staff of relevant social organizations among its 300,000 to 400,000 full-time employees. For scattered data, see SBPC 1999; SBPC 4 March 2002; Yearbook 2001: 42–43. A study of program funding and personnel is Banister and Harbaugh 1994.

12 For the problems posed by local financial reform and for the program’s countermeasures see Yearbook 2001: 95–96 and 118–119; on the reform in general see Bernstein and Lu 2003. Another problem is that abolition of unpaid labor for community service will eliminate the possibility of exempting one-child couples from that labor. A new opportunity is that establishment of a uniform local tax will create the possibility of granting partial exemptions to that tax. Thus both the incentives and disincentives surrounding reproductive behavior could be largely rolled into the local tax system.

13 For circumstantial reports on the local implementation and personal impact of birth planning, see Chu (2001); Greenhalgh (1994); Greenhalgh, Zhu, and Li (1994); Greenhalgh and Li (1995); Gu, Xie, and Hardee (1998); Kaufman (all entries); Li (1995); Milwertz (1997); O’Brien and Li (1999); White (1987); Short and Zhai (1998); Zhang Wei-guo (1999); and Zhu et al. (1997).

14 Like its approach to all rights, the PRC’s approach to health rights is “developmentalist”: the PRC is willing to state them in principle but does not expect to be able to implement them in practice until economic development makes the resources available. Broadly speaking, during its first quarter century (1950–75) the PRC approached developing-country health levels on a developing-country economic base. For example, by improving nutrition, combating contagious diseases, and extending basic health care to the countryside, China nearly doubled average life span. However, this health achievement helped create the population problem that the birth program was then created to solve. Moreover, during the PRC’s second quarter-century (1975–2000), while China still remained at developing-economy levels of per capita income, this health achievement began shifting China’s main health problem from contagious diseases affecting children (which are relatively inexpensive to combat) to the chronic illnesses of old age (which are expensive to treat). Even during the Maoist period the formal “state” financial system did not attempt to fund community health care. Unfortunately it is not clear that collective community health facilities were financially viable, except where collective village and township industry flourished. As the PRC begins its third quarter-century, despite China’s great progress toward reducing poverty, these financial constraints remain in place, aggravated by rising medical costs associated with privatization of health care. See Hossain 1997; Shi 1999; Shi and Li 2000; and Lawrence 2002.

15 For informed Chinese critiques see Li 1996; Zhu et al. 1997; and the views reported in Greenhalgh 2001.

References

Chinese news service items relayed by FBIS

Most of the news items listed below were broadcast from the Beijing office of the New China News Agency (Xinhua) in Chinese or English and were translated or relayed by the Foreign Broadcast Information Service (FBIS) in its China Daily Report. The date of the citation (e.g., 2000.1.31 or 31 January 2000) is nearly always the date of the Chinese original, the date of the FBIS translation, and the number of the FBIS issue (e.g., FBIS-CHI-
2000-0131). All items appear in the electronic database World News Connection (WNC), accessible in many university libraries. Most items appeared in WNC on the date of the Chinese original and FBIS translation, so can be searched in WNC by that date. Most items were originally news reports with no titles, so the titles here were supplied by FBIS. Where that title does not clearly indicate the topic, I have provided additional information in brackets. In the few cases where more than one item has the same date, the topic should make clear to which the text refers.

2000.3.12 “Jiang Zemin on population, resources.” Beijing: Xinhua. FBIS-CHI-2000-0312. [annual central forum]
2000.5.29 “Jiang Chunyun addresses Beijing family planning seminar.” Beijing: Xinhua. FBIS-CHI-2000-0529. [BPA 20th anniversary]
2000.7.11 “China NPC Vice-Chairman Jiang Chunyun meets US guests to discuss health issues.” Beijing: Xinhua. FBIS-CHI-2000-0711. [PATH, adolescent reproductive health]
2000.7.19 “China expects to maintain population below 1.3 billion at year’s end.” Beijing: Xinhua. FBIS-CHI-2000-0719. [report from Chinese Academy of Social Sciences and SBPC]
2000.7.31 “Shanghai launches family planning website.” Beijing: Xinhua. FBIS-CHI-2000-0731 [local]
2000.7.31 “PRC to improve family planning services in western regions.” Beijing: Xinhua. FBIS-CHI-2000-0731. [State Development Planning Commission to provide vehicles]
2000.8.17 “China to promote family planning among ethnic minorities.” Beijing: Xinhua. FBIS-CHI-2000-0817. [national meeting]
2000.9.11 “He Luli receives family planning donation from HK entrepreneur.” Beijing: Xinhua. FBIS CHI 2000-0911. [vice chair of NPC and chair of CPWF]
2000.11.2 “China to cooperate with developing countries in population control.” Beijing: Xinhua. FBIS-CHI-2000-1102. [SBPC minister Zhang to Partners in Population and Development]
2001.1.2 “Twenty years after China’s ‘one-child’ policy began, abuses run rampant.” Hong Kong: Agence France Presse. FBIS-CHI-2001-0102.
2001.3.28 “China says population’s rapid growth curbed, low fertility stage entered.” Beijing: Xinhua. FBIS-CHI-2001-0328. [communiqué on 2000 census]
2001.4.7 “NPC Vice Chairman Jiang Chunyun meets IPPF delegation.” Beijing: Xinhua. FBIS-CHI-2001-0407. [International Planned Parenthood Federation]
2001.5.27 “NPC’s Jiang Chunyun urges local family planning workers ‘to perform competently.’” Beijing: Xinhua. FBIS-CHI-2001-0527. [21st anniversary of BPA.]
2001.5.27 “PRC’s Jiang Chunyun urges strengthening family planning at grassroots level.” Beijing: Xinhua. FBIS-CHI-2001-0527. [by BPA, “in real terms”]
2001.6.26 “NPC Standing Committee examines draft laws, Li Peng chairs meeting.” Beijing: Xinhua. FBIS-CHI-2001-0626. [second review]
2001.11.16 “PRC offers liberalized sex education to students at schools.” Beijing: Xinhua. FBIS-CHI-2001-1117. [scholar Tian Xueyuan at expert seminar]
2001.11.16 “PRC offers liberalized sex education to students at schools.” Beijing: Xinhua. FBIS-CHI-2001-1222. [SBPC minister Zhang]

Other sources

Law. 2001a. “PRC law of population and family planning.” Beijing: Xinhua. FBIS-CHI-2001-1229. [This translation evidently was hastily done and is seriously misleading on some key points.]
Law. 2001b. “Population and family planning law of the People’s Republic of China.” An “unofficial translation” posted on the website of the United Nations Economic and Social Commission for Asia and the Pacific, under Population and family planning: Laws, policies and regulations: China. «www.unescap.org/pop/database/law_china/ch_record052.htm» [This translation was carefully done but evidently has been revised by so many different hands that it does not translate key terms consistently or precisely.]
Peng, Zhiliang. 2000. “Thoroughly implementing the mass line is a basic guarantee of doing a good job of the work of Birth Planning Associations,” in Yearbook 2000: 218–221. [in Chinese]


The End of the Fertility Transition in the Developed World

JOHN BONGAARTS

Over the past quarter-century massive changes in fertility behavior have occurred in most world regions. Many developing countries have experienced large and rapid fertility declines, and a number of countries in Asia and Latin America are now approaching the end of their transitions with fertility around or in a few cases (e.g., China) even below 2 births per woman. In the “more developed” world (Europe, North America, Japan, Australia, and New Zealand) average period fertility was already low in the early 1950s and, after temporary baby booms of varying magnitude, has decreased further to 1.6 births per woman in the late 1990s (United Nations 2001).

These recent fertility declines have been more rapid and pervasive than was expected. For example, medium variant projections for the late 1990s prepared by the United Nations Population Division in the 1970s, 1980s, and early 1990s slightly overestimated the fertility levels observed in the 1990s for the world and many regions. These results are primarily attributable to the invalid assumption that all countries end their fertility transitions with fertility stabilizing at the replacement level of 2.1 births per woman. This assumption was widely accepted in the past, and it is fair to say that the UN incorporated the consensus of the demographic community on this issue. Starting with its 1998 revision the UN no longer takes 2.1 as the eventual end point of the transition, and countries with low fertility are now projected, in the most commonly cited so-called medium projections, to remain permanently below the replacement level (United Nations 1999, 2000a, 2001).

One reason for this uncertainty about future fertility trends is that conventional demographic theory has little to say about levels and trends in post-transitional societies (Caldwell 1982). In an attempt to remedy this shortcoming, demographers and social scientists are engaged in an active debate on the causes of low fertility and the prospects for further change (Chesnais 1996, 1998; Lesthaeghe 2001; Lesthaeghe and Willems 1999;
McDonald 2000). The matter is of considerable importance because further declines in fertility or even a continuation of current low fertility levels will contribute to rapid aging of populations and will lead to a decline in the size of national populations. These demographic developments in turn are likely to have significant social and economic consequences (Coale 1986; OECD 1998; World Bank 1994).

This study examines recent trends and patterns in fertility in the developed world, with particular emphasis on the effects and implications of changes in the timing of childbearing. The main objective is to demonstrate that while fertility in these countries is indeed low, women’s childbearing levels are not as low as period measures such as the total fertility rate suggest. This argument has been advanced in earlier research based on theoretical analysis (Bongaarts and Feeney 1998). The present study supports this earlier work with more extensive empirical evidence. I conclude by discussing the implications for future trends in fertility.

Fertility levels and trends

To obtain a fuller understanding of the various dimensions of fertility change, several indicators need to be examined, starting with period fertility.

Period fertility

Overviews of recent fertility trends in the developed world are widely available (Calot 1999; Coleman 1996; Council of Europe 2000; Demeny 1997; Sardon 2000; United Nations 2000b); only a brief summary is provided here based on estimates from United Nations (2001). In general, fertility as measured by the total fertility rate (TFR) was well above the replacement level in the 1950s and early 1960s, averaging 2.8 births per woman. In most countries, this period was followed by one of sharp decline to below-replacement levels (to 1.91 on average) between the mid-1960s and late 1970s. Over the past two decades fertility decline has continued but at a much slower pace, and in a few countries fertility has turned upward slightly—for example, in Denmark, Finland, Norway, and the United States. In the four decades from the late 1950s to the late 1990s the TFR of the developed world dropped by 44 percent, from 2.82 to 1.57 births per woman, with more than two-thirds of this decline occurring before the late 1970s.

These average trends conceal much variation among regions and countries. In the late 1990s the highest total fertility rates were observed in North America (2.00), Australia/New Zealand (1.80), and Northern Europe (1.67) and the lowest in Japan (1.41), Southern Europe (1.32), and Eastern Europe (1.28). The TFRs of particular developed countries are as low as 1.2 in Italy, Russia, and Spain while TFRs of 2.0 births per woman are found in
the United States and New Zealand. Although our focus here is on the “more developed” world (as defined by the UN), it is worth noting that period fertility has also dropped below replacement level in several Asian populations where socioeconomic development has been rapid (e.g., in Hong Kong, Singapore, and South Korea).

Cohort fertility

The fertility of a cohort of women born in the same year is usually measured by the completed fertility rate (CFR), which equals the average number of births per woman at the end of the childbearing years. Trends in the CFR of successive cohorts have generally followed the downward trend in period fertility (Frejka and Calot 2001). A substantive drawback of cohort measures such as the CFR is that they are primarily affected by childbearing levels in the past. Peak childbearing years occur typically two or three decades before the end of the reproductive years when the women whose completed fertility is being measured were in their 20s and early 30s. As a result, the CFR does not provide useful information on recent trends in fertility, which is the main reason why cohort measures are not widely used. However, the CFR does have the considerable advantage of being an unambiguous and real measure of fertility, while the more up-to-date period TFR is a hypothetical measure that is subject to bias and hence potential misinterpretation, as will be demonstrated below.

Comparisons of period and cohort fertility are complicated by the fact that childbearing of a cohort is spread out over a range of ages and years. Nevertheless, one can make useful comparisons of completed cohort fertility with the average TFR prevailing during the years in which the cohort was in its prime childbearing years. Table 1 presents the completed fertility rate for the 1960 cohort and the average total fertility rate for 1980–94 when this cohort was between the ages of 20 and 35. The 1960 cohort was chosen for this exercise because it had reached age 40 by the year 2000. Although this cohort has not yet completed its childbearing, its additional fertility is likely to be modest and can be projected with considerable confidence (Council of Europe 2000). Table 1 includes the developed countries for which the relevant data were available from the sources indicated (with the CFR projected to age 50). In this group of countries the average TFR for 1980–94 ranged from a low of 1.38 in Italy to a high of 2.40 in Ireland, and the CFR ranged from 1.65 to 2.41 in the same two countries. There is a strong correlation between the CFR and TFR ($r = 0.94$). A key finding from this comparison of cohort and period fertility is that in all but one of these countries (Russia) the CFR of the 1960 cohort exceeds (or in one case equals) the average TFR for the period 1980–94. This difference averages 0.2 births per woman for the set of 32 countries in Table 1.
Some analysts have argued that if period fertility remains significantly below the replacement level of 2.1 births for a long time, then the fertility of the cohorts who did their childbearing during these years cannot reach replacement fertility. This conclusion is not correct as is evident, for ex-

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>2.12</td>
<td>1.89</td>
<td>0.23</td>
</tr>
<tr>
<td>Austria</td>
<td>1.69</td>
<td>1.51</td>
<td>0.18</td>
</tr>
<tr>
<td>Belgium</td>
<td>1.84</td>
<td>1.59</td>
<td>0.25</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1.95</td>
<td>1.85</td>
<td>0.10</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2.02</td>
<td>1.89</td>
<td>0.13</td>
</tr>
<tr>
<td>Denmark</td>
<td>1.89</td>
<td>1.57</td>
<td>0.32</td>
</tr>
<tr>
<td>Estonia</td>
<td>1.99</td>
<td>1.99</td>
<td>0.00</td>
</tr>
<tr>
<td>Finland</td>
<td>1.95</td>
<td>1.72</td>
<td>0.23</td>
</tr>
<tr>
<td>France</td>
<td>2.10</td>
<td>1.80</td>
<td>0.30</td>
</tr>
<tr>
<td>Germany</td>
<td>1.65</td>
<td>1.41</td>
<td>0.24</td>
</tr>
<tr>
<td>Greece</td>
<td>1.93</td>
<td>1.64</td>
<td>0.29</td>
</tr>
<tr>
<td>Hungary</td>
<td>2.02</td>
<td>1.81</td>
<td>0.21</td>
</tr>
<tr>
<td>Iceland</td>
<td>2.49</td>
<td>2.18</td>
<td>0.31</td>
</tr>
<tr>
<td>Ireland</td>
<td>2.41</td>
<td>2.40</td>
<td>0.01</td>
</tr>
<tr>
<td>Italy</td>
<td>1.65</td>
<td>1.38</td>
<td>0.27</td>
</tr>
<tr>
<td>Japan</td>
<td>1.84</td>
<td>1.65</td>
<td>0.19</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.75</td>
<td>1.53</td>
<td>0.22</td>
</tr>
<tr>
<td>Macedonia</td>
<td>2.29</td>
<td>2.25</td>
<td>0.04</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.85</td>
<td>1.55</td>
<td>0.30</td>
</tr>
<tr>
<td>New Zealand</td>
<td>2.34</td>
<td>2.02</td>
<td>0.32</td>
</tr>
<tr>
<td>Norway</td>
<td>2.09</td>
<td>1.78</td>
<td>0.31</td>
</tr>
<tr>
<td>Poland</td>
<td>2.18</td>
<td>2.15</td>
<td>0.03</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.90</td>
<td>1.75</td>
<td>0.15</td>
</tr>
<tr>
<td>Romania</td>
<td>2.16</td>
<td>2.05</td>
<td>0.11</td>
</tr>
<tr>
<td>Russia</td>
<td>1.83</td>
<td>1.89</td>
<td>−0.06</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2.17</td>
<td>2.12</td>
<td>0.05</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1.87</td>
<td>1.64</td>
<td>0.23</td>
</tr>
<tr>
<td>Spain</td>
<td>1.75</td>
<td>1.58</td>
<td>0.17</td>
</tr>
<tr>
<td>Sweden</td>
<td>2.04</td>
<td>1.85</td>
<td>0.19</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1.77</td>
<td>1.54</td>
<td>0.23</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.96</td>
<td>1.80</td>
<td>0.16</td>
</tr>
<tr>
<td>United States</td>
<td>2.02</td>
<td>1.88</td>
<td>0.14</td>
</tr>
</tbody>
</table>

NOTE: CFR includes estimated remaining fertility to age 50. TFR estimates for Australia and New Zealand are from United Nations 2001 and refer to the period from mid-1980 to mid-1995.

ample, from the data for France. The TFR in France has been below 2.0 since the early 1970s, and the average TFR for 1980–94 was 1.80. Despite this low period fertility, the 1960 cohort is expected to have 2.1 children. A similar pattern is observed in Australia, Czech Republic, Hungary, Norway, and Sweden. The reasons for these differences between cohort and period fertility are explored further in a later section.

Birth-order components of fertility

The birth-order components of cohort or period measures of fertility are the parts of these measures that are attributable to births of given orders. For example, the first-order component of completed cohort fertility (CFR₁) is simply the average number of first births per woman, which equals the proportion of the cohort that has had a first birth during their lives; the second-order component (CFR₂) is the average number of second births per woman, which equals the proportion that has had a second birth, and so forth. The sum of these components equals the CFR. None of the birth-order components exceeds one, because women can have no more than one birth of any order, and the components decline in size as birth order rises, because no woman can have a birth of a given order without also having had a birth of the preceding order. Similar components can be calculated for the TFR. For example, the component for births of order 1 (TFR₁) equals the average number of first births women would have by age 50 if they were to bear first births at the age-specific rates observed in a given year or period. Throughout the present analysis order refers to the biological birth order of the mother, and data from countries registering births by order within current marriage are therefore not used. Figure 1 illustrates the birth-order decomposition for cohort and period fertility in Japan (Sato 2001). The 1960 cohort on average had 1.84 children, which is the sum of 0.84 births of order 1, 0.70 of order 2, 0.26 of order 3, and 0.05 of order 4 and higher. Similarly, the total fertility rate for 1980–94 was 1.65 births per woman, which is the sum of 0.73 births of order 1, 0.64 of order 2, 0.24 of order 3, and 0.04 of order 4 and higher.

The first-order component of cohort fertility (CFR₁) is of special interest because, by subtracting it from 1.0, we obtain the proportion childless among women in the cohort. For example, the CFR₁ for the 1960 cohort in Japan equals 0.84, which means that 16 percent of these women are childless. Figure 2 plots estimates of the CFR₁ for the 1960 cohort for 17 countries for which these data are available. The CFR₁ ranges in size from 0.97 in Bulgaria to 0.82 in Italy, indicating levels of childlessness of 3 percent in the former country and 18 percent in the latter.

A comparison of these cohort results with the first-order component of period fertility (CFR₁ for the 1960 cohort and TFR₁ for 1980–89, respec-
FIGURE 1 Completed fertility (1960 birth cohort) and total fertility rate (1980–94), Japan

![Completed fertility and total fertility rate chart]


FIGURE 2 Completed cohort fertility (1960 birth cohort) and period total fertility (1980–89) for first births

![Completed cohort fertility and period fertility chart]

tively4) in the same countries reveals substantial differences (see Figure 2). Specifically, the period-based estimates suggest, implausibly, that childlessness is much more common than the level calculated for cohorts in most of these countries. An explanation for the unexpectedly small sizes of these first-order components of period fertility is given shortly.

Timing of childbearing

The most widely used indicator of timing is the mean age at childbearing (MAC). The MAC can be measured either for cohorts or for specific periods, but the focus here is on period measures of timing. In European countries the MAC for 1995 was typically in the late 20s, ranging from 24.3 years in Bulgaria to 30.2 years in Ireland and the Netherlands (Council of Europe 2000). Similar averages are obtained in Japan (29.4) and the United States (26.8) (Sato 2001; Ventura et al. 1997).

Changes over time in the mean age at childbearing are the result of two demographic factors. The first is the decline in higher-order births that occurs as countries move through their fertility transitions. Fertility declines are observed at all orders but they are usually far larger at higher than at lower orders. In other words, in contemporary societies with fertility around 2 births per woman, most women have at least one birth as was the case historically, but the proportion of women with third and higher-order births is much smaller than in the past. As a result, the mean age at childbearing declines even if there is no change in the timing of births of each order. The second factor is the change in the timing of births of specific orders. The net effect of these two factors varies among countries. In many contemporary developing countries the decline in higher-order births is occurring more rapidly than the rise in the timing of individual births, so that the mean age at childbearing is declining (Bongaarts 1999a). In contrast, in most contemporary industrialized countries the rise in the mean age at first and higher-order births is occurring so rapidly that their effect exceeds any birth-order composition effect. The mean age at childbearing has therefore risen over the past two decades in most developed countries (Council of Europe 2000).

For present purposes the trend in the mean age at first births (MAC1) is of special interest, because it is the key factor determining trends in higher birth orders. Figure 3 plots trends in MAC1 for a number of large developed countries. In each of these the mean age at first birth has risen sharply since the mid-1970s. During the 1980s increases exceeding one year per decade were observed in many European countries including France, Germany, Italy, and the United Kingdom as well as in Japan and the United States. This upward trend continued unabated in the 1990s in most countries, although in the United States the MAC1 leveled off briefly around 1990.
Evidence pertaining to women’s childbearing intentions and a comparison of these intentions with actual fertility can shed light on current childbearing behavior. Table 2 shows the average number of children ultimately wanted by women aged 30–34 for 15 countries participating in the Fertility and Family Surveys project undertaken in the ECE region (which includes the US and Canada) in the early 1990s. This preference indicator is obtained by adding the number of children a survey respondent already has to the additional number wanted over the remainder of her reproductive years. Average ultimate wanted family size for these women is quite similar within this group of countries, ranging from 2.0 children per woman in Austria and Germany to 2.5 in Sweden. There is little variation between preferences of women in the 30–34 age group and women of other age groups. Changes in preferences from successive surveys are not available for most of these countries. Exceptions include the US and the Netherlands, where preferences have been essentially unchanged since the 1970s (Peterson 1995; De Graaf 1995).

The preferences for the age group 30–34 were selected for inclusion in Table 2 because this age group represents cohorts born around 1960 (the surveys were mostly conducted in the early 1990s). These preferences can be compared with the CFR for the 1960 cohort to determine the level of preference implementation. In an ideal world women would bear the num-
ber of children they want, but this clearly is not the case in contemporary developed countries. A comparison of the wanted number of children with the completed fertility estimates from Table 1 shows that completed cohort fertility falls well short of women’s preferences. The shortfall averages 0.3 births per woman in this set of countries. The reasons for the shortfall are likely to include competing preferences for a career, marital disruption, celibacy, and infecundity. This finding suggests that efforts to help women overcome the various obstacles to implementing their preferences would lead to higher fertility, with cohort fertility at least potentially not far below replacement level.

**Distortions of period fertility measures**

The preceding discussion summarized recent levels and trends in period and cohort fertility, their birth-order components, and their timing. I turn next to an examination of the interrelations among these measures.

**Empirical evidence of tempo distortions**

Demographers have long known that changes in the timing of childbearing affect the relationship between cohort and period fertility. Norman Ryder
(1956, 1964, 1980, 1983) has written a series of influential articles exploring the relationship. He demonstrated that period fertility is lower than cohort fertility when the mean age at childbearing rises and the reverse is true when the mean age at childbearing declines. In effect, when successive cohorts delay childbearing their births are spread out over a longer period than would be the case if the timing were constant; the result is a reduction in period fertility. Conversely, when successive cohorts are advancing their childbearing, their births accumulate more rapidly in periods, thus inflating period fertility relative to cohort fertility. These effects are sizable: one year’s worth of births are lost/gained for every one year rise/decline in the timing of childbearing during a specific interval of time. The difference between period and cohort fertility caused by changes in the timing of births is called the tempo or timing effect. Analytically, this tempo effect may be considered a distortion; it renders conventionally measured TFRs difficult to interpret.

The existence of timing distortions is readily documented when the age at childbearing is declining rapidly. In that case, implausible results are usually obtained for birth-order components of the TFR. For example, as shown in Figure 4, in most years during the 1950s $TFR_1$ in the United States exceeded 1.0, which would literally mean that women had more than one first

**FIGURE 4** Total fertility rate for birth-order 1 and mean age of women at first birth, United States, 1950–60

![Graph showing total fertility rate for birth-order 1 and mean age of women at first birth in the United States from 1950 to 1960.](source)

birth on average. This is impossible and these $TFR_1$ estimates must therefore be reinterpreted. The main reason why $TFR_1$ is higher than 1.0 during many baby boom years is that the age at childbearing declined, with the $MAC_1$ changing from 23.3 years in 1950 to 22.4 years in 1960. This decline resulted in a temporary inflation of $TFR_1$. The size of this tempo distortion at birth-order 1 can be roughly estimated as the difference between the average $TFR_1$ in the 1950s and the $CFR_1$ of the 1930 cohort, which had most of its first births during the 1950s. The average tempo distortion was positive and equal to 0.10 birth (or 11 percent) in the US during the 1950s, because the average observed $TFR_1$ was 1.00 and the $CFR_1$ for the 1930 cohort was 0.90.

A negative tempo effect is more difficult to document, because an examination of observed birth-order components of the TFR does not produce obvious inconsistencies. However, a persuasive case for such an effect can be made in a number of contemporary countries. For example, as shown in Figure 5, the average $TFR_1$ during the 1980s in Denmark was 0.68. If taken at face value this estimate implies that 32 percent of women would remain childless. This is clearly an unrealistic estimate, because the actual level of childlessness for the 1960 cohort (which had most of its first births in the 1980s) is 12 percent as its $CFR_1$ equals 0.88 (Sardon 2001). In this case, the $TFR_1$ contains a downward distortion because the mean age at

**FIGURE 5** Total fertility rate for birth-order 1 and mean age of women at first birth, Denmark, 1980-90
first birth rose by 1.9 years from 24.5 to 26.4 years during the 1980s. The size of this tempo distortion is –0.20 births per woman, or 23 percent below the cohort level.

These comparisons of the fertility of the 1960 birth cohort and period fertility during the 1980s for birth-order 1, and the relationship of their difference to the timing of first births have been repeated for 18 additional countries. Results from this exercise are summarized in Figure 6. The horizontal axis plots the change in the mean age at first births during the 1980s (i.e., MAC₁ in 1990 minus MAC₁ in 1980) and the vertical axis plots the tempo effect measured as the percentage difference between the CFR₁ of the 1960 cohort and the average TFR₁ during the 1980s. că Each point in this figure represents one country. For example, Denmark, the country with the largest negative distortion during the 1980s, had a –23 percent distortion and a 1.9-year increase in MAC₁. In contrast, the United States during the 1950s experienced an upward distortion of 11 percent because the MAC₁ declined by 0.9 years. In general, the preceding analysis indicates that the tempo effect should be 0 when MAC₁ is constant, it should be negative when MAC₁ rises, and it should be positive when MAC₁ declines. The results pre-

![Figure 6](image-url)

**Figure 6** Relationship between the tempo effect (percent) at birth-order 1 and the increase in mean age of women at first birth, selected countries, 1980–90, and United States, 1950–60

Sources: Council of Europe 2000; Sardon 2000, 2001; Sato 2001; Bongaarts and Feeney 1998.
presented in Figure 6 confirm these expectations: the tempo effect is strongly and inversely associated with the change in the mean age during the 1980s \((R^2 = 0.95)\). This finding provides clear support for the existence of tempo distortions of period fertility.

**Theoretical estimates of tempo effects**

Up to this point only empirical evidence for a tempo effect has been examined. I now discuss the magnitude of the tempo effect expected on theoretical grounds and then compare the two approaches.

In a recent study, Bongaarts and Feeney (1998) propose a procedure for removing tempo effects from the total fertility rate. They demonstrate that (provided fertility is influenced only by period effects\(^6\)) the observed total fertility rate in any given year is related to the total fertility rate that would have been observed in the absence of tempo effects as

\[
TFR_o = (1-m_o)TFR'_o.
\]

In this equation \(TFR_o\) is the observed total fertility rate component for birth-order \(o\), \(TFR'_o\) is the tempo-free total fertility rate component for birth-order \(o\), and \(m_o\) is the annual absolute change (in years) in the mean age of the age-specific fertility schedule for birth-order \(o\) during the year the TFR is observed. Multiplying the tempo-free \(TFR'_o\) by the distortion component \((1-m_o)\) yields the observed \(TFR_o\). For example, according to equation (1), an annual increase of one-tenth of one year in the mean age at childbearing \((m_o = 0.1)\) reduces the \(TFR_o\) by 10 percent below its tempo-free level, because in that case \(TFR_o = 0.9TFR'_o\). Similarly, an annual decline in the mean age by just 0.1 year per year \((m_o = -0.1)\) inflates the \(TFR_o\) by 10 percent. Apparently, modest changes in the timing of childbearing at any birth order can produce substantial changes in observed period fertility. These tempo effects operate instantaneously, that is, a change up or down in the timing of childbearing from one year to the next as measured by \(m_o\) results in simultaneous changes in the TFR relative to the tempo-free TFR.

In practice the \(TFR_o\) is observed, and the unobserved tempo-adjusted fertility can be estimated from

\[
TFR'_o = TFR_o/(1-m_o).
\]

By dividing the observed total fertility rate by \((1-m_o)\) at any given birth-order \(o\), one obtains an estimate of the total fertility rate that would have been observed had there been no change in the timing of childbearing. Applying this equation separately to all birth orders and adding the results gives the overall tempo-free total fertility rate: \(TFR' = \sum TFR'_o\). The difference \(TFR' - TFR\) equals the absolute tempo effect.
The tempo-adjusted TFR’ should be interpreted as a variant of the conventional TFR. The conventional 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 is likely to experience these observed period fertility rates. The adjusted TFR’ is a similar hypothetical measure, but one in which the distortions caused by tempo changes during the year have been removed. 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. The goal of the TFR’ is simply to remove tempo distortions in observed total fertility rates.

The above tempo-adjustment formula (2) has been analyzed by Kohler and Philipov (2001). They advance a more general equation that incorporates variance effects, but their formula reduces to equation (2) when the shape of the fertility schedule is invariant.

Finally, to compare the theoretical and empirical analyses, we make use of the fact that cohort fertility equals the tempo-adjusted period fertility when cohort and period fertility are constant (but not necessarily equal) and the mean age at childbearing at each order changes by a constant amount each year (Bongaarts and Feeney 1998). In practice these conditions are not observed in any actual population, but during the 1980s these conditions were approximated in many developed countries for births of order 1. In that case the tempo effect at order 1 calculated by comparing the 1960 cohort with period fertility during the 1980s (as in Figures 2 and 6) should be the same as the tempo effect calculated from equation (1) from the annual mean change in the age at first birth during the 1980s. According to equation (1) the proportional tempo distortion of the average TFR$_1$ during the 1980s equals minus $m_1$ ($\text{MAC}_1$ in 1980 minus $\text{MAC}_1$ in 1990 divided by 10): the more rapid the rise in $\text{MAC}_1$, the larger the downward tempo distortion. This implies that in a plot of $m_1$ versus the proportional tempo distortion during the 1980s, countries should lie along a straight line going through the origin with a negative slope. This expected model relationship is plotted in Figure 6 as the dashed line. This line is very close to and statistically indistinguishable from the observed pattern plotted in Figure 6, indicating that in this set of countries the observed tempo effect calculated as the ratio of period to cohort fertility for birth order 1 is well predicted by $(1 – m_1)$. In other words, the empirical and theoretical analyses of the tempo effects are consistent with each other.

**Estimates of tempo-adjusted TFR**

The tempo effects that so clearly affect the TFR$_1$ also affect the TFR components for birth orders 2 and higher. These tempo effects at higher orders can
be larger or smaller than those at order 1 depending on the annual changes in the mean ages at different orders. As was explained above, the adjustment procedure for eliminating tempo effects is applied separately to all orders, and summing these order-specific results then produces the adjusted TFR'. Since the data required for the tempo adjustment were not available in the precise form needed, an indirect procedure was used to calculate the mean ages of births of orders above the first, as described in the Appendix. These results should be regarded as approximations. Estimation of the TFR' with this procedure was possible in 19 countries for the period 1980 to the late 1990s, with the latest available year varying slightly among countries.

The results of this exercise are summarized in Table 3, which provides average observed and tempo-adjusted TFRs for two periods, 1980–94 and 1990 to circa 1997. Results for France, Germany, and the United Kingdom could not be included in this table because available statistics give births by order within current marriage rather than by biological order for the mother as required for the application of the tempo-adjustment procedure. The main finding in Table 3 is that the tempo effects (measured in births per woman)
in the last two columns with the single exception of Russia for 1980–94 are negative. This implies that observed TFRs in the 1980s and 1990s in low-fertility countries contain a downward distortion. As expected, the magnitude of the tempo effects varies among countries, with the largest effects in the 1990s in Spain (–0.42), the Czech Republic (–0.40), and Greece and Italy (–0.34). In most countries the negative tempo effect is larger in the early 1990s than in the 1980s.

A comparison of the average tempo-adjusted total fertility rate for 1980–94 in Table 3 and the completed fertility of the 1960 cohort in Table 1 reveals generally small but significant differences in a number of countries. These differences are due to three distinct factors: a) the approximate nature of the current estimates of TFR’ (owing to the unavailability of published data needed for its calculation); b) violations of the assumptions on which the tempo-adjustment equation (2) is based; and c) variations in cohort and period fertility over time. In other words, the TFR’ and the CFR would have been equal if the data for the calculation of the TFR’ were available and accurate, if the assumptions underlying equation (2) were not violated, and if cohort and period fertility were constant. When only the first two of these conditions are valid, then the tempo-adjusted TFR’ is not equal to the CFR, but the TFR’ gives an accurate estimate of the total fertility rate that would be observed in the absence of changes in the timing of childbearing. Of course, in reality, the assumptions on which equation (2) are based are also not entirely valid, and estimates of TFR’ are therefore approximate.

Tempo and quantum of fertility

The implication of the preceding analysis is that observed total fertility rates are determined by both the quantum and tempo of period fertility. The terms quantum and tempo are used here to refer to components of the TFR observed during any given year as proposed by Bongaarts and Feeney (1998). The quantum component is what the TFR would have been without tempo effects, that is, the quantum equals the tempo-adjusted TFR. The tempo component is the difference between the quantum component and the observed TFR. This formulation 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 those cohorts. In Ryder’s cohort-based formulation, quantum and tempo are observable quantities, if only after the cohorts in question have completed their childbearing years. In the alternative formulation used here, the terms quantum and tempo have meaning and can be calculated only on the basis of a conceptualization that introduces the tempo-adjusted TFR, a new indicator not used by Ryder.
Trends in period fertility are the net result of trends in tempo and quantum. There are two situations in which an analysis of tempo effects is of special interest. The first is in countries where the tempo effect is large. This is the case, for example, in Italy and Spain during the 1990s as already noted. In these two countries the effect is large and negative, which implies that the observed TFR (1.27 and 1.25, respectively) is substantially lower than the undistorted rates of 1.62 and 1.68. The second situation where an analysis of the tempo effect is important is in countries where it is changing rapidly. In such circumstances both the level and trend of the TFR can give misleading impressions, and tempo trends can mask underlying quantum trends. An example of this occurred in the United States in the late 1980s. Between 1985 and 1990 the TFR rose from 1.84 to 2.07. However, this rise in the TFR was largely due to a disappearance of the tempo effect, and the tempo-free TFR remained nearly constant around 2.0 births per woman during this period (Bongaarts and Feeney 1998). Another example of a country with a clear downward trend in the tempo effect is the Netherlands during the 1990s. As shown in Figure 7, the tempo effect was about 0.35 births per woman at the beginning of the 1990s, but it declined to about 0.10 in 1998. The TFR remained relatively unchanged during most of this period, as the decline in the

**FIGURE 7  Observed and tempo-adjusted TFR, Netherlands, 1990-98**

NOTE: For discussion see text and Appendix.
tempo effect offset a decline in the tempo-free TFR. In the late 1990s the TFR
turned up slightly and the reduction in the tempo effect is apparently in part
responsible for this upturn.

A rise in fertility has also been observed in 1999 in a number of other
European countries (Sardon 2001). Whether declines in tempo effects are
responsible for or are contributing to these slight upturns in fertility will
remain unclear until additional data become available.

Implications for future fertility

As in the past, future trends in the quantum and tempo of fertility will be
driven largely by socioeconomic, sociopsychological, and cultural develop-
ments. Most analysts attribute low and delayed fertility to the difficulties
women in contemporary industrialized societies face in combining child-
rearing with their education and a career, and to a rise in individualism and
consumerism (Frejka and Calot 2001; Lesthaeghe 2001; McDonald 2000;
vande Kaa 1987). These recent trends in childbearing are part of a larger
process of social and demographic change usually referred to as the second
demographic transition. In addition to declines in fertility, these new tran-
sitions are typically accompanied by widespread changes in attitudes and
behaviors regarding sexuality, contraception, cohabitation, marriage, divorce,
and extramarital childbearing (vande Kaa 1987). Lesthaeghe (2001) iden-
tifies the following set of factors affecting childbearing behavior in post-
transitional societies:

(i) increased female education and female economic autonomy; (ii) rising and
high consumption aspirations that created a need for a second income in
households and equally fostered female labour force participation; (iii) in-
creased investments in career developments of both sexes, in tandem with
increased competition in the workplace; (iv) rising “post-materialist” traits
such as self actualization, ethical autonomy, freedom of choice and tolerance
for the non-conventional; (v) a greater stress on the quality of life with a
rising taste for leisure as well; (vi) a retreat from irreversible commitments
and a desire for maintaining an “open future”; (vii) rising probabilities of sepa-
ration and divorce, and hence a more cautious “investment in identity.”

There is no agreement on which of these potential explanatory factors are
most important in determining fertility trends—in part because, as
Lesthaeghe (2001) aptly notes, “we have more explanatory factors than ob-
servations.” In any case, explanations are likely to vary from society to so-
ciety; and even if past behavior could be explained, the implications for
future fertility trends would not necessarily be clear, because many trends
may have run their course and new factors influencing fertility might emerge.
Future tempo effects

Although existing theory is of little help in projecting future trends in the quantum of fertility, it is possible to make some general predictions about the tempo component. Tempo effects are by their nature temporary. They exist only as long as the mean age at childbearing rises, disappearing when the change in the timing of childbearing ends. This is true regardless of the level of the mean age. The tempo effect becomes zero even if the mean age is high, provided the latter is constant.

The combined consequences of future changes in quantum and tempo effects can lead to a wide range of possible outcomes. Figure 8 presents two illustrative examples. Both scenarios assume that the current TFR is deflated by a significant negative tempo effect, and that this tempo effect will disappear at some unspecified point in the future because the mean age at childbearing will stop rising. The scenario presented in Figure 8a further assumes that the quantum remains constant at current levels. As a consequence of these two trends, the TFR will rise over time from its current level to equal the quantum, that is, the adjusted TFR. An example of such a trend is the United States in the late 1980s, as discussed earlier.

A second scenario is summarized in Figure 8b. In this case the quantum of fertility is assumed to continue to decline over time. The disappearance of the tempo effect again puts upward pressure on fertility, but the rise in the TFR is not as large as in Figure 8a because there is an offsetting decline in the quantum. This scenario corresponds roughly to trends ob-

---

**FIGURE 8  Fertility impact of future reductions in the tempo effect**

![Diagram](image-url)

a. Constant quantum  

b. Declining quantum

---

Total fertility rate  

Quantum (TFR')  

Tempo effect  

Observed TFR  

Mean age at childbearing  

Time  

---

Click to return to Table of Contents
served in the Netherlands in the 1990s as summarized in Figure 7. Of course if the future decline in the quantum is sufficiently rapid, then it is possible that no rise at all or a decline would be observed in the TFR, despite the disappearance of the tempo effect.

A number of other scenarios could be envisioned, although the two presented in Figure 8 are deemed most plausible. It is obviously not possible to predict trends in the quantum and tempo components in any future year. However, since the mean age at childbearing cannot rise forever, it must stabilize eventually. When that happens the disappearance of the tempo effect will put upward pressure on the observed TFR. In fact, even a slowdown in the pace of increase in the timing of childbearing reduces the size of the tempo effect and this in turn exerts upward pressure on period fertility.

It is of interest that the scenarios depicted in Figure 8 are consistent with the fertility projections made by the United Nations. As noted, the UN has recently abandoned its earlier assumption that all countries will eventually maintain fertility at the replacement level. The latest projections incorporate complex assumptions about future trends in fertility in countries with below-replacement fertility. The main assumption is that in the long run countries will level off at the completed fertility rate of cohorts born in the early 1960s, which implies TFRs in 2050 between 1.7 and 1.9 births per woman for most low-fertility countries (United Nations 2001). As is clear from the earlier discussion, this assumption implies significant increases from current TFRs in the large majority of developed countries. The reasoning behind the UN’s assumption is not spelled out in detail, but the implied disappearance of the tempo effects and resulting future trends in the observed TFR are broadly similar to those shown in Figure 8.

Conclusion

During much of the past half-century the attention of the scientific and policy communities has focused on fertility declines, particularly in the developing world. By the mid-1990s fertility transitions in most of these countries were well underway or even nearing completion, and these issues have therefore become somewhat less urgent. Attention has increasingly turned to a relatively new and unexpected development, namely the very low fertility observed in most post-transitional societies. The common past view among demographers that fertility would level off at or near the replacement level is now seen as ill-founded and indefensible (Demeny 1997). The aggregate concept of replacement fertility is a theoretical threshold that has little or no direct meaning for individual couples building their families. Coalescence on 2 as the model desired family size is, however, a micro-equivalent of replacement fertility.
What happens next is far from clear. The future course of fertility in countries where it is already at or below replacement is one of the most hotly debated topics in contemporary demography. There is no doubt that fertility in much of the developed world has reached historic lows and will almost certainly remain below replacement in the future. However, the present analysis has demonstrated that observed period fertility measures such as the TFR are temporarily depressed by a rise in the mean age at childbearing in most of these countries. This postponement effect has been present in many developed countries since the 1970s and could continue for years into the future. But once this rise ends—as it eventually must—the corresponding fertility-depressing effect stops, thus putting upward pressure on period fertility. When the tempo effect becomes smaller or disappears, the downward trend in period fertility could end, and a slight upturn is a distinct possibility. Such a rise could occur even while the mean age at childbearing is still rising, if the rate of increase becomes less steep than in the past. Additional upward pressure on period fertility would result if the obstacles that prevent women from achieving their desired family sizes could be removed. Women on average want about two children in contemporary societies for which preference measures are available. Although these preferences have been quite stable since the 1970s, there is, of course, no assurance that preferences will remain at current levels in the future. Moreover, removing existing obstacles to preference implementation is difficult and expensive.

In an analysis of the most recent fertility trends in the European Union (EU), Sardon (2001) concludes: “Fertility...increased in over half of the [EU] member states in 1999 (Netherlands, France, Belgium, Denmark, Finland, Luxemburg, Spain, Greece, Italy, Portugal) plus Norway and Switzerland.” This is a reversal of past trends even though the increases are small. It is too early to tell why the reversal is happening and whether it is a temporary phenomenon. In view of the analysis presented here this new development is not a surprise; indeed one would expect an end or reversal of the downward trend in fertility sooner or later. The implication is that countries with very low fertility and substantial tempo effects in the EU and elsewhere could well experience a period of modest rises in fertility in the near future if the timing of childbearing stabilizes. Even if this happens, however, it seems unlikely that fertility will climb back to the replacement level.
Appendix

Data for this study are primarily taken from Council of Europe (2000) and Sardon (2000, 2001). These references provide annual statistics for the following variables in many European countries:

- **TFR**: Total fertility rate (all birth orders combined)
- **TFR1**: Total fertility rate for births of order 1
- **MAC**: mean age at childbearing (all orders combined)
- **MAC1**: mean age at first birth
- **B**: total number of births (all orders combined)
- **B_o**: number of births of orders 1, 2, 3, 4, and 5+ (o is birth order)

Because these sources do not include estimates of **TFR_o** and **MAC_o** for birth orders above 1, the following indirect procedure was developed.

Estimates of the **TFR_o** for orders above 1 were obtained from

\[ TFR_o = (TFR - TFR_1) \frac{B_o}{B - B_1} \]  

(A1)

The mean ages at childbearing for birth orders higher than 1 were estimated as

\[ MAC_o = MAC_1 + (o-1)I \]  

(A2)

where **I** equals the interval between the mean ages at successive birth orders. **I** is assumed constant across birth orders but varies with time. The average age at childbearing is a weighted average of the mean ages at each order:

\[ MAC = (MAC_1 TFR_1 + (MAC_1 + I) TFR_2 + (MAC_1 + 2I) TFR_3 + (MAC_1 + 3I) TFR_4 + (MAC_1 + 4I) TFR_5) / TFR. \]  

(A3)

Rearranging gives

\[ I = TFR (MAC - MAC_o) / (TFR_2 + 2TFR_3 + 3TFR_4 + 4TFR_5). \]  

(A4)

Substitution of the order components of the **TFR** from (A1) in (A4) gives an estimate of **I** that when substituted in (A2) gives estimates of **MAC_o**. Application of equation (2) in the main text then produces estimates of the tempo-adjusted **TFR_o**.

Since direct estimates of **TFR_o** and **MAC_o** were available for the Netherlands from Eurostat (1997), it is possible to compare the above indirect procedure for estimating **TFR_o’** with the **TFR_o’** obtained directly from **TFR_o** and **MAC_o** for each year from 1980 to 1994. The average absolute error in the **TFR_o’** during this 14-year period resulting from the above indirect procedure was 0.008 births per woman. The smallness of this error suggests that the proposed indirect procedure is sufficiently accurate for present purposes. In general the procedure gives acceptable results in countries with very low fertility, but the accuracy declines as the proportion of fertility at birth orders 2 or higher rises. The procedure is not recom-
The author gratefully acknowledges comments on earlier drafts of this article from Brian Pence and financial support from USAID and the Hewlett and Mellon Foundations.

1 In this study the term developed world refers to what the UN (2001) calls the “More developed regions,” which comprise Europe, Northern America, Japan, Australia, and New Zealand.

2 Once the components of CFR are known, other order-specific measures can be calculated. For example, the parity progression ratio at parity o equals CFR_{o+1}/CFR_o and the proportion of the cohort that has exactly o births equals CFR_{o+1}−CFR_o.

3 It is computationally straightforward to calculate total fertility for any specific birth order. Instead of including births of all orders in the numerators of the age-specific fertility rates on which the TFR is based, only births of a single order are included and the same denominators are used. The result of such a calculation for each birth order o is a set of birth-order components TFR_o that when summed equal the TFR (TFR = ΣTFR_o).

4 For first births the period 1980–89 is used for comparison with fertility of the 1960 cohort, because the large majority of first births occur when women are between ages 20 and 30.

5 The tempo effect in percent is calculated as T=100*(TFR_i − CFR_i)/CFR_i. MAC_i is measured at the beginning of 1980 and 1990 to obtain the change during the 1980s.

6 The 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 move the level of period age-specific birth rates up or down and translation 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. For further discussion of this tempo-adjustment procedure see Bongaarts and Feeney (2000), Kim and Schoen (2000), and van Imhoff and Keilman (2000).

Notes


Production, Reproduction, and Education: Women, Children, and Work in a British Perspective

Heather Joshi

Production and reproduction are necessary activities to sustain human society, but it is often supposed that for women, participation in advanced economies and the bearing of children are incompatible. The increase in economic opportunities for women has been offered as an explanation of low fertility, and maternal responsibility as an explanation of women’s underachievement compared to men’s in the sphere of paid work. This article reviews the evidence for such incompatibility and its effects on women, childbearing, and children. A novelty of this synthesis is to consider outcomes for children alongside the more familiar theme of female employment and fertility. The story focuses on one country, Great Britain, but allows for differences within it according to levels of human capital. Such disaggregation is necessary because of the empirical heterogeneity of behavior, and also because of the implications of such behavior for the transmission of social inequality across generations. We return to this theme at the end.

Let us first review the theoretical connections between women’s paid work and motherhood. One presumed relationship is an effect of children on women’s earnings. That childbearing should reduce a woman’s lifetime earnings has, until recently, been treated as inevitable (Mincer 1962; Davis 1984). Such an effect implies another, on the number of children born, if the prospect of forgoing earnings would tend to discourage women from childbearing. The greater the potential loss, the less likely a woman would be to have any, or at least additional, children (Becker 1981; Cigno 1991; Ermisch 1996). Since educational attainment is expected to raise a woman’s earning power, it, too, would increase the earnings opportunity cost of childbearing. Therefore motherhood tends to be deterred, or at least deferred, among more highly educated women.
Now consider what mothers do for children. Mothers generally divert time from the labor market for the valuable purpose of childrearing. New Home Economics has coined the phrase home production for this unpaid or reproductive work. It has also coined child quality for one of its outputs. The more human capital a child obtains, in the form of ability, skill, health, and perhaps social support and contacts, the greater the resulting quality. It is suggested that, as birth rates fall with economic development, people, particularly the rich, substitute high child quality for large families (Becker 1981). Parents’ investment in reproduction does not cease after bringing children into the world. There is plenty of scope for cultivating child quality thereafter, in terms of both parental time and cash. Thus human capital of the parental generation is transmitted to the next generation. The inheritance may be cultural, genetic, or some combination. Those highly educated women who do have children would have the most to transmit and should, on average, produce the best-educated children. Potential conflict exists, however, between time devoted to employment and time devoted to childrearing. If children with employed mothers receive less time investment, and especially if there are negative influences, such as effects on children of maternal stress or inadequate day care, a tradeoff would occur between mother’s employment and child quality.

Intergenerational continuities in educational attainment would normally be expected to reinforce tendencies to social polarization, although other forces may tend in the opposite direction. If mothers’ employment holds back child development, could this be one such force? Is there a reverse cycle leading from riches to rags in two generations? In other words, are the high levels of employment of highly educated women leading to underinvestment in their children, setting up a countervailing undertow in the intergenerational transmission of advantage?

The evidence assembled here comes from research over the past 20 years on British women and children, by the author and a number of colleagues, using longitudinal evidence from sources described below. The review addresses three questions:

1. How do children affect women’s paid work and lifetime earnings?
2. How does women’s employment affect the quantity and timing of children born?
3. How does women’s employment affect the quality of children?

In the context of contemporary Britain, these relationships depend upon the woman’s own educational human capital, expressed in terms of formal (academic or vocational) qualifications. The educational system may not be entirely responsible for the greater economic success of the more highly educated, but qualifications mark stratification by earning power, which in turn has important demographic and social implications. For children, human capital or quality is assessed here mainly by the results of cognitive tests. Although
the cognitive tests are often labeled tests of “ability,” it is not clear how far they reflect learning at school or an endowment of the home background, whether inherited or acquired. Whatever their source, such test scores have been predictive of later success in school exams and in the labor market. I also make use of ratings of the children’s reported behavior.

The research surveyed involves relationships between generations and between sexes, and the balance of productive and reproductive activities. The aim to balance rather than juggle such activities is a central feature of the lives of women, children, men, and society at large, but is achieved differently in different social strata. The focus is on mothers, because that is where the evidence starts and the tension is most evident, but not where the questions end (see Joshi 1998; Folbre 1994). This synthesis is offered as a contribution to the scientific and policy debate in Britain and beyond. It is intended to encourage international comparisons in the application of demographic research to policy analysis, although a complete survey of the national, let alone international, literature is beyond the scope of this article. I also make no attempt to discuss ethnic or regional differences within Britain.

After an introduction to the longitudinal data and some descriptive background drawn from the Birth Cohort Studies, the three central sections of the article address the questions posed above. The first looks at influences of children on women’s earning power and employment participation. These are summarized in a simulation model of the influence of motherhood and education on a woman’s lifetime earnings. Section 2 looks at education and employment as influences on the number of children born. Section 3 turns to children and the associations between several of their cognitive and behavioral outcomes and mothers’ employment, educational qualifications, and family income. The diversity of results, notably by level of educational attainment, has implications for the understanding of social inequality and the formulation of policy related to combining paid work and parenthood. These implications are discussed in the concluding section.

Sources of longitudinal data

The unfolding of employment and family-building careers is better addressed by longitudinal data than by cross-sectional surveys. Britain is fairly exceptional in the range of longitudinal data sets now available. An extensive inventory of these resources has been published by the Office for National Statistics (ONS 2001) and also a website of the ONS/ISER. Notable among these are Britain’s longstanding nationally representative Birth Cohort Studies. The research reviewed here has used, among other sources, the first three of them, which have followed into adulthood people born in a week of 1946, 1958, and 1970. The Medical Research Council’s National Survey of Health and Development (NSHD), which follows people born in a week
in March 1946, is housed at University College London. From a follow-up subsample of around 40 percent of the original births in that week, around 4,000 have been followed into midlife, the latest of 22 contacts occurring at age 53 years in 1999 (see Wadsworth 1991). The studies of cohorts born in 1958 and 1970 are now housed in the Institute of Education. The 1958 cohort is known as the National Child Development Study (NCDS), and the British Cohort Study of 1970 is known as BCS70 (see Ferri 1993; Bynner, Ferri, and Shepherd 1997).

The NCDS and the BCS70 each started with around 17,000 births and collected data on around 12,000 cases at their latest sweeps, at ages 42 and 30 in 2000 (see Bynner, Ferri, and Wadsworth forthcoming). They had fewer contacts in childhood than NSHD (four each with the full cohort versus seven). Between age 16 and the 2000 surveys NCDS contacted the full cohort twice in interviews at ages 23 and 33, and BCS70 had one postal survey of the full cohort at age 26 (with 9,003 responses). The most recent data were not available for the research reviewed in this article, which made use of the NSHD only up to age 32 in 1978 and the NCDS only up to age 33 in 1991, looking at women’s wages in their early 30s and the effects of children on women’s employment. The special second-generation study of the children of one-third of the sample born in 1958 provides data on school-age children in 1991 (CHRR 1998). BCS70 is used here principally for outcomes in early adulthood in 1996, in relation to childhood experiences in the 1970s.

The British Household Panel Study (BHPS) is a complementary source of longitudinal data, a panel of households across Britain and across all ages, modeled on the US Panel Study of Income Dynamics (Taylor 1996). It started in 1991 with surveys conducted annually ever since. Another strand of the research cited here used data, including retrospective employment histories, from the first four waves of the BHPS, up to 1994, as a major source of evidence on wages, employment, and income. Unlike the cohort studies, it covers all ages, but neither source covers whole lifetimes. Where lifetime data do not exist, it has been possible to invent them (Joshi and Davies 2002). Synthesized scenarios, based upon models fitted to the BHPS data, are presented in section 1 below. Two other major longitudinal sources have also been consulted: the ONS Longitudinal Study, which links over 800,000 records from the census and vital registration, and the 1980 Women and Employment Survey, with a pioneering set of retrospective life-event histories for women (Hattersley and Creeser 1995; Martin and Roberts 1984).

Although few other countries have a comparable portfolio of longitudinal data resources, there is scope for making international comparisons with at least parts of the following analyses. Some of the replications that have already been done are mentioned in sections 1 to 3 below, involving for example the French record-linkage study Echantillon Démographique Permanente and the US National Longitudinal Survey of Youth.
Key indicators of change

Table 1 presents several key indicators of relevant change in the economic and demographic life of the British population as seen through the lives of the members of the three cohort studies. Between those born in 1946 and in 1970 the level of educational attainment changed markedly, especially for women. The table shows a rise from 11 percent to 32 percent in the proportion of women with higher educational qualifications (requiring study at university, college, or other post-school-level training—the top two levels, 4 and 5, in the hierarchy defined in note 1). The fraction with higher

Table 1: Key indicators of economic and demographic change: Evidence from the British Birth Cohort Studies

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Survey and year of birth</th>
<th>NSHD 1946</th>
<th>NCDS 1958</th>
<th>BCS70 1970</th>
<th>Sourcea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent with no educational qualifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>42</td>
<td>14</td>
<td>5</td>
<td></td>
<td>For BCS70 Joshi and Paci 1997</td>
</tr>
<tr>
<td>Men</td>
<td>43</td>
<td>12</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent with tertiary qualifications (level 4 and above)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>11</td>
<td>25</td>
<td>32</td>
<td></td>
<td>Joshi and Paci 1998: Table 3.5; Joshi and Paci 1997</td>
</tr>
<tr>
<td>Men</td>
<td>22</td>
<td>28</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio of women’s to men’s wage at age 26 (23 for 1958 cohort)</td>
<td></td>
<td>0.63</td>
<td>0.84</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Percent of women who were mothers by age 26</td>
<td></td>
<td>72</td>
<td>50</td>
<td>30</td>
<td>Macran, Joshi, and Dex 1996; Joshi and Paci 1997</td>
</tr>
<tr>
<td>At selected levels of educational qualification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None (0)</td>
<td>81</td>
<td>69</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-level (2)b</td>
<td>65</td>
<td>47</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher/tertiary (4+)</td>
<td>31</td>
<td>18</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of women employed in their early 30s</td>
<td></td>
<td>25</td>
<td>37</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td></td>
<td>29</td>
<td>32</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td></td>
<td>25</td>
<td>37</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Median gap in employment after first child (years)</td>
<td></td>
<td>5.5</td>
<td>2.2</td>
<td>n.a.</td>
<td>Macran, Joshi, and Dex 1996</td>
</tr>
<tr>
<td>Sample size at age:</td>
<td></td>
<td>32</td>
<td>33</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>2,751</td>
<td>5,583</td>
<td>5,447</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>2,875</td>
<td>5,786</td>
<td>5,772</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n.a. = not available.

aUnless otherwise specified the estimates are taken from the preliminary report on all three studies (Bynner, Ferri, and Wadsworth forthcoming). The editors’ permission is gratefully acknowledged.

bO level and equivalent (level 2). Details of the scheme for classifying educational levels are given in note 1.

qualifications classified as degrees (university level 5) included in these proportions rose from 3 percent to 17 percent (through 11 percent for women in the 1958 cohort). Women’s educational attainment was rapidly catching up with men’s (and at some levels overtaking them). In the labor market, female disadvantage was also rapidly diminishing. Women in the labor force from the 1946 cohort, at age 26 in 1972, were paid on average 63 percent of the hourly wage received by their male contemporaries. In 1981, when the 1958 cohort were age 23, the wage ratio had risen to 84 percent; and by 1996, the women in the 1970 cohort were receiving over 90 percent of men’s wages. This increase may be partly attributable to the relative rise in education and the accumulation of labor force experience, but the earlier and bigger increase also reflects the introduction of the Equal Pay Act in 1975 (Makepeace et al. 1999; Joshi forthcoming). Although the equal opportunity policies had their limitations, they helped to improve women’s prospects in the labor market. Meanwhile, women in their 20s were experiencing an even more marked change in the proportions becoming mothers. By age 26, which is a point of contact for both the 1946 and the 1970 cohorts, nearly three-quarters (72 percent) of the women born in 1946 had borne at least one child. For the 1958 cohort, 26 was the age (identified in retrospective birth histories) at which half the cohort had entered motherhood. By 1996, only 30 percent of the 1970 cohort reported having done so. By the time the cohorts were next contacted, at age 30 for BCS70, age 33 for the 1958 cohort, and age 32 for the 1946 cohort, the proportions with children had risen, to 54 percent, 76 percent, and 87 percent respectively (not shown), but the differences between them were still marked. The cohort studies also show how entry to childbearing was, and remains, highly differentiated with respect to educational qualifications. In all cohorts, the least educated tend to start childbearing before the more educated, as shown in Table 1, but the postponement within each selected educational level means that the overall trend is not just a product of more women attaining higher levels of education. At age 26, there is a gap of around 50 percentage points in the proportion of each cohort that have become mothers between those with no educational qualifications and those with tertiary qualifications (degree plus other level-4 diplomas). The qualified catch up in their 30s, but only partially.

The postponement of childbearing helps to explain the rising rates of labor force participation, particularly in full-time employment, shown in Table 1, but there is also a rising level of labor force participation among women with children of a given age. This is illustrated by a dynamic measure of labor force participation, the time it takes before a mother resumes paid work after the birth of her first child. For the 1946 cohort this was 5.5 years, itself a change from the 8.0 years we observed for their mothers’ generation, but for the 1958 cohort it was down to 2.2 years. The equivalent data are not yet available for the 1970 cohort, but other evidence indi-
cating that the majority of eligible women take advantage of maternity leave provisions suggests it is likely to be under one year.

Children’s impact on women’s paid work

The wages of motherhood

How much a British worker is paid per hour can be quite well predicted by the individual’s educational and employment experience (human capital) and sex, at least in data collected around the beginning of the 1990s. Especially for a woman, whether or not she is in a full-time job also matters, part-time jobs being on the whole less well paid for a given level of human capital. In our analysis of two birth cohorts in their early 30s, it is possible also to include, as part of human capital, a measure of ability from childhood4 (Joshi and Paci 1998; Makepeace et al. 1999). Comparing the two ends of the educational spectrum, the value of having a university degree rather than no formal educational qualifications is estimated as an 80 percent gain, for 33-year-olds in full-time jobs, for someone of given ability and experience. A year of recent experience raised the full-time wage of these 33-year-olds by about 7 percent for women and about 10 percent for men (Joshi and Paci 1998: Table 4.3).

We also sought to ascertain whether the presence of children reduced women’s pay beyond the downward influence of their lesser work experience, their greater chance of being in part-time jobs than childless women, and mothers’ lower educational attainments. On the whole, these three factors together were sufficient to explain the 39 percent gap between mothers’ pay and childless women’s pay, among 33-year-olds born in 1958 and also among 32-year-olds born in 1946. For mothers, the fact that they had part-time jobs and less human capital accounted for their lower pay. Among full-time workers born in 1958 we found one group of mothers who encountered labor market penalties over and above those predicted by the human capital model: mothers in full-time jobs who had taken more than a one-year break from employment at the time of their first birth. Their wages were marked down 17 percent. The mothers who took little or no more interruption beyond maternity leave (generally, but not universally, seven months after a birth) were paid as highly as childless women (Joshi and Paci 1998: chapter 6; Joshi, Paci, and Waldfogel 1999). We speculate that this penalty to combining motherhood with staying at home longer could arise because of lower training, poorer promotion prospects, or poorer job match on return to the labor market, rather than, as Becker (1985) suggested, because motherhood makes a woman too tired to put as much effort into her productive work as contributed by her childless colleagues.5

The apparent immunity of women in professional careers, in the 1958 cohort, to the pay penalties of motherhood needs to be viewed with caution.
They did face penalties of gender. We have little evidence, until the 2000 sweep of NCDS at women’s age 42 is analyzed, as to whether mothers in professional careers were as successful as other women, or as men, in ascending the career ladder. Does a glass ceiling represent more of a barrier for women with children than for women in general? This question remains on the research agenda.

We next analyze the wages of women of all ages, from the BHPS in 1994 (Davies, Peronaci, and Joshi 1998), done as part of our work on income over the life cycle. This confirms the broad picture: the payoff to women holding a degree (vs. having no educational qualifications) is about 100 percent higher earnings for full-time work, controlling for experience but not ability. The payoff to experience was steeper for the more educated, though it leveled off during midlife. Toward the beginning of a career, the loss in full-time earnings, per year taken out of the labor force, would be about 10 percent for the highly educated and 8 percent for the less highly educated. As in the cohort studies, men and women were paid unequally for a given level of human capital. This fact is relevant to the issues relating to women and children, as the higher price on a man’s market time will tend to reinforce the tradition in which mothers rather than fathers adapt their market work. Also the low pay of women in general may arise from employers’ expectation that they will eventually assume a domestic role, even if they are not currently committed to such a role.

The extent to which mothers’ wages fall short of other women’s, sometimes called the “family gap,” varies a good deal across countries. Harkness and Waldfogel (forthcoming) present evidence and analysis for seven industrialized countries. Before and after the controls in their regression analysis, Britain stands out as having by far the greatest family gap. In a sample of women of all ages (rather than the 33-year-olds considered above), the adjusted shortfall for a woman with two children was 32 percent in Britain, nothing significant in Sweden and Finland, and intermediate (around 10 percent) in Australia, the United States, Canada, and Germany. A good part of the exceptional position of Britain could be attributed to the low pay of part-timers, but the authors suggest that the international differences may best be understood in the context of the different family policies across countries.

Effects of motherhood on participation in production

In the early years after World War II the employment of mothers was frequent only among working-class families in certain regions of Great Britain. In the next few decades regional and socioeconomic differentials narrowed (Joshi 1985; Joshi and Hinde 1993). In evidence about women’s paid work collected for the years leading up to the Women and Employment Survey in 1980, the dominant predictor of whether a woman would have full-time employment was the absence of responsibility for children (Martin and Roberts 1984). Mothers of preschool children were mostly at home,
and mothers with children at school were typically employed part-time, often doing jobs at a lower skill level than they had attained before their employment break (Dex 1987; Joshi and Newell 1997). Most mothers combined employment and childrearing on terms that compromised, but did not completely sacrifice, lifetime earnings (Joshi 1990a; Dex and Joshi 1999). Schools were a major source of day care, free but not unlimited.

The dominant pattern of interrupting employment while children were below school age was also found in Germany and the Netherlands, but was not characteristic of other industrial countries (Kempeneers and Lelievre 1991; Drew, Emerek, and Mahon 1998). Whether as cause or effect, countries with more nearly continuous employment by mothers (e.g., France and Scandinavia) have a larger infrastructure of institutions providing child care (Joshi and Davies 1992; Gornick, Meyers, and Ross 1997; Meyers, Gornick, and Ross 1999), as also remarked by Harkness and Waldfogel (forthcoming).

By the 1990s the British picture had changed substantially. The majority of mothers of preschool children were in paid work. Over two-thirds returned to employment for at least a portion of the year after the birth of their first child (Callender et al. 1997). A growing minority sustained a full-time career, punctuated only by maternity leave and facilitated by the purchase of child care. As summarized in the “median gap in employment after first child” in Table 1, we compared the length of employment breaks taken by mothers up to 1978 and 1991 in the 1946 and 1958 cohort studies, respectively (Macran, Joshi, and Dex 1996). There were sharp contrasts at higher levels of educational attainment. Among those born in 1958, well over half the graduates who had become mothers by age 33 had resumed employment within a year of their first birth, whereas for graduate mothers in the 1970s, it took more than five years before half had returned to a job. At the other end of the scale, for women with no qualifications there was little difference between the cohorts: in both cases the median gaps were also around 5.5 years. We saw a widening gap emerging among British mothers (Dex, Joshi, and Macran 1996), although women’s earnings had hitherto had an equalizing impact on income distribution (Davies and Joshi 1998). Women in professional careers are paying women with little education to care for their young children. Other mothers are still largely relying on jobs within the teaching profession to balance career and childrearing.

The same pattern of social divergence appeared in BHPS in the 1990s, in the study we did for the Women’s Unit of the Cabinet Office (Rake 2000). This used a simulation model developed over a number of years from my first attempt to quantify the cash opportunity cost of childbearing in Britain (Joshi 1990a). The model relies on generating employment and earnings histories for “typical” individuals with a given level of educational qualifications. It is based on stylized biographical assumptions and the parameters of models fitted to cross-sectional earnings and participation data, along with a summary of labor market experience. Past work experience helps predict wages,
which help predict employment and feed into estimated income. The simulation assigns a woman to employment in any year when her predicted probability of employment exceeds 50 percent, and to full-time or part-time work according to whichever is more likely. Unlike Calhoun and Espenshade’s (1988) estimates of lifetime earnings forgone by US mothers, it does not attempt to simulate a whole population. (Details of the method are set out in the appendix of Rake 2000 and in Davies, Joshi, and Peronaci 2000.) This method has also been applied to France, Germany, and Sweden (Joshi and Davies 1992; Davies and Joshi 1994) and to the Netherlands (Dankmeyer 1996). In our 1980-based model Britain, Germany, and the Netherlands looked fairly similar, but mothers’ forgone earnings were much smaller in France and Sweden, as they also appeared to be in the United States according to the different methodology of Calhoun and Espenshade. Our more recent simulations of earnings lost to motherhood, based on 1994 data, are very similar to the 1980-based “Tale of Mrs Typical” (Joshi, Davies, and Land 1996), but only for some groups of women. These are the low-skilled, and indeed the mid-skilled if they embark on childbearing early (up to their mid-20s).

Figure 1 shows the gross earnings profiles constructed for a hypothetical woman with the low earning power of someone with no educational qualifications using parameters from the 1990s for illustrative numbers of children born. She is assumed to have her first child at age 23 and to take a nine-year break from employment if she has two children. She returns to

**FIGURE 1** Annual earnings for women with no educational qualifications over the lifetime

![Graph showing annual earnings for women with no educational qualifications over the lifetime](source: Rake 2000: Figure 3.5.)
the labor market initially part-time, and when she eventually resumes full-
time employment her pay does not reach the level it would have done had
she remained childless and in uninterrupted employment. The earnings tra-
jectory of such a childless counterpart is plotted in the solid black line. The
area between this solid line and the others represents forgone earnings for
each number of children. For two children this amounts to 58 percent of
earnings for the period from the year of the first birth up to assumed retire-
ment at age 65.

For women with the earning power of someone with mid-level edu-
cational qualifications who have accumulated earning power through de-
ferring the first child to age 28, which is the current average age at mother-
hood of all women, the simulated earnings losses are much smaller (see
Figure 2). In the simulated scenario the woman does not leave paid work,
apart from paid maternity leave, until the birth of the second child, and
then takes only two years’ leave if she has no further births.9 The earnings
loss for a family of two averages around one-fourth of post-childbearing
earnings, rather than over one-half.

Women with university degrees and thus high earning power had be-
come more numerous by the 1990s, and they were also likely to defer moth-
erhood until at least age 30, as assumed here. For them the simulated earn-
ings loss from motherhood is minimal (see Figure 3). There is no loss of
earnings at all associated with the first birth at age 30 (assuming maternity

**FIGURE 2** Annual earnings for women with mid-level educational
qualifications over the lifetime

![Graph showing annual earnings for women with mid-level educational qualifications over the lifetime.](source)

SOURCE: Rake 2000: Figure 3.5.
leave during full-time employment is fully paid); for a second birth one year of part-time employment is assumed, and this rises to two years at each of the third and fourth births for the hypothetical mother of four. In the case of a mother with four children, earnings drop after each interruption, and when she returns to full-time employment her wages for some years are marginally below those of university graduates with fewer or no children. Nevertheless the earnings conceded to motherhood by graduate mothers of either two or four children are on a much smaller scale than by the less-educated women. These “earnings regained” are likely to be partly offset by increased expenditure on child care. Women with high earning power are more likely to be able to afford to invest in unsubsidized private child care services.

Figure 4 summarizes the categories of earnings loss for a mother of two children. For the low earner the losses are roughly evenly divided between lost years, lost hours, and lost pay (embracing the part-time penalty as well as the consequences of losing experience). At the high-level end of the scale there is no loss of years, and what loss there is comes mainly from working two years part-time rather than full-time. For women with mid-level educational qualifications the mother’s employment profile and earnings losses are sensitive to the age at which she bears her first child (see Figure 5). If she starts motherhood early, the model implies that she drops

**FIGURE 3** Annual earnings for women with high-level (graduate) qualifications over the lifetime

![Graph showing annual earnings for women with high-level qualifications over the lifetime.](image-url)

**SOURCE:** Rake 2000: Figure 3.5.
out of paid work for seven years. Her earnings loss has the same composition as, but is worth more than those lost by women with low-level qualifications. Beyond age 27 she would stay in the labor force between the two births and take only a short break after the second.

The implications of forgone earnings for lifetime income are complicated by the interplay of taxes, benefits, pension contributions, pensions, and the sharing of net income within the family. These are also explored in the model of lifetime incomes (Rake 2000). The main point here is that the greater the extent to which old-age income support is a function of pre-retirement earnings, and the longer a mother has forgone earnings, the greater will be the projected cash penalties of motherhood when a woman is aged 65 and older. The scenarios presented here imply differing degrees of financial independence for the different hypothetical women in old age as well as during family building.

Mothers’ employment in Britain in the 1990s acquired a socially structured diversity. Compromises to combine motherhood with employment are still being made. They take several forms: flexible hours, part-time work, shift work, term-time work (i.e., working only when school is in session), teleworking (i.e., working from home), and so on (Dex and Joshi 1999). Full-time workers, especially, invest in formal child care, but “informal” par-
The constraints facing single mothers are (or have been) particularly stark, for part-time earnings may well be insufficient for a sole breadwinner, and the child care services to support full-time employment may not be available or affordable. Nor, until the end of the 1990s, have means-tested benefits for single parents encouraged paid work (Joshi 1990b). During the 1980s and 1990s single mothers were less likely than married mothers to have paid work.

Men also face limited options in combining parenthood and paid work. Work organization and culture seldom make it easier for a father than for a mother to adapt time to accommodate domestic tasks (Joshi 1998). Higher rates of pay for men usually mean that a two-parent family loses less in earnings if the father rather than the mother gives priority to earning.

The impact of women’s productive role on the quantity of children

Does women’s participation in the economy reduce their fertility? The view that women’s entry into the labor force lowers the number of children born
is widespread but not universally accepted. Some demographers hold that ideational factors and contraceptive technology lie behind internationally similar fertility trends in developed countries (Lesthaeghe and Surkyn 1988; Murphy 1993; Hobcraft 1996). Although these factors are not necessarily incompatible with materialist explanations of motivation, there is not much British evidence that economic incentives or constraints have a substantial or long-term effect on completed fertility.

Table 2 summarizes two indexes of cohorts’ completed fertility—the average number of children born and the proportion of women having at least one child—alongside an alternative summary measure of fertility, the synthetic period total fertility rate, and a synthetic measure of cohort labor force attachment. It considers cohorts of women born at 12-year intervals between 1922 and 1970 and takes the data from the official registrations in England and Wales, not the Birth Cohort Studies themselves, though these have provided the last three years of births represented. Going back 12 years from 1946 includes the 1934 birth cohort, which had peak cohort fertility in the baby boom of the 1960s, and were at age 30 in 1964 when the period fertility indicator was at its peak. The 1922 cohort is included to show pre-peak experience, although the fertility trough came earlier (to those born in the first decade of the twentieth century).

It is well established that cohort fertility varies little compared to period indicators, which are sensitive to birth timing. Over about 30 years the average number of children per woman did not deviate greatly from the 2.1 needed for cohort replacement. Following the peak of the baby boom,

<table>
<thead>
<tr>
<th>Birth cohort</th>
<th>Completed cohort fertility (1)</th>
<th>Period total fertility rate in year aged 30 (2)</th>
<th>Percent having at least one child by 45 (3)</th>
<th>Percent having at least one child by 30 (4)</th>
<th>Long-term indicator of employment attachment (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922</td>
<td>2.05</td>
<td>2.16</td>
<td>82</td>
<td>73</td>
<td>.64</td>
</tr>
<tr>
<td>1934</td>
<td>2.42</td>
<td>2.93</td>
<td>89</td>
<td>82</td>
<td>.74</td>
</tr>
<tr>
<td>1946</td>
<td>2.19</td>
<td>1.91</td>
<td>91</td>
<td>84</td>
<td>.78</td>
</tr>
<tr>
<td>1958</td>
<td>1.98a</td>
<td>1.82</td>
<td>82a</td>
<td>68</td>
<td>.83</td>
</tr>
<tr>
<td>1970</td>
<td>1.81b</td>
<td>1.66</td>
<td>77c</td>
<td>58</td>
<td>[.85]d</td>
</tr>
</tbody>
</table>

*Based on data to age 42.
Illustrious extrapolation well out of range of evidence used in model. See source for column 5.
SOURCES: Cols. 1–4: Birth registration statistics for England and Wales. Col 5: This synthetic indicator of long-term labor force attachment was used by De Cooman, Ermisch, and Joshi 1987. It was based primarily on analysis of the proportion of the female population by single year of birth who were employees, over the years 1950–74, adjusted for their age, current responsibility for children, and the business cycle (eventually published in Joshi and Overton 1988). The labor force attachment of the more recent cohorts was extrapolated with reference to the educational qualifications reported in the 1971 census.
completed fertility has fallen by less than half a child for the cohorts who have so far approached the end of their reproductive span. The period fertility indicator fluctuated over the corresponding years—ranging more widely from 2.93 to 1.66. Given that the changes in cohort fertility have themselves been modest, the long-term trend toward stronger female labor force attachment could at most have had a modest effect, among other factors. To investigate the presumed relationship, we used the index, shown in Table 2, of a cohort’s underlying labor force attachment net of current responsibility for children, in a multivariate model of parity-specific births between 1952 and 1980 (De Cooman, Ermisch, and Joshi 1987). We intended to capture the idea of Butz and Ward (1979) that the proportion of women who expected to be in a two-earner couple would affect fertility responses to labor market signals. At the bivariate level there is not much prima facie evidence of a fertility–employment tradeoff for the cohorts up to 1958. For the cohorts born before 1934, labor market attachment and fertility were both growing strongly in the same direction. After the start of the “baby bust,” female labor force attachment, measured in this way, continued to rise, but its growth had slowed. Nor did we detect much impact of the growth in cohort labor force attachment on births in our multivariate analysis, also controlling inter alia for women’s and men’s wages and unemployment. Any long-term relationship in recent years and in the uncompleted fertility of women born in the 1960s and 1970s remains to be seen.

The main conclusion of our econometric time-series analysis (further elaborated by Ermisch 1998) was that influences from the labor market on fertility behavior are more likely to be felt in tempo than in quantum, and that improvements in women’s labor market prospects in the 1970s associated with the Equal Pay Act intensified the postponement of births, particularly first births at that time. This aspect of the variation in fertility timing in the postwar period is also shown in Table 2, comparing the proportion of women who had become mothers (or who are projected to do so) by age 45 and by age 30, the halfway point in the childrearing span. The former ranges relatively modestly from 82 percent for the 1922 cohort to a peak of 91 percent for the 1946 cohort, dropping back to 82 percent for the 1958 cohort and to a projected 77 percent for the 1970 cohort. The range of 14 percentage points represents an increase in childlessness by age 45, contributing to the modest fall in average births per woman. The proportion of women who had already borne their first child by age 30—ranging from 84 percent for the 1946 cohort to 58 percent for 1970 cohort—shows that once the baby bust was underway it involved a delay in the start of childbearing (also apparent in the cohort study data in Table 1 and evident in other European countries; Gustafsson 2001).

Childbearing at all parities among women in their early 20s has been exceeded in numbers by births to women in their early 30s. Despite this general trend to later childbearing, childbearing under age 20 has changed little
in quantity since the late 1970s. This contrasts to a continuing downward trend in teenage fertility in Europe, but resembles the situation in other English-speaking countries (Coleman and Chandola 1999). Social differentials in the timing of entry to motherhood are not confined to Britain, but they are not identical in other settings. Comparing Britain and France, Ekert-Jaffé et al. (2002) find that social differentials in birth probabilities are becoming more marked in Britain and less so in France. As suggested in Table 1, differential timing of motherhood according to women’s education and the rise in the latter have helped to account for the average delay in British first births.

Early motherhood is increasingly confined to unmarried, uneducated women whose alternative prospects on the job market are poor (The Social Exclusion Unit 1999). The better educated a woman is, the more likely she is to defer childbearing, particularly in more recent cohorts. In NCDS, at age 33 in 1991, only 16 percent of the least-qualified women had not yet had children, compared with 46 percent of university graduates (Dale and Egerton 1997). At least one-third of the childless graduates reported that they would like to have children, and some have gone on to do so in their later 30s and their 40s (42 percent of female graduates in the age 37 subsample were still childless in 1995). The proportion not wanting any children is small, though larger among university graduates, 8.6 percent, than for the cohort as a whole, 5.0 percent. Although the final tally for the 1958 cohort is not yet known, it appears that the most highly educated women are more likely to end up having fewer children, and to have them at later ages, than women who finished their education sooner and started childbearing at younger ages.

Is the reproductive shortfall of the educated the result of employment or education? Highly educated women usually become mothers and often avoid having to sacrifice labor market opportunities, but they usually have to face the challenge and the cost of making child care arrangements. The association between education and earning power could even produce a positive effect on family size. As John Ermisch (1989) pointed out, higher earning power implies greater ability to purchase child care. As options emerge to combine motherhood and employment, the grounds to expect women’s employment to have a large negative effect on fertility have weakened (Bernhardt 1993). Although there is clear evidence that opportunities for women in education and jobs change the timing of childbearing, we suggest that adaptations in employment, as discussed earlier, may have limited the adaptations British women have needed to make to their long-term fertility aspirations.

The outcome for children

What consequences do the increased education and employment of women have on the “quality” of children? Might there be relationships here that either redress or worsen any effect on the quantity of children born in Britain
in recent decades? Recall the idea that education should, on average, make people productive in their unpaid as well as paid activities, thus raising the input received by their children. On the other hand, paid employment may reduce parental investment in a child’s upbringing. This section considers effects on British children of their mothers’ human capital and employment.

Our estimates of child outcomes are taken from several analyses of the one-third sample of children whose parents were members of the 1958 NCDS. The interviews took place in 1991, when the cohort members were aged 33 while their children ranged in age from 0 to 17 years. We looked at the children who were old enough to take tests, all of whom therefore had parents who were relatively young at the time the children were born. The regressions, primarily designed to assess relationships between family structure, maternal employment, and cognitive development, also controlled for maternal ability and education, providing estimates of interest in themselves. Regarding family structure, we may note that the negative impact of single motherhood and of step families on cognitive outcomes was substantially accounted for by the poor economic circumstances of these families (Joshi, Cooksey et al. 1999).

It is always necessary to be cautious about treating the terms estimated in these regression models as effects, since causality cannot be strictly proven (see Ní Bhrolcháin 2001). In the case of these intergenerational analyses of the cohort studies, such an interpretation is not, however, unreasonable. Many predictors clearly refer to dates before the presumed outcomes, notably when the reference is to the parent’s own childhood, which conclusively rules out reverse causation. The rich set of measured information collected as lifetimes unfold rather than retrospectively also helps to reduce the possibility of unmeasured factors generating spurious correlation. One example of the value of such prospective data collection is that assessments of abilities in childhood, which cannot be recalled in a cross-sectional sample of adults, can be matched against later outcomes.

The impact of mother’s human capital on child development

Before turning to the estimated effects of mother’s employment on child development, we consider those of mother’s education and human capital, since the impact of employment cannot be assessed without also controlling for the “quality” of the mother’s earning power. In our study of maternal employment, child development was measured in the NCDS second-generation study in two cognitive tests, reading and mathematics, and two summaries of behavior reported by the mother. Our models control for mother’s cognitive ability assessed in a childhood test and subsequent educational attainment, as well as the child’s age, sex, and birth order, the family living standard as proxied by type of housing tenure, and family structure (full details
given in Joshi and Verropoulou 2000, available from the author). The mother’s cognitive ability measured in childhood, by her general ability score at age 11 years and her score on a reading test at age 7, is one of the prospectively measured predictors. It probably reflects a combination of genetic factors and early environment at home and at school. These had strongly significant effects on the offspring’s reading, math, and aggressive-type behavior (although there is no effect on anxious-type behavior). A 10-point increase in both the mother’s ability and attainment scores (about half a standard deviation) appears to raise her child’s reading score by 5 percent, raise the math score by 3 percent, and reduce the aggression score by 2 percent. Thus there is some parent-to-child transmission, but it is not perfectly determined. Many of these children also succeed or fail despite the parental precedent.

Note also that the estimated impact of a girl’s ability score on her own earning power as an adult is not dissimilar to its estimated “return” in reproducing “quality” in her children—or at least in the replication in children’s test scores. The apparent payoff to having a 10-point higher general ability score at age 11 is a 4 percent gain in hourly pay at age 33, midway between the payoff in the child’s math and reading scores. To the extent that the ability term reflects a genetic inheritance, this similarity may not be surprising, but it also suggests that productive people not only have higher earnings but are more productive in unpaid work.

We also found that mother’s formal qualifications are positively associated with children’s cognitive scores (the math and reading tests), and with the rating for aggressive behavior, but again not for anxiety. Her qualifications are also associated with children’s performance in the Peabody Picture Vocabulary Test (McCulloch and Joshi 2001, 2002). The magnitude of these effects depends on what else is being held constant and is reduced by the inclusion in the regression of the mother’s test scores in childhood (Joshi and Verropoulou 2000). However, the payoff to educational qualifications (unlike ability) is clearly better on the labor market than in childrearing. The payoff on the wage rate to mothers from having a degree versus no qualifications was 74 percent in full-time and over 100 percent in part-time jobs (Joshi and Paci 1998: Table 6.3). The differentials attributable to the same contrast in mother’s qualifications on the reading, math, and aggression scores of their children are about 10 percent. We also found that the benefit of mother’s education on child development manifests itself more clearly through the provision of a cognitively stimulating home environment than through the effects of mother’s ability more generally (McCulloch and Joshi 2001). Material as well as human resources appeared important, at least in the longer term, for child development in our other studies (Joshi, Cooksey et al. 1999; McCulloch and Joshi 2002). Parental aspirations for their child and their interest in his or her education also play a role. The association of such aspirations with successful outcomes in young adults has been shown by Wadsworth (1991) and Schoon and Parsons (2002).
Mother’s employment

Our study of maternal employment looked for an impact on children of their mother’s taking paid work, after allowing for the family’s current living standards (Joshi and Verropoulou 2000). A mother’s employment was measured at various stages of the child’s first five years and at the time of the interview when the children were aged between 5 and 17. It was not until we introduced the mother’s ability as measured in her own childhood test scores that any significant negative relationship between maternal employment and children’s test scores emerged.16 Even then, the main picture of our results, for these relatively young mothers, was that the impact of maternal employment was mixed and minor.

The impact of a mother’s being employed rather than staying at home at various ages of the child is assessed in terms of the child’s cognitive and behavioral scores measured during school ages. All comparisons are made with mothers staying at home. The first is with mothers who took any paid work when the child was under age 1. The second and third comparisons are of mothers who did any full-time paid work during the years the child was aged 1–4 (under school age), separately for mothers whose only paid work in that pre-school period was part-time. Finally, two comparisons with nonemployed mothers are made at the time of interview, when children are aged anywhere between 5 and 17 years and mothers may be employed either full-time or part-time. These sets of comparisons form the horizontal axis of Figure 6. The vertical axes measure estimates of the differences between the employed mothers and those at home on four indicators of the child’s development. The scores are adjusted for the age of the child and other family circumstances. Estimates are expressed as a score relative to 100, where the best possible score is set to 100 and the index shows the percentage of correct (or well-adjusted) responses on the items in each test. Thus the vertical axes measure how far the offspring of employed mothers differ from other children in terms of their marks out of 100.

Figure 6 summarizes the estimated effects and the margins of error around them. Few have confidence limits that exclude zero. One such significant estimate is for reading by the child at school age and the mother’s employment in the first year of that child’s life: a lower score by around 2 percentage points. But the negative impacts on other outcomes were not significant, and we found a couple of significant positive estimates. Children were slightly less anxious if the mother had a part-time job after the child’s first year, especially if she currently worked part-time.

We pursued the notion that certain effects of early maternal employment might only come to light in adolescence or later and would not have been apparent in our analysis of the NCDS second-generation study. We turned to the 1970 cohort, where parents at all ages are represented, and looked at the members of this cohort as young adults in 1996 (Joshi and
FIGURE 6 Effects of mother’s employment on child scores, with 95 percent confidence intervals

Score out of 100

Math

-4% 0% 4%

Age 0 Age 1–4, full-time Age 1–4, part-time Age 5–17, full-time Age 5–17, part-time

Reading

-4% 0% 4%

Nonaggressive behavior

10% 0% -10%

Age 0 Age 1–4, full-time Age 1–4, part-time Age 5–17, full-time Age 5–17, part-time

Nonanxious behavior

10% 0% -10%

Age of child at time and hours of mother’s job

SOURCE: Joshi and Verropoulou 2000, using the NCDS second-generation study.
We analyzed outcomes by whether their mothers had been employed when children were under age 5 years (in the early 1970s) and by the family’s educational and economic background. Cohort members’ test scores at age 10 were not related to mothers’ early employment, although they were related (positively) to social class and parents’ schooling, and (negatively) to indicators of poverty.

We have thus found little evidence that the “working mother” is jeopardizing child development greatly, especially if the benefit of her earnings is brought into account. A similar remark formed the subject of the presidential address to the Population Association of America in 2000 (Bianchi 2000). Suzanne Bianchi pointed to the paradox that increasing time being spent by American mothers in the labor market had little or no deleterious effect on their children. She examined factors beyond the tradeoffs between women’s financial contributions to the household and time spent with children, and suggested that one answer may be that the amount of time devoted to children has not changed much. It may have been no greater in the past, when families were large and housework was arduous. She also pointed to increases in the time fathers spend with children and the time children spend out of the home. Evidence for Britain points in the same direction (Jenkins and O’Leary 1995). Fathers’ participation in domestic work and child care seems to be greatest also in dual-earner, dual-degree families (Dale and Egerton 1997; Joshi and Davies 2000). Mothers with full-time jobs sacrifice leisure and sleep in order to compensate for time that otherwise could not be spent with children. Thus, we cannot necessarily assume a one-to-one tradeoff between the quantity of time in paid work and the “quality time” devoted to children. Given appropriate support, people with multiple roles may make better use of their time through combining multiple tasks more efficiently.

Discussion and implications

Motherhood in Britain is combined with employment through varying degrees of compromise. At one extreme is the career woman who balances baby and briefcase. Many do not attempt her feat, some who do so abandon the attempt, and others simply stay at home when their children are small or take part-time jobs. A few reject all the options for raising children and remain childless. Well-educated women experience the smallest loss of earnings at motherhood, but they are also the most likely to postpone or avoid it. Economic opportunities for women do not appear to be seriously jeopardizing the quantum of reproduction. The quality of children has a large random element, but it is positively affected in part by the mother’s cognitive ability and education and by parental affluence. Children’s performance is not much affected by mothers’ taking paid work, except for small shortfalls in test scores associated with employment when children are infants, and in
children’s eventual formal qualifications. There are also signs of behavioral development gains in children of employed mothers. Perhaps these mixed, minor, and variable results reflect the adjustments that many mothers make in order to provide for their children. The offspring of the most advantaged reap the benefits of the human and material endowment, without, in general, much handicap from having two-career parents.

If there are negative long-term outcomes for children of early maternal employment, this does not mean that the only way to prevent them is to discourage women from working. There are other considerations: the value to the child of the resources the earning parents bring into the home; the quality of day care; the terms on which employment is organized and its hours; and the way in which an employed mother spends her available time with her child. It is not known to what extent quality time with children is affected by paid work. Other unknown factors in the sort of multipurpose, but home-based data sets used here are the day care settings for children who go to them, the quality of the schools that children attend, the culture and flexibility of workplaces, and neighborhood amenities. Knowing more about such factors would help answer the central question about the way in which parenting and production are being combined and would indicate ways in which the options may be improved. What are the terms on which parents may balance multiple tasks? Balancing job, children, and home is difficult for any family, but especially for low earners. The options facing families—about hours of work, affordable child care, or child care alternatives at home—need to be improved and diversified.

In this article we have made limited reference to countries other than Britain, but one should not expect these results to apply uniformly across industrialized countries, given the variety of institutional arrangements that may promote or hinder the combination of women’s productive and reproductive roles (Pfau-Effinger 1998). Formal and informal institutions differ across countries in the provision and pricing of child care, in the wages accessible to women, in the terms on which families are taxed, and above all in the norms about acceptable and feasible practice. The grounds for expecting women’s employment to have a noticeable effect on the number of children born have weakened. Eva Bernhardt (1993) and Britta Hoem (1993) pointed out that women in Scandinavia were among the first to be able to pursue a “combination strategy.” Alena Heitlinger (1993) suggested that institutional arrangements such as Sweden’s would be more supportive of reproduction than more traditional models of gender roles. This theme is elaborated by Jean-Claude Chesnais (1996) and Peter McDonald (2000), looking at the balance between gender equity in the family, the market, and the state, in the wider context of the fertility transition.

To round off, I return to the question of how education is intertwined with reproduction and production in Britain. The New Labor government of 1997 has extolled education as a priority, if not a panacea. Can it solve the
problems of production, reproduction, and redistribution? Education may reduce reproduction somewhat, but it compensates by increasing production (and home production) through raising the skill or human capital of at least some who receive it. But does it solve the issues of equity: between men and women; between generations (children, parents, and grandparents); or, within generations, between the most and the least advantaged?

To take the last issue first, we have seen that education is associated with differential outcomes and is most beneficial to those whose own endowment of social and parental capital is already auspicious. The home and the school have tended to act as complements rather than substitutes, as illustrated by our comparison of young adults in the 1958 and 1970 cohorts (Bynner, Joshi, and Tsatsas 2000). The analysis presented here suggested that maternal employment may be widening economic disparities between families. Compensatory or remedial interventions, such as Sure Start (modeled on the US Head Start), are underway. On the question of equity within generations there is the issue of whether sustaining the continuous careers of the highly qualified requires an army of cheap child care labor from less-qualified women. Such a market solution is a far cry from high-quality mass child care with staff trained in child development, as can be found in Sweden, where the welfare state is committed both to child welfare and to equality among adults.

On the question of equity between generations, there must be limits on the extent to which educational interventions can simultaneously benefit the elderly and families with young children. Although some elderly citizens may welcome access to lifelong learning, many would also welcome better compensation in their pensions for a lifetime subordinating paid employment to reproduction and caring (Arber and Ginn 1991; Joshi and Davies 1994; Joshi, Davies, and Land 1996).

Finally, the evidence on gender equity suggests that increases in education reduce the difference in earning power between men and women and the difference in hours of paid and domestic work of couples. Remaining differences range from the under-representation of women in top-level jobs to the long paid hours and low domestic participation of most fathers. The impact of education is almost inevitably uneven across the social spectrum. It could be a long or futile wait for gender equity to be introduced by educational stealth. Positive encouragement is needed to improve the attainments of women in the productive sphere but is also much needed to improve the balancing of paid and unpaid work for both men and women. Diverse circumstances require diverse solutions. We subscribe to the growing belief that these circumstances will be improved if the renewal and development of the next generation in the family can be pursued without requiring the subordination of women. Reproduction is worthy of public appreciation and support, and as a venture in which government, employers, schools, fathers, and mothers need to work together.
The work synthesized in this article took place over 20 years and has benefited from the help of many people. Much of it results from collaboration with the late Hugh Davies of Birkbeck College, London. Many other coauthors are identified in the bibliography. For the various projects surveyed here I have received financial support from the Economic and Social Research Council, the Leverhulme Trust, the Nuffield Foundation, the Joseph Rowntree Foundation, the Smith Institute, and the Cabinet Office Women's Unit. The article is based on a Professorial Lecture published by the Institute of Education in 2000 under the title "Production, reproduction, and education: Women, children, and work in contemporary Britain."

Figures 1 to 5 are reproduced from Rake (2000) with the permission of the Cabinet Office Women and Equality Unit and The Stationery Office; Figure 6 is reproduced by permission of the Smith Institute.

Women’s educational human capital is measured in terms of the highest educational qualification reported to surveys, broadly classified, grouped into:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>University level (&quot;degree&quot;); includes B.A., M.A., Ph.D., and some professional qualifications;</td>
</tr>
<tr>
<td>4</td>
<td>Other tertiary qualifications and diplomas usually obtained after leaving school at age 18; this used to include teaching and nursing diplomas now treated as degrees;</td>
</tr>
<tr>
<td>3</td>
<td>“A-level”—roughly equivalent to US high school diploma or European baccalaurcate, usually taken at school around age 18, equivalent vocational qualifications;</td>
</tr>
<tr>
<td>2</td>
<td>Mid-level examinations usually taken around age 16 (includes &quot;O levels&quot; and higher grades of the GSCE, which replaced O level and CSE in the mid-1980s), equivalent vocational qualifications;</td>
</tr>
<tr>
<td>1</td>
<td>Lower level of &quot;some qualifications&quot; below &quot;O level,&quot; CSE, low grades of GSE, low-level vocational qualifications;</td>
</tr>
<tr>
<td>0</td>
<td>No formal qualifications.</td>
</tr>
</tbody>
</table>

These levels cover academic and vocational qualifications. They are normally associated with increasing years of schooling beyond the minimum school leaving age, now 16, which has itself been rising over time. But the relationship is not exact. For example, it is possible to continue one’s education to age 18 without obtaining qualifications as high as level 3, and it is also possible to acquire qualifications at the higher levels after having joined the labor force at an early age. Thus, though still very rough and ready, the level of the highest qualification is a more consistent indicator of earning power than is a measure of the quantity of formal schooling received, which is in any case less consistently reported in the sources used.

2 As is the fourth national birth cohort study, the Millennium Cohort Study, with subjects born over 12 months in 2000–01.

3 Comparison with birth registration data indicates this is an underestimate for the whole population, possibly connected with low response to the postal survey. The official figure for England and Wales is 43 percent of women having borne at least one child by age 26.

4 Our models investigated possible biases from selection into full- and part-time employment and into motherhood, but we did not attempt to model choices about education.

5 Rejecting such an assertion accords with the result of another analysis, where the outcome was mortality, based on the ONS Longitudinal Study. We found little evidence that mothers carrying the double burden of job and children were facing a higher risk of premature death (Weatherall, Joshi, and Macran 1994).

6 Funded by the Leverhulme Trust.

7 Evaluated after 5 years. The penalty per year lost falls to under 2 percent after 20 years.

8 The controls were age, education, ethnicity, region, urban residence, and marriage, but not work experience. The coefficients have been transformed to express percentages as a percent of mothers’ pay, as above. Another feature of the data, which cover all ages of women, is that increasing differentials with the number of children are apparent in this analysis based on the Luxemburg Income Study.

9 The probabilities of participation or non-participation are fairly close while children are young, so in practice many variants of this tra-
jectory will be observed, including “back to the kitchen sink” transitions out of full-time employment.

10 Apart from an acceleration of third-birth probabilities toward women’s late 20s and away from the late 30s as labor force attachment rises. An argument for why such a positive relationship might be expected between an acceleration of birth intervals and labor force orientation has been offered by Ní Bhrolcháin (1986).

11 This study is a rare example of a comparison of the census-linked datasets that exist in the two countries: the ONS Longitudinal Study and the Echantillon Démographique Permanente.

12 Work sponsored under the Economic and Social Research Council’s Children 5–16 Programme and by the Smith Institute in association with Harriet Harman M.P.

13 Our evidence does not necessarily apply to children whose cohort member parent was over age 28 at the time the children were born. We will not be able to test whether our results can be generalized to children of older parents within the 1958 cohort because further follow-ups of the second generation have not been funded. Nevertheless, this is an extraordinary opportunity to link observations on children with information about the parents collected a generation earlier. We are able to use childhood test data and other variables to observe differences between parents, and we do control for mother’s age, although it is still true that generalization to other children requires caution.

14 For cohort members who had become mothers by age 33 in both full- and part-time jobs, also controlling for education and work experience—Joshi and Paci 1998: Table 6.3.

15 Many of the most highly qualified mothers did not yet have children, if any, old enough to take the tests.

16 This resembles the sequence of findings in similar studies, on different data, by Ermisch and Francesconi (2001) and Ruhm (in press), although there is some difference in the emphasis accorded to the emergence of a negative finding.

17 I prefer “mother who does paid work.” All mothers work, not just those some of whose work is paid.

References


Click to return to Table of Contents


Kempeneers, Marianne and Eva Lelievre. 1991. Employment and Family Within the Twelve. (Eurobarometer 34), Brussels: Commission of the European Communities.


Children’s Economic Roles in the Maya Family Life Cycle: Cain, Caldwell, and Chayanov Revisited

RONALD D. LEE
KAREN L. KRAMER

According to Caldwell’s (1976) theory, wealth in traditional societies flows upward from children to their parents. Cain’s (1977) classic study of a village in Bangladesh found that cumulative production by male children exceeded their cumulative consumption by age 15, lending support to Caldwell’s view. More recent empirical research has questioned these results (Kaplan 1994; Lee 1994c and 2000; Stecklov 1999; and Kramer 1998 and 2002). This subsequent research has found that children are costly to their parents and that in fact wealth flows downward from parents to children.

Our findings in this article are consistent with the view that children are costly to their parents. Using time-allocation data for a group of Maya agriculturists in Yucatán, Mexico, we show that children nonetheless do have an important economic role in the family’s life, even if their net asset value up to the time of leaving home is negative. On the one hand, their individual economic contributions offset a substantial portion of their individual costs. On the other hand, the economic contributions of the earlier-born children enable parents to continue childbearing during family life cycle stages when they themselves might not have sufficient time to support their family (Kramer and Boone 2002). Chayanov’s (1966 [1925]) analysis of the economic–demographic life cycle of the peasant family provides a useful framework for investigating these aspects of children’s contributions.

Many demographic changes occur after a union is formed and the family life cycle unfolds. Children are born. Early-born children become productive workers while their mothers are still in their childbearing years. Later-parity children are born into the family as older siblings leave their
natal households and establish households of their own. Finally, parents age and become grandparents while they still have dependent children living at home. Because both consumption and the capacity for work vary over a person’s life course, and because a family contains varying numbers of people at each age as it moves through its life cycle, a family’s consumption demands and its labor supply are determined not only by its size, but also by its age-sex structure. It is this dynamic process of family maturation, and shifting consumer demands and labor supply, that Chayanov recognized in his pioneering work on rural agriculturists’ household production. Chayanov’s insight has implications for the transfers—also referred to as wealth flows—of resources and labor across generations.

If the sum of children’s consumption needs exceeds their parents’ time and resource budget, then parents must seek help from others. When parents reach bottlenecks in the availability of time and resources, they can meet their family’s consumption demands in a variety of ways depending on the cultural and institutional context. Parents in market economies can smooth consumption over the family life cycle by saving and dissaving, as life cycle saving theory posits for market economies with well-developed financial institutions (e.g., Tobin 1967; Lee, Mason, and Miller 2000). In some settings, public-transfer programs may ease these difficult stages of the family life cycle. In Mexico today, PROGRESA is a national antipoverty program of this sort, but it did not exist at the time the fieldwork underlying the present analysis was done. The Maya parents in our study live in a subsistence economy—that is, one in which a family produces a majority of what it consumes (food and other material goods) and consumes a majority of what it produces. Nor do Maya parents have financial and government institutions available to them. They must rely on familial transfers that come from some combination of a) increased labor effort of parents (which was observed by Chayanov and by anthropological studies in his tradition); b) the productive contributions of teenage or older children who are still coresident (observed by Cain 1977; Kramer 1998, 2002; and implicit in Chayanov’s analysis); and/or c) contributions from related elders, particularly grandmothers (Hawkes, O’Connell, and Blurton Jones 1989, 1997; Kaplan 1994, based on studies with hunter-gatherers).

In what follows we develop two analytic objectives. First, we investigate the net asset value of Maya children up to their leaving home and beyond, using a number of analytic methods. Second, we take a more dynamic approach by exploring the relationship between household demographic pressure and interage transfers over the life cycle of the family. This study contributes to the discussion about the net direction of wealth flows by examining the special role that children play in helping the family cope with a) the timing of demographically induced consumption pressures and b) underwriting the cost of younger siblings.
The study population and data

The Maya discussed in this study have a long history in the Yucatán peninsula that is reflected in its rich archaeological record and in the many villages where present-day Maya live as successful agriculturists. At the time of this study all residents of Xculoc were subsistence maize farmers. In this, as in many rural Maya communities, basic modern technologies—a gas-powered water pump and maize grinder—have been introduced in the last 20 years, yet participation in wage labor and the cash economy remains minimal. In 25 percent of households, no member participated in wage labor and family members subsisted solely on the crops they grew, on domesticated and hunted animals, and on the occasional sale of small quantities of honey. In the other 75 percent of households, at least one male engaged in wage labor at some point over the course of the year’s data collection. Men who participate in wage labor spend a median of 24 percent of days working for wages. There was no running water or electricity in the village at the time of this study. The village is a five-hour walk or a two-hour bicycle ride from the closest paved road where villagers can catch a ride to several market towns 40 to 60 kilometers away. The long distances and the inaccessibility of motorized transportation limit opportunities for exchange between remote villages and market centers. Many households own a bicycle, but the most that can be transported on a bicycle is about a 35-kilogram sack of maize. Consequently, the village is removed from much participation in the cash economy. Likewise, education is minimal, classes are infrequently held, and school is rarely allowed to interfere with children’s work activities.

The majority of calories consumed comes from maize, but the Maya also cultivate beans, squash, sweet potatoes, and peanuts. Many families maintain a kitchen garden where they grow a variety of citrus, avocado, banana, and papaya trees, and numerous other fruits and vegetables. Domesticated turkeys, ducks, chickens, and pigs are raised for occasional consumption, and deer, peccaries, coatís, armadillos, and various birds are hunted to supplement the diet. Honey is collected for sale from hives they maintain in the forest, and small quantities of maize may be exchanged in the village stores for a limited range of commodities such as vegetable oil, eggs, and candles. Otherwise no cash crops are grown. Despite their geographic isolation and lack of modern facilities, Maya villagers are well nourished and, once past early childhood, appear to live long and healthy lives.

As noted above, the household forms the economic unit of production and consumption. Each household grows its own food. In many other tropical or cash crop agricultural systems, labor demands peak at various times during the agricultural cycle, such as when garden products are harvested to be taken to market. During periods of high labor demand, labor may be pooled or exchanged across households. This is seldom the case, however,
among Xculoc farmers since they do not grow cash crops. Given the local ecology, field preparation, weeding, and harvesting are all tasks that occur over a period of several months, and only rarely are non–household members asked to assist in field work.

Consumption as well occurs largely within the household. While tools and other items may be borrowed across families, food seldom is. During midday, equal-sized portions of food are exchanged between related households. Mothers give children a small bowl of the midday meal, which they deliver to members of various related households, who receive the food and refill the bowl with something from their pot. Such sharing appears to be entirely symbolic, with no net transfer, and may reaffirm familial obligations that may be drawn on during periods of resource scarcity.

Of the 55 households in Xculoc, 82 percent are nuclear families (45): husband, wife, and their children. In another 16 percent of households (9), a widowed mother or father (4), an elderly parent (1), or an older unmarried sibling (2) lives with the nuclear family. In two cases, a recently married son, his wife, and their young children live with his natal family. In these extended families everyone in the household eats together and cultivates one field. Another household consists of a bachelor and his widowed father. Household size ranges from two to 11 adults and children, and averages just over seven individuals.

Certain features of this study population make it suitable for researching the relationship between household demographic composition and interage transfers. The Maya are traditional subsistence agriculturists and children regularly, productively, and safely participate in many tasks from an early age. Maya parents have large completed families. The mean number of births to village mothers aged 46 and older is seven. These large families challenge the ability of parents to produce enough food and other resources for sustenance, creating a situation in which help is critical to family survival. As we noted above, villagers have no access to financial institutions and the government has a minimal presence, limiting the help options available to parents during labor squeezes.

This Maya group enriches the set of populations for which we have direct or indirect information on interage transfers, and broadens our picture of how transfer systems are associated with economic systems. Although this population is beginning to become involved in the modern cash economy, it is still overwhelmingly subsistence-based and can therefore shed light on premarket and pre–public transfer systems.

During 1992 and 1993 the second author collected individual reproductive histories and time-allocation data from village members using scan sample techniques. Scan sample techniques (Altmann 1974; Borgerhoff-Mulder and Caro 1985; Hames 1992; Johnson and Behrens 1989) have several advantages for investigating how people spend their time. First,
rather than having to reconstruct a participant’s time use from recall or interview data, the observer records first hand how the participant spends his or her time. Second, the observer immediately records an individual’s activity at specified time intervals—in this case every 15 minutes, for a 3- to 4-hour observation period, every several weeks over the course of a year. Use of this method permits a large number of observations to be recorded relatively quickly. In this study, over 17,000 observations were recorded for 112 individuals ages 0 to 65 years, with an average of 155 observations per individual. These data give us an accurate estimate and detailed profile of the time that family members of all ages spend in a wide variety of activities (Dunbar 1976). Third, data are collected on individuals. These individual data allow us to analyze and observe factors determining interage transfers in more detail than, for example, was possible in Lee’s (1994c and 2000) previous cross-cultural analyses of income transfers using aggregate data.

**Estimating an individual’s production and consumption from time-allocation data**

Since we are first interested in exploring the net asset value of Maya children, we start by using the time-allocation data to construct an estimate of an individual’s production and consumption, which are expressed in the common currency of time. Although it might seem more straightforward to use money or calories to measure an individual’s production and consumption, neither is appropriate in the case of subsistence agriculturists. First, the Maya participate minimally in the cash economy, and while wage labor does have a monetary value, men are only sporadically employed and women and children never engage in wage labor. Consequently, monetary earnings and expenditures would capture very little of an individual’s production or consumption, and market prices would not accurately reflect the group’s valuations. Second, although a person’s daily energy consumption can be reasonably estimated in calories using age, sex, body weight, and activity data—variables known for all individuals in the sample—many productive tasks in which the Maya engage daily have no obvious caloric output.

While a task like harvesting maize does have a caloric output that can be reasonably well estimated, agriculture involves many activities such as planting, weeding, and maintaining crops that have no readily measurable caloric output. Other food-processing tasks, hauling water, collecting firewood, and many food-related and domestic activities also have no measurable caloric output. Nor do these subsistence tasks have a readily assessed monetary equivalent since crops, water, and firewood are not sold for profit. Given these considerations, time expenditure is the most suitable starting point for a common currency to estimate an individual’s production and consumption.
From direct observation, we know that individuals spend time in a variety of productive activities, as summarized in Table 1. Relative to females, males do more field work and less domestic work. Children become economically active at an early age and, by the age group 15–20, work about as many hours as adults. Girls contribute considerably more hours of work than do boys, particularly below age 15.

This simple count of time spent in each activity by each individual must be adjusted to take account of differences in average productivity by age and sex. It must also be adjusted to reflect the differential value of the product of the different activities.

First, individuals are differentially productive per hour at a given kind of task. For example, young children harvest less maize per hour of work than do prime-age male workers. For each task, an individual’s hours of work are weighted by his or her productivity per hour in this task, relative to the productivity of a prime-age adult. These weights are calculated for age and sex groups and range between zero and unity. The weights themselves are derived from direct measurement of output per hour (or return rate) for a number of activities that have a measurable output, including chopping wood, collecting water, harvesting maize, planting maize, weeding, shelling maize, grinding maize, and making tortillas. For example, the output per hour for harvesting maize (kilos per hour) of males under the age of 11 is 0.47 that of a prime-age adult, 0.71 for males 11 to 13, 0.95 for males 14 to 19, and 1.0 for males 19 and older. Harvesting and chopping wood are the only activities for which adult males and females can be compared. On the basis of these measurements, we have weighted the labor productivity of adult females at 80 percent of that of adult males for tasks re-

TABLE 1 Mean number of hours that male and female children and parents allocate to various activities in an 11-hour observation day

<table>
<thead>
<tr>
<th>Activity</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>Domestic work</td>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Field work</td>
<td>0.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Wage labor</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Hunting and beekeeping</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Nonsubsistence labora</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Child care</td>
<td>0.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Total workb</td>
<td>0.6</td>
<td>2.6</td>
</tr>
</tbody>
</table>

|                                | Age (years)    | 3–8 | 9–14 | 15–20 | Parents |
|                                | 3–8 | 9–14 | 15–20 | Parents |
| Domestic work                  | 0.3 | 1.1  | 1.0   | 1.1     | 1.1 | 3.7  | 5.8   | 5.4     |
| Field work                     | 0.3 | 1.5  | 1.8   | 2.6     | 0.2 | 0.6  | 1.1   | 0.8     |
| Wage labor                     | —    | —    | 2.6   | 1.4     | —   | —    | —     | —       |
| Hunting and beekeeping         | —    | —    | —     | 1.1     | —   | —    | —     | —       |
| Nonsubsistence labora          | —    | —    | 0.9   | 0.4     | —   | —    | —     | 0.1     |
| Child care                     | 0.6 | 0.2  | 0.2   | 0.8     | 1.3 | 0.3  | 1.5   |         |
| Total workb                    | 0.6 | 2.6  | 6.3   | 6.6     | 1.3 | 4.3  | 6.9   | 6.3     |

aObligatory community labor, travel to a job, and community wage labor.
bDoes not include child care. See note 1. Dashed line indicates no observed time spent in the activity.
quiring physical strength. For other tasks that do not require strength, such as preparing food, we use equal productivity weights for males and females at a given age. For various reasons, we do not consider a simple neoclassical model appropriate for inferring the marginal productivity from these observations. Later we discuss the results of sensitivity tests of these assumptions. Cain, in his study in Bangladesh, did not have direct measures of output from productive activity: he had to rely on age-specific wage rates for weights and, in doing so, restricted his analysis to males. Our richer data for the Maya provide a firmer basis for analysis.

Second, some activities require harder work than others, and requirements for various tasks can be assessed by measures of caloric expenditure. If two production tasks take the same time but one requires more calories of energy expenditure than the other, then its product must be more highly valued at the margin than the product of the other task. For this reason, we weight more heavily the time spent in activities that are more energy intensive. In particular, the output from an hour of adult male work in a particular activity is valued at \((1 + .0019C)\), where \(C\) is the caloric cost of this hour of work (see Appendix A for a derivation of this adjustment). The energetic requirements for the various tasks, taking into account the height and weight of each person, are taken from standard coefficients for taskspecific energy expenditures from established experimental data (Astrand 1971; Durnin and Passmore 1967; Montgomery and Johnson 1977; National Academy of Sciences 1989; Ulijaszek 1995).

The Maya live in self-supporting nuclear family households that typically produce what they consume, consume what they produce, and do not store resources beyond subsistence needs. Consequently, we assume that each household consumes exactly what it produces, and therefore that there are no net interhousehold transfers (consistent with ethnographic evidence, as discussed earlier) and no household saving or dissaving.

To calculate individual consumption, we begin by assuming that 80 percent of a household’s consumption takes the form of food: the labor to grow, prepare, and cook it; to do related cleaning; and to fetch water and wood. We allocate this 80 percent of total household consumption to family members in proportion to their caloric needs. This share is computed by calculating the daily caloric requirement of every individual in the sample using standard tables based on the individual’s age, sex, weight, and activity level. For example, if a household of five spends an average of 27.5 weighted hours a day in work, of which 80 percent is 22 hours, and if a 12-year-old boy consumes 20 percent of the household’s daily caloric consumption, he is estimated to consume 4.4 weighted hours daily of household work related to food \((22 \times .2 = 4.4)\). The remaining 20 percent of household consumption is allocated to members on a per capita basis, so if the boy is one of five household members, he would be allocated an addi-
His total daily consumption would then be 5.5 weighted hours. In this way, the additional caloric requirements associated with heavier physical tasks apply only to the food portion of household consumption. While we cannot know for certain how time and resources are allocated among household members, this method is preferable to those used in many anthropological and economic studies where consumption is taken from standard calorie tables based on age and sex alone, without taking into account actual body weight and activity levels, as we do here.

Production and consumption across
the Maya life cycle

The individual production (P) and consumption (C) values across ages 0 to 65 years are shown separately for females and males in Figure 1, along with smoothed curves. The shape and location of the curves vary with the method used to smooth the individual data points, but the qualitative conclusions are robust. Consumption roughly quadruples between birth and age 12, and increases more gradually thereafter. On an annual basis, girls begin to produce as much as they consume around age 15, and are substantial net producers thereafter. Boys begin to produce as much as they consume a bit later, approximately at age 17. Males generally consume more and produce more than females at each age. Even the oldest people in the sample, the seven men and women aged 55 to 65, are still producing more than they consume according to the smoothed age-sex profiles, and this is true of six of the seven individuals as well. Evidently these older members of the population are not living off transfers from their children and grandchildren, but are instead making transfers themselves.

These smoothed age-sex profiles describe the average levels of consumption and production by age and sex. Since the total of consumption and production is equal for each household by construction, it follows that these must also be identically equal for the population as a whole. After smoothing, however, the population-weighted sums of the production and consumption profiles need not be exactly equal, although as Figure 1 indicates they remain very close to equality. For individual households, on the other hand, the population-weighted sums of the smoothed profiles need not be near equality.

It is of interest to compare the Maya age-sex profiles to those presented in Cain’s (1977) seminal Bangladesh study. Maya boys at ages 5, 8, 11, and 14 years contribute 6 percent, 20 percent, 35 percent, and 50 percent as much labor value as a prime-aged (30-year-old) male. In Cain’s study, the corresponding percentages are 1, 16, 67, and 100. Taking these comparisons at face value, it appears that Maya boys are relatively more productive.
FIGURE 1  Production (solid line) and consumption (dashed line) across the life course of Maya females and males

---

Click to return to Table of Contents
in early childhood and relatively less productive in later childhood than boys in Bangladesh. Consumption by boys relative to a 30-year-old male is fairly similar in the two studies. However, Maya boys’ consumption is higher relative to their production, because our concept of consumption is considerably broader, including the many hours on home production tasks (such as the share of the family’s washing, cooking, and food preparation that a child consumes) excluded as both production and consumption in Cain’s study. By counting only food consumption, Cain’s method overstates the economic value of boys. Compared to Maya children, boys in Cain’s study appear more valuable regardless of any real difference in work effort.

As reported earlier, we made a number of assumptions in converting hours of work into measures of production and consumption. We have recalculated the production and consumption profiles based on a variety of assumptions, and summarized the results by reporting the break-even ages for boys and girls (see Table 2). Based solely on unadjusted hours, the break-even age, or age at which children produce more than they consume, is 19 years for males and 10 for females. The series of adjustments described, each one more comprehensive than the preceding one (except for the last), move these ages progressively closer together. Our preferred assumptions and estimates are given in the last row in the table, with break-even ages of 16.5 for males and 15 for females. The difference between males and females shrinks because males are more productive per hour spent in physically demanding tasks and because the activities at which males work are more energetically costly per hour and therefore deemed to be more valuable.

### TABLE 2  Estimated age (years) at which production exceeds consumption for total work calculated under different assumptions regarding value of time

<table>
<thead>
<tr>
<th>Description</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hours spent working; no adjustment</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>2. Only tasks with observed outputs per hour weighted by adult and child return rates</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>3. All tasks weighted by output per hour, with male and female weights equal by age (&gt;20=1.0, 10–20=.8, &lt;10=.5)</td>
<td>17.5</td>
<td>13</td>
</tr>
<tr>
<td>4. All tasks weighted by output per hour, with unequal male and female weights by age (male: &gt;20=1.0, 10–20=.76, &lt;10=.47; female: &gt;20=0.8, 10–20=.72, &lt;10=.47)</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>5. All tasks weighted by output per hour as above and additionally by caloric cost of activities as described in text</td>
<td>16</td>
<td>15.5</td>
</tr>
<tr>
<td>6. Weighted for strength-based tasks only and additionally by caloric cost of activities as described in text</td>
<td>16.5</td>
<td>15</td>
</tr>
</tbody>
</table>

**NOTE:** For each value-of-time assumption, total production and total consumption are recalculated at the household level, and consumption for each household member is then recalculated.
The net asset value of Maya children to their parents

The cumulative break-even age

Cain (1977) was one of the first to calculate the economic value of children to their parents. He asked at what age the cumulative value of the child’s production minus its consumption would equal zero. We ask the same question, but our calculations differ from Cain’s both in richness of data and in method, as follows. 1) We use direct observation of time allocation rather than interview data. 2) We have data not only on the time use of individuals, but also on their energetic expenditure and on their output (for many activities), so that we do not need to (nor could we) rely on wage data to assess relative productivity by age and sex. 3) We can calculate the caloric needs of all individuals based on their energy expenditure derived from age, sex, body weight, and specific activities. Cain had to rely on standard age-sex charts for caloric requirements. 4) While Cain considered only food consumption by individuals, we assign to each individual a share of household consumption based on the individual’s share of the total energetic consumption for the family, as described earlier, on the assumption that all product is consumed. By counting only food consumption, Cain’s method overstates the economic value of male children. 5) We take into account survival probabilities, whereas Cain’s calculations pertained only to survivors. 6) We are able to carry out the calculations for both males and females, whereas Cain was limited to males. We believe that the omission of female home production time from Cain’s calculation of consumption by a male child led him to underestimate significantly the age at which a boy would have reached the break-even point on a flow basis, hence the age at which he would have repaid his cumulative consumption costs.

Figure 2 plots the cumulative net production (that is, the sum of production minus consumption) up to each age for Maya males and females. At age 22, the average age of leaving home and marrying for males, the cumulative balance is still negative and large, and earlier consumption costs are not fully offset until around age 30 (this age can reach as high as 40, depending on the smoothing assumptions). Females also have a large negative cumulative balance at age 19, the average age at which they leave home and marry. Their cumulative break-even point is around age 31. In all cases, the cumulative break-even age is reached only slightly earlier if mortality is not taken into account, and assuming that life expectancy is substantially lower than 70 years also has little effect.

These results contrast strongly to Cain’s (1977) original finding that males paid back their own cumulative consumption by age 15, and their own as well as a sister’s by age 22, assuming the sister marries and leaves home by age 15. But because of important differences in the calculations as
outlined above, the Maya results cannot be directly compared to Cain’s. For example, a boy breaking even by age 15 in Cain’s study would have repaid the cost of his cumulative food consumption. However, repayment of any other kind of consumption, such as clothing, would add to that age. Furthermore, the cost of food consumption in Cain’s study includes only the cost of the field labor used to produce the food; it excludes the time costs of processing the food, preparing the meals, and so on. In our calculation, those costs included as well.8

Internal rate of return earned by childbearing

Other measures of the net economic contribution of children to their parental households can be used to supplement the cumulative break-even age we have just discussed. One such measure is the internal rate of return earned by childbearing, counting only those energetic costs and contributions made up to the age of leaving home. This is defined as the discount rate at which the present values of production and consumption—weighted for survival—would be equal (or equivalently, the discount rate at which the survival-weighted net production flow would equal zero). For a boy through age 22 or a girl through age 19 (the respective average ages for leaving home and marrying), the internal rate of return is highly negative.
Average age of consumption and production

Another measure of the net economic asset value of children, developed by Lee (1994a, b, c and 2000) and Willis (1988), is the difference between the average ages of consuming and producing. If the average age of consuming is lower than the average age of producing, then the direction of net transfers in the population is from older members to younger members. For this population, we can calculate the average age of producing (or consuming) by, for example, multiplying each individual observation of production (or consumption) by the corresponding age of the individual, summing over all individuals, and dividing by the total production (or consumption). This can be done by sex, and the calculation does not require smoothing the observations. For males, the average ages of production and consumption are 32.0 and 28.1, with a difference of 3.9 years; for females, the corresponding average ages are 26.4 and 22.6, with a difference of 3.8 years. For both sexes, the direction of net transfers is strongly downward, from older to younger. The calculations of the cumulative break-even ages and of the internal rates of return bear specifically on net transfers within the family. These differences in average ages, by contrast, reflect the entire life cycle patterns of transfers, not just those made while children are living in the parental household. These estimates fit with the general pattern of downward transfers in agricultural and hunter-gatherer populations reported in Lee (2000: 44).

In sum, each of these measures of the net cost of childbearing to parents indicates that Maya parents provide more to their coresident children than they get back from them, contrary to Cain’s original findings for children in a village in Bangladesh. The reasons are partly substantive and partly methodological, as we have already discussed. This finding also appears inconsistent with some assertions made by studies in the tradition of Caldwell: that wealth flows upward from children to their parents in pre-transitional societies (Caldwell 1976 and in later work). Our analysis, like other empirical tests of Caldwell’s wealth flows theory, indicates that children in preindustrial societies remain a net cost to their parents for the duration of time that they live in their parents’ household (Kaplan 1994; Lee 2000). While these empirical studies challenge the often-made assumption that high fertility in preindustrial societies is economically beneficial to the family, one should keep in mind that Caldwell was frequently referring to a broader concept of children’s economic value than the concept we use here. We use only measurable production to quantify children’s economic contributions, whereas Caldwell (and Cain) included less measurable aspects of children’s value such as political power, physical security, and risk sharing in his general discussion of wealth flows. Our results contradict only a literal interpretation of Caldwell’s assertions about wealth flows. Nonetheless, it is this literal interpretation—that children transfer a
positive production balance to their parents—that is most commonly attributed to Caldwell by social demographers and anthropologists.

Cain’s (1977) analysis, while rich in many respects, was largely limited to examining the economic value of children using individual-level data in the individual context. In the next section of this article, we examine production, consumption, and the economic value of children in the context of the family life cycle, which puts the results for individuals in a rather different light.

The economic value of children across the family life cycle

Here we look at the economic role of children from a dynamic perspective by considering the extent to which demographic changes over the typical family life cycle generate economic pressures on the household. The first step is to construct a measure of the varying demographic pressure on the family over its life cycle, building on Chayanov’s pioneering work (1925). Chayanov first constructed a stylized family life cycle, based on simple demographic assumptions. He then used stylized age-sex profiles of production and consumption that were assumed constant over the entire adult life cycle, starting with the late teenage years. He constructed the weighted sum of producers and consumers in the family by applying the age-sex profiles to the numbers of people in each age-sex group at each marriage duration. The Chayanov ratio, which is the ratio of consumers to producers, expresses the extent of demographic pressure at each life cycle stage.

Estimating standardized age-sex profiles

Chayanov did not base his age profiles on his own empirical analysis. We, however, want to exploit our rich and detailed dataset rather than to proceed by stylized assumption. It is tempting to use the smoothed age-sex profiles for this purpose, but there would be a problem in doing so. These age-sex profiles already include the ameliorating response of work effort to typical variations in household economic pressure over the life cycle. For example, the average production effort of a 30-year-old woman already reflects the fact that 30-year-old women typically live in households with many young children and therefore experience economic pressure in response to which they have already adjusted their production or consumption. The smoothed profiles already assume a response to the very household pressures that we now wish to measure, hence their use would lead us to underestimate the extent of these pressures. To avoid this problem, we must first remove the influence of the economic circumstances of the particular families in which people of different ages and sexes are located in the study population.
Our approach is to estimate a model in which production and consumption for each age and sex are the product of an age-sex-specific standardized profile and a household-specific fixed effect (see Appendix B). In this approach, the estimates of standardized profiles are based entirely on variation within the households in production and consumption, and abstract entirely from variations between households. This removes the problem that individuals at particular life cycle stages are likely to live in households experiencing systematically different levels of economic stress.

The economic and demographic life cycle of Maya families

The next step is to construct a typical Maya family life cycle based on our reproductive history data. We begin with a marriage between a female and male at the average age at first marriage for each sex. We then suppose that the first birth occurs after the average interval from marriage to first birth, and the second and subsequent births after their average intervals, until we reach the average number of births, which is seven. We can then apply the average life table to calculate the age distribution of surviving members at each marriage duration. No deaths occurred during the field study period, but retrospective data indicate that 95 percent of births survived to age 15. This corresponds to a life expectancy at birth of 70 years in the Coale–Demeny (1983) model West female life table system. Experiments show that the results reported here are not very sensitive to the level of life expectancy within a plausible range, for which 70 years would be the upper end. A Coale–Demeny stable population model with the reported parameters closely fits the age distributions of the village and the study population.

Figure 3 summarizes the demographic changes over the life cycle of the typical Maya family as children are born into the family and leave the family to marry. During the first 20 years of a marriage union, children are born into the family. The number of children peaks 18 to 20 years after the start of the marriage when parents have about seven children living at home. After marriage year 20, children begin to leave home and marry and the number of children living at home declines over the next 20 years of the marriage. The jaggedness of this and subsequent figures reflects the discreteness of births and departures of children. Figure 3 also plots the actual composition of the 18 nuclear families in the study populations, and it can be seen that the correspondence to the stylized family life cycle is close.

We now use the standardized age-sex-specific consumption weights to calculate the level of consumption, \( C \), in the family at each stage in its marriage duration (Figure 4). \( C \) grows over the life cycle of the family, peaking in the family’s twenty-second year, in part because continuing fertility raises
**FIGURE 3** Family composition across a typical Maya family life cycle, showing stylized numbers of surviving children and adults compared to the actual numbers in the study population.

**FIGURE 4** Production and consumption across the life cycle of a typical Maya family (fixed-effect estimates).
the number of family members, and in part because the consumption needs of each child increase with the child’s age. After the twenty-second year, the departures of older children lead to a decline in \( C \).

We next make the same calculation for production, \( P \), also shown in Figure 4. While \( C \) begins to grow in the second year of the marriage union, \( P \) declines through the sixth year owing to the probability of death of adults, and then begins to rise in the seventh year, since children start to produce only at older ages, and even then begin by producing little. Like \( C \), \( P \) peaks in the twenty-second year and then declines, but not as rapidly as \( C \). Indeed, after the twenty-fifth year, \( P \) always slightly exceeds \( C \). It is important to keep in mind that \( C \) and \( P \) do not correspond to actual family consumption and production, but rather to a certain weighting of the family members by age and sex, designed to show how the demographic composition of the family influences its consumption needs and potential labor supply.

The ratio of \( C \) to \( P \) is known as the Chayanov ratio. This ratio, \( C/P \), indicates whether the family’s demographic composition places it in a state of relatively high or low consumption needs relative to the family labor pool. The \( C/P \) ratio is plotted over the family life cycle in Figure 5, where we see that the ratio rises to a peak from the ninth to the fifteenth year of marriage, during which time it is more than double its level at the start of marriage. From an economic point of view, this is the most difficult time
for the family. Soon after 15 years of marriage, as the earlier-born children grow and are able to contribute more and more to production, the ratio begins a sustained, slow decline, reaching a trough after more than 30 years of marriage. (Note that in this figure, for expositional simplicity, the ratio has been normalized to unity at year 0 of the marriage.) Thereafter, it again begins to ascend, as the couple ages. This economic life cycle of the family is quite similar to Chayanov’s version for an early-twentieth-century family in Ukraine. In those families, the ratio peaked after 14 years of marriage at a level 94 percent higher than at the start of the marriage. The later peak occurs because Chayanov assumed that children did not begin to make economic contributions until after age 12, whereas direct observation of Maya children indicated that girls began to produce at age four and boys at age five.

The standardized estimates of consumption and production propensities were necessary for the construction of the Chayanov ratios and other measures of demographic pressure over the family life cycle. However, for our remaining analysis, it is appropriate to revert to the unstandardized average age and sex profiles with which we began.

The economic contributions of children in the context of the family life cycle

We have demonstrated that Maya children do not pay their own way; their cumulative consumption exceeds their cumulative production at the time they leave the parental home. Nonetheless, one should keep in mind that children are economically active from a young age and that their total economic dependency ends quite early. Continuing to use the stylized family life cycle and applying the unstandardized average consumption and production profiles, we can calculate the total consumption and production by children across the family life cycle. The result is plotted in Figure 6. Children, as a group, are producing more than half of what they consume by the thirteenth year of the family life cycle, when the mother is still in prime reproductive years. They are producing 80 percent of what they consume by the twentieth year of the family life cycle. After 28 years, all children living at home combined are producing 100 percent or more of what they consume.

It is also of interest to consider the parents’ share of total family production, according to the average production profiles and synthetic family life cycle, shown in Figure 7. Parents are responsible for virtually all of their family’s production during the first five years of marriage when children are too young to work. As the earlier-born children grow older and help out more and more, the parental share of total family production declines to 40 percent from the twentieth to about the thirty-third year of marriage.
FIGURE 6   Gross production and consumption of all children in a typical Maya household

FIGURE 7   Parental share of total family production in a typical Maya household
the family life cycle. It then starts to increase as the older children marry and leave home. This same pattern is observed in the production and consumption data for actual families in the study population. The inverse of this parental share tells us by what factor parents would have to increase their production if children made no contribution to production but average consumption levels of all family members were to be maintained. Between the twentieth and thirty-third years of the family life cycle, parents would have to work 2.5 times as hard as they do to maintain that consumption level, were it not for the contributions of children (or of some other source) to family production. Parents, in fact, could not by themselves sustain a level of production sufficient to meet the consumption needs of their family if the children did not work. To do so would require that they increase their actual average work effort by 150 percent in their 40s and early 50s, with each working more than 16.5 hours per day, excluding child care.

From these calculations, it is clear that the economic contributions of Maya children offset a substantial portion of their cumulative consumption costs, and that their economic contributions play a key role. For boys, by the average age of leaving home at 22 years, their cumulative production amounts to 82 percent of their cumulative consumption. For girls, the corresponding figure at age 19 is 76 percent. Also important is the particular timing of their contributions relative to the timing of demographic pressures in the household life cycle, with total production of all children rising as family size increases, often to a level of seven children per household.

Conclusions

Maya children consume more than they produce while in their parents’ household, and therefore have negative asset value from a narrow economic point of view. This result is consistent with recent research on other populations, but is inconsistent with Cain’s earlier findings for a village in Bangladesh and with a narrowly construed version of Caldwell’s wealth flows theory. One might question the usefulness of comparing a Maya group in the Yucatán to a village in Bangladesh. Would we expect to be able to generalize from either one of these small groups in any event? Yet the evidence in favor of a negative asset value for children is beginning to mount, and we have raised questions about the method behind the calculations in Cain’s original study.

Despite their negative asset value, Maya children play a critical economic role in the family economy. Without the contributions of children, Maya parents would not be able to raise such large families. Even though some of those contributions are greatest after the mother has reached age...
40 and has little if any reproductive potential remaining, she and the father would not have been able to have such a large family without being able to anticipate and then actually receive children’s contributions at this later stage. The older children heavily subsidize the consumption of younger children. Without these contributions, to have a large family parents would have to work two-and-a-half times as hard over much of the family life cycle. Thus while it is true that children are a negative net asset to parents, nonetheless they play a key role in allowing parents to continue childbearing in their later reproductive years when they might otherwise be unable to bear the costs of a large family.

Many other questions that can be addressed with these data remain to be explored in future research. We have shown that the Chayanov ratio more than doubles over the life cycle of the family, but we have not yet investigated how the family addresses the resulting imbalance in the family budget. Does production increase, as Chayanov found, or does consumption decline? Which ages and sexes are primarily responsible for making the necessary adjustments to consumption and production? Are younger children an economically privileged group compared to older children? We have seen that the elderly in this population, those aged 50 to 65 years, continue to produce more than they consume. It will also be informative to examine their role in responding to economic stress in their own households and in the households of their adult children.

Appendixes

A. Relative value of outputs depends on caloric costs

Suppose there is just one kind of labor, valued at $w$ per hour, but $l$ kinds of activities and outputs, indexed by $i$. To produce one unit of output $i$ requires inputs of $t_i$ time and $t_i c_i$ calories, where $c_i$ is the calories expended per hour for activity $i$. Let $w$ be the price of an hour of labor and $p_i$ be the price of a unit of output $i$. The shadow price, or value, of a unit of output $i$ equals the sum of the costs of its inputs: $p_i = w t_i + p_i c_i$. This equation must hold for all goods, and in particular must hold for the price of food, $p_c$, with $i = c$: $p_c = w t_c + p_c c_c$. Solving this equation for $p_c / w$, the price of food relative to labor, we find: $p_c / w = t_c / (1 - t_c)$. This solution can be used with the equation for $p_i$ to find the price of good $i$ relative to an hour of labor. Substituting in the price of food calories, $p_c / w$: $p_i / w = t_i [1 + c_i t_c / (1 - t_c)]$.

The cost of producing a ready-to-eat calorie includes all the related field work, plus all the related domestic tasks, from preparing the grain to cleaning up after a meal, as well as fetching the water and chopping the wood that is used. On the basis of the Maya data, we find that a single calorie has a time cost of .0014 hours. In this way, all activities can be valued according to the expenditure of time and the energetic cost of the activity, the latter depending on body weight and basal metabolism.
B. Age profiles with household fixed effects

For each individual in the sample, numbered from \( j=1 \) to \( J \), we observe production and consumption, \( p(j) \) and \( c(j) \). Each of these individuals belongs to exactly one household, with households numbered from \( i=1 \) to \( I \). Each individual belongs to a certain age group, \( x \), and a given sex, \( s \). We assume that there are true underlying propensities to produce, \( \pi(x,s) \) and \( \gamma(x,s) \), which are functions only of age and sex and do not vary by household membership. These propensities are not observed directly. Within a given household, we assume that production tasks and consumption are allocated in proportion to these underlying propensities. The household-specific proportional adjustment factor is its fixed effect. This will reflect the particular age-sex composition of the household, as emphasized by Chayanov, in addition to the particular good or bad fortune experienced by the household. The following model is easily estimated in logarithmic form:

\[
\begin{align*}
\ln[c(j)] &= \ln[G(i)] + \ln[\gamma(x,s)] + \eta(j) \\
\ln[p(j)] &= \ln[F(i)] + \ln[\pi(x,s)] + \epsilon(j)
\end{align*}
\]

In this specification, \( G(i) \) and \( F(i) \) are household fixed effects. \( \gamma \) and \( \pi \) are estimated solely on the basis of relative work efforts and consumption amounts for people living within the same household at the same time. \( \eta \) and \( \epsilon \) are errors in the equation.

Notes

The research for this article was supported by a pilot grant from the NIA P30 Center for the Economics and Demography of Aging (CEDA), by NIA R03 award AG19044-01, and by NIA R37 AG11761. Carl Boe, Tim Miller, and Peiyun She provided assistance with the research. We are grateful to Monica Das Gupta for comments on an earlier draft.

1 Productive activities include any agricultural task (ground preparation, planting, weeding, harvesting, transporting field goods), domestic task (washing, cleaning, food processing, food preparation, cooking, serving, running errands, hauling water, chopping firewood, tending animals), and wage labor. Although child care was recorded in the field, it is not included in the tally of work for a number of reasons. While direct child care (activities such as washing, feeding, bathing, and nursing) can be clearly observed and recorded, many indirect forms of child care (carrying a child, talking to a child) may or may not be recorded depending on observer discretion and what suite of activities he or she classifies as child care. In some households, for example, babies and young children are put in a hammock (the Maya equivalent of a playpen) much more often than is the case in other households, where young children are constantly held or carried. We do not include child care as work because personal parenting preferences would lead to marked individual differences in overall work effort. Nonetheless, child care is an important activity, especially in young girls’ lives. Maya girls allocate 7 percent of their time to child care compared to the 1 percent boys spend on that activity. If child care were included as work, it would considerably boost the time girls spend working while having little effect on boys’ work effort.

2 Mueller (1976), on the basis of agricultural wage data for India and Egypt, gives adult women a productivity weight equal to 75 percent that of an adult male. That weight was not intended to apply to domestic labor as well. There are obvious difficulties in establishing relative values for the labor of men and women when there is specialization of tasks by sex and
most tasks are performed by only one sex or the other.

3 First, some activities may be linked in a way that does not permit substitution of amounts of labor. For example, production of maize-based food requires closely coordinated amounts of agricultural labor in the various tasks and also in the stages of food preparation, including making tortillas. A fixed-coefficient input–output model might be more appropriate. Second, it might be more appropriate to think of the observed outputs for men and women in an activity as reflecting returns to specific attributes they possess to varying degrees: physical strength, domestic skills, and agricultural skills, for example. In this case, the relative marginal productivity of men and women may be quite different in different tasks.

4 Activity levels (indicated in italics) and caloric expenditures are given for various Maya tasks below. This standard classification of caloric expenditure and corresponding activity level is reported in Durnin and Passmore 1967: 47 and National Academy of Sciences 1989: 27. Caloric expenditures (kcal consumed per minute by a 65 kg male or 55 kg female) have been measured in several studies of subjects performing a wide variety domestic, agricultural, industrial, and recreational activities (Durnin and Passmore 1967; National Academy of Sciences 1989; Montgomery and Johnson 1977; and Ulijaszek 1995). Caloric expenditures for Maya tasks are taken from these experimental data. Numbers express the ratio of the caloric cost of the activity to caloric expenditure while sleeping. Following the number is a list of activities to which it applies. Resting, 1.0, sleep. Very light, 1.5, childcare; personal maintenance; social, religious, and political activities; unobserved hours. Play, 1.9, children’s play and leisure, babies when awake. Light, 2.5, domestic work, errands, hunting, beekeeping, nonsubsistence labor, wage labor. Moderate, 5.0, field work, sports, firewood collection, water collection. Note that heavy work (defined as 7.5–9.9 kcal/min) refers to activities such as running and heavy manual digging (National Academy of Sciences 1989: 27). No commonly performed Maya task is sustained at this level of caloric expenditure.

5 We have experimented with different smoothing procedures in S+ and SAS with a variety of settings. Although there is no standard statistical method to evaluate which profiles best represent the underlying behavior of the population, experiments with different procedures and resolutions produced fairly consistent results in the crossover point between production and consumption. This stability suggests that the curves reflect the underlying data and not the choice of smoothing method per se. The values from the procedure presented in Figure 1 (SAS spline routine with an interpolation value of 65) are conservative in the sense that they come from a relatively wide span and low resolution, and therefore avoid the risk of over-fitting the data. We have also estimated smoothed profiles for the individual differences between production and consumption. In all these methods that we judge plausible, the age at which annual production crosses consumption for females remains the same and as reported here; the corresponding age for males varies by a year plus or minus, with the broader range reflecting greater variability in work effort for males.

6 In Bangladesh, as in many other agricultural settings, wage data for children are available primarily during the harvest and are rarely available for females. Furthermore, wage data are not available for most home production tasks.

7 That is, we calculate the ex ante expected net asset value of a birth, taking into account the probabilities of survival at each age, whereas Cain (1977) did not take account of the economic loss of children who died before becoming net producers. A case could be made for discounting children’s costs and contributions up to the time they leave their parental households. The rationale would be that if we are viewing children as economic assets, we should assume that parents may have alternate investment opportunities also yielding a return, opportunities to which children may be compared as investments. Cain did not use discounting, nor do we. We do not know what the rate of return on such investments might be, so we do not know what an appropriate discount rate would be. Also, one might want to discount on the basis of parents’ subjective time preference, which would tend to offset the discounting for a positive rate of return. However, we
calculate below an internal rate of return for children.

8 While this earlier study is the one most frequently cited, Cain (1982) later revised his position, pointing out that discounting the rate of return on the value of children over the duration of time that children live in their parents’ household would substantially affect the determination of the break-even point: “Any positive rate of time discount would push the break-even point to a higher age.…[I]t is no longer as clear that the labour of children in rural Bangladesh compensates for their consumption over the period that children typically remain members of their parents’ household…” (p. 164).

9 The younger average ages for females probably reflect differences in the age distribution of males and females in the sample population.

References


NOTES AND COMMENTARY

A Biodemographic Interpretation of Life Span

S. JAY OLSHANSKY
BRUCE A. CARNES
JACOB BRODY

“What is the natural, usual, and normal duration of the life of man?” (Florens 1855). How long humans are capable of living has always been a subject of great interest and debate. Throughout history, great thinkers not only speculated about the duration of life, but also devised what they believed were methods of modifying how long people are capable of living (for examples see Gruman 1966). The public fascination with longevity continues to this day, but now the subject has serious implications for public policy as well. For instance, projections of mortality are critical elements in determining the funding requirements to maintain the future solvency of age-entitlement programs (Bennett and Olshansky 1996; Lee 2000; Olshansky 1988; Social Security Administration 2002). In recent years, some scientists have used mortality trends observed in the past to speculate on the duration of human life that might be achieved in the future (Oeppen and Vaupel 2002; Olshansky, Carnes, and Cassel 1990; Olshansky, Carnes, and Désesquelles 2001; Tuljapurkar, Li, and Boe 2000; Wilmoth 1998), while others have explored the theoretical (Carnes and Olshansky 1994; Charlesworth 1994; Medawar 1952; Williams 1957) and biological (Carnes et al. 1999; Carnes, Olshansky, and Grahn 2002; Finch and Kirkwood 2000) forces that influence the duration of life of sexually reproducing species. Here we explore the concept of life span from a biodemographic perspective.
A variety of terms have been used to describe how long humans and other species can live, both as individuals and as populations. Researchers in the social and biological sciences use the concept of life span in different ways, with some applying it to individuals and others to populations. It is not surprising, therefore, that the public is often confused by reports about scientific research on duration of life. What follows are our recommended definitions for terms commonly associated with duration of life. Adopting these definitions would enable scientists from the diverse fields that contribute to research on aging to communicate more effectively not only among themselves, but to the general public as well.

Life span refers to an individual’s verified age at death. Life spans can range from minutes after a live birth to the world’s longest-lived individual. Life span potential is the maximum attainable age for a specific individual under optimal living conditions. Because optimal living conditions cannot as yet be identified for individuals nor could they realistically be maintained throughout the life span, this theoretical age can only be estimated. Maximum life span is the longest life span ever recorded for a species. In other words, it is the world longevity record for a species—a number that can only increase over time. Trends in the verified age of the oldest living person in a population subgroup over time has also been the subject of study (Wilmoth 1998). We recommend the term oldest prevalent life span to define the age of the oldest living person in any given year—a number that can rise or fall over time. Life expectancy is the average number of years of life remaining for individuals of a given age assuming that the age-specific mortality risks of the life table used to generate the estimate remain unchanged. Typically, this population-level statistic is reported for a specified period of time, such as a calendar year, and is referred to as period life expectancy. Longevity is a generic term that is often used in place of the duration of life, and may be applied to both individuals and populations.

Life span limits: Historical perspective

Central to the concept of longevity is the long-held belief that the life spans of humans and other species are fixed by a supernatural power or by biological laws that apply to all living things. One of the earliest suggestions that the human life span is fixed appears in the Old Testament: “My spirit will not abide in man forever, for he is mortal; his days will be a hundred and twenty years” (Genesis 6:3). To illustrate how this biblical notion of a 120-year life span for humans has been perpetuated for centuries through mutual citation, consider the words of the Italian noble and health “expert” of the seventeenth century, Luigi Cornaro, who suggested that “even the
weakest people had enough ‘vital principle’ to live for 100 years, and those endowed with a stronger constitution could live to the biblical maximum of 120 years” (Cornaro 1634).

The logic supporting the idea of a fixed life span appears throughout the historical literature (Gruman 1966), but one example in particular exemplifies this view. The influential eighteenth-century zoologist, Georges Buffon (1747), suggested that every person has the same allotment of time from birth to death, and that the duration of life depends not on our habits, customs, or quality of food, but rather on physical laws that regulate the number of our years. This belief was based on his observation that species possessed a suite of fixed biological attributes (e.g., gestation period, age patterns of growth, constant physical form). For example, Buffon noted that the duration of time from birth to sexual maturity is consistently fixed at 30 days for the rabbit, 60 days for the guinea pig, 56 days for the cat, 64 days for the dog, and about 14 years for humans. If all biological phenomena conform to fixed laws like those governing the timing of gestation and sexual maturity, then, Buffon reasoned, duration of life must also be fixed.

Buffon’s interest in life span led to the creation of an extensive database of life-history characteristics for a variety of species. Relying on these data, Buffon reasoned that a species’ life span was a product of interconnected chains of functional relationships between biological attributes. He envisioned a fixed duration of gestation giving rise to a fixed duration of growth, which in turn leads to a fixed duration of life (life span). These data supported his hypothesis that the average life span of individuals within a population (i.e., life expectancy at birth) should be proportional to the amount of time that is allocated to growth and development. Specifically, Buffon suggested that life expectancy was consistently six to seven times greater than the time required to reach puberty. Applying this quantitative relationship to humans (assuming 14 years as the age of puberty) leads to the prediction that life expectancy under ideal living conditions should fall somewhere within the range of 85 to 100 years.

Buffon also speculated on how to estimate what we have defined as maximum life span. Without any biological evidence, Buffon declared that lives of extraordinary duration could, on rare occasion, double the life expectancy of a population. According to Buffon, this meant that it should be theoretically possible for a human to attain an age as high as 200 years.

**Life span limits: Demographic perspective**

Although demographers study populations, the results of their work are often used to make inferences about limits on the life span of individuals. The logic is that if there is a limit to the life expectancy of a population, then limits must also exist for the life spans of the individuals who make up...
that population. Some researchers (Wilmoth 1997) have argued that if low-mortality populations are approaching a limit to life expectancy as claimed by some biodemographers (Carnes, Olshansky, and Grahn 1996; Olshansky, Carnes, and Désesquelles 2001; Olshansky, Carnes, and Cassel 1990), then the approach to these limits should be reflected in the trends in vital statistics. For example, populations approaching a limit should be characterized by a stagnation in the age trend of the oldest prevalent individual. Critics of limit hypotheses also argue that limits imply there must be an age beyond which there can be no survivors. Documented violations of both of these conditions have led some demographers to conclude that limits on human life expectancy either do not exist or are not yet in sight (Oeppen and Vaupel 2002; Wilmoth 1997).

Critics of a purely mathematical approach to the study of human life span suggest that the validity of limit hypotheses cannot be ascertained without considering biological evidence on senescence (Carnes, Olshansky, and Grahn 2002). Duration of life is an outcome variable for researchers in the demographic and actuarial sciences. From a biological perspective, however, duration of life is the product of a multidimensional process that involves behavioral, environmental, genetic, and random forces (Carnes and Olshansky 2001; Finch and Kirkwood 2000). As such, there is no defensible basis for the claims, based on purely mathematical models of mortality, that there are no biological or demographic reasons why death cannot decline to zero (Wilmoth 2001) and, in a more cautious formulation of the idea, that life expectancy at birth can rise to 100 years or more (Oeppen and Vaupel 2002).

A discussion of limits

One of the oldest and most frequently mentioned hypotheses about the duration of life is known as the “fixed limit to life hypothesis” (see Gavrilov and Gavrilova 1991 for a detailed discussion). According to this hypothesis there is an age beyond which no human can live. The best-known example of such a fixed limit to life is the 120-year life span figure mentioned in the Old Testament—a limit already surpassed in 1995 by Jeanne Calment of France, who was 122.5 years of age when she died (Allard et al. 1998). Most researchers agree that limits like these appear to be based more on subjective opinion than on objective analysis (Gavrilov and Gavrilova 1991). Once it is recognized that every individual has his or her own life span potential, it becomes clear that distributions, not single numbers, are required to properly describe an attribute like expectation of life at birth.

Similar issues arise when interpreting the significance of observed trends in the maximum life span over time (Wilmoth et al. 2000). Olympic records and maximum life span share a common feature: they behave like ratchets. The current record is always an improvement over the previous one. The
passage of progressively larger birth cohorts through the age structure practically ensures that someone will eventually survive beyond the current maximum life span. The critical question is whether or not the probability of exceeding that maximum remains constant or becomes progressively smaller. It is also evident that the life expectancy of a population has far more relevance to most people than does maximum life span. One individual, even one living well beyond the world longevity record, would not have a detectable impact on a mean that is estimated for millions of people. Yet, even though the extreme tail of the mortality distribution has little demographic importance, it may have some biological relevance. A genetic comparison of people who survive to extreme ages (i.e., centenarians) with those dying at younger ages may reveal genes that influence longevity determination (Perls and Fretts 2001) and may help determine whether bodies have biological warranty periods and whether the expiration dates for these warranty periods are anywhere in sight (Carnes, Olshansky, and Grahn 2002).

Another limit concept has been referred to as the “limit-distribution hypothesis” (Wilmoth 1997). In the last two centuries, researchers have developed and debated the merits of mathematical models used to describe age patterns of mortality in humans and other species (Deevey 1947; Economos 1982; Gavrilov and Gavrilova 1991; Greenwood 1928; Makeham 1867; Olshansky and Carnes 1997). Because these models are based on statistical distributions (Gompertz 1825, 1872; Weibull 1951), their mathematics formally captures the reality that deaths are distributed throughout the age structure of a population. The part of the hypothesis dealing with limits denotes a presumed convergence toward a mortality schedule (set of age-specific death rates) that, in the absence of medical interventions, cannot be further reduced (Carnes, Olshansky, and Grahn 1996; Olshansky, Carnes, and Grahn 1998). Even supporters of the concept recognize that biological, behavioral, and socioeconomic heterogeneity among individuals (Carnes and Olshansky 2001), coupled with biomedical technologies that manufacture survival time by saving the lives of people who would otherwise die (Olshansky, Carnes, and Grahn 1998), greatly complicates the task of identifying a limiting distribution for any species, especially humans.

An appealing but superficial logic permeates many of the purely mathematical approaches to investigating limits on the life span of individuals and the life expectancy of populations. In all of these approaches there is no age at which the probability of survival becomes zero. This means that no matter how old an individual becomes, there is a nonzero probability that the individual can survive at least one more day. When taken to its illogical extreme, this approach leads to the biologically untenable conclusion that there are no limits on how low death rates can decline (Wilmoth 2001) and, therefore, no limits to how high the life expectancy of populations can climb.

Although the mathematical models used to describe age patterns of mortality within populations are examples of scientific creativity, popula-
tions are composed of individual biological entities. As such, biology must also be given a role within the mortality dynamics described by these mathematical models, and the collective mortality dynamics of an assemblage of unique individuals can never be anything other than distributive.

**Life span limits: Biodemographic perspective**

Biodemography examines demographic issues from a biological perspective (Carnes and Olshansky 1993; Wachter and Finch 1997). Like traditional demography, the basic unit of study in biodemography is the population. The intellectual roots of biodemography can be traced to the early nineteenth century (Gompertz 1825). A persistent and central feature of biodemographic analysis is the partitioning of causes of death into biologically meaningful categories (Benjamin 1959; Bourgeois-Pichat 1978; Carnes and Olshansky 1997; Clarke 1950; Makeham 1867; Pearl 1921; Ricklefs and Scheuerlein 2001; Shryock and Siegel 1975; Strehler 1959). Although the specific composition of these categories has shifted with the gains in biomedical knowledge, the mortality partitions invariably distinguish between forces of mortality that cause premature death (e.g., accidents, infectious diseases) and those that arise from the intrinsic biology of the organism (e.g., genetic and degenerative diseases).

Adherents of this biodemographic paradigm have demonstrated that the schedule of age-specific death rates associated with intrinsic causes of death (referred to as an intrinsic mortality signature) is invariant (within statistical error) across populations within a species and, with appropriate adjustment for differences in life span, is remarkably predictive between species (Carnes, Olshansky, and Grahn 1996). The relevance of intrinsic mortality signatures to debates about limits is that by establishing lower bounds to age-specific death rates, intrinsic mortality signatures impose upper bounds on life expectancy. If the life expectancy of a population is constrained by a limit, then the individual members of that population must also have life spans whose durations are subject to constraints. From a biodemographic perspective, however, the identification of biological warranty periods for individuals and the expiration dates of those warranty periods can be revealed only through an examination of biological evidence (Carnes, Olshansky, and Grahn 2002).

The intrinsic mortality signatures of human populations, unlike those of laboratory animals, change over time (Carnes, Olshansky, and Grahn 1996; Jones 1956). Further, this change has been in the direction of lower death rates. Demographers and biodemographers interpret this trend as arising from human interventions that have helped people come closer to achieving their life span potential, in some cases through biomedical advances (e.g., heart bypass operations, dialysis machines) that extended life
spans (i.e., delayed death) by manufacturing survival time for people who would have died without the intervention (Olshansky, Carnes, and Grahn 1998). Human ingenuity—which brought us sanitation systems, vaccines, antibiotics, and many other advances in public health—has also had great success in thwarting the external mortality threats (infectious and parasitic diseases) that continue to be responsible for most premature deaths (Carnes and Olshansky 1993; Olshansky, Hayflick, and Carnes 2002). Taken together, the dramatic reductions in death rates for intrinsic and extrinsic causes over the last century have resulted in the largest and most rapid increase in life expectancy that has ever been experienced in human history.

From a biodemographic perspective, most of the rise in human life expectancy has come from saving children from infectious and parasitic diseases and by reducing mortality among women resulting from childbirth. These gains cannot be repeated in developed countries today because the reservoir of potential person-years associated with further declines in these causes of death has been nearly exhausted. Future gains in life expectancy will have to come from saving the lives of older people through the development and use of interventions that alter the fundamental processes of aging. Although not impossible, no interventions in existence today have been demonstrated to moderate the rate of aging. As such, if another quantum leap in human life expectancy is going to occur, future trends in mortality will have to be fundamentally different from those observed in the past. This conclusion is the opposite of the one reached by Oeppen and Vaupel (2002), who predict that human life expectancy will reach 100 years by the year 2060 through future trends in mortality that mimic those observed in the past.

Life span limits: A biogerontological perspective

The modern evolutionary theory of senescence is based on the premise that natural selection is most effective in altering gene frequencies in the prereproductive period. When the normally high force of external mortality is controlled and survival beyond the end of the reproductive period becomes a common occurrence (as in the case of humans, laboratory animals, household pets, and zoo animals), senescence and senescent-related diseases and disorders have the opportunity to be expressed. If gene expression in the postreproductive period—whether favorable, detrimental, or neutral—is beyond the reach of natural selection, then a genetic basis for either immortality or senescence resulting from the direct action of selection is not possible. Thus, senescent-related diseases and disorders must be an inadvertent consequence of selection pressures that shape the reproductive biology of species (Hamilton 1966). As a consequence, an organism’s investment in the biochemical machinery necessary to maintain life should diminish as the reproductive potential of the individual is achieved (Kirkwood 1977).
At its core, this fundamental biological explanation for why individuals age is predicated on the importance of natural selection and its declining effectiveness relative to the timing and distribution of reproduction within the life span of organisms. Applying these principles of evolutionary biology to explain age patterns of death among and between sexually reproducing species has come to be known as the biodemography of aging—a concept with historical roots in the search for a law of mortality (Brody 1924; Brownlee 1919; Deevey 1947; Greenwood 1928; Loeb and Northrop 1916; Pearl 1921; Pearl and Miner 1935) and in contemporary interdisciplinary research on aging (Carnes and Olshansky 1993; Carnes, Olshansky, and Grahn 1992, 1996; Olshansky and Carnes 1994; Wachter and Finch 1997). Although a vast number of genetically based biological processes (e.g., growth, development, surveillance, maintenance, and repair) that sustain life and maintain functional integrity have been identified and characterized, senescence is not among them. A genetic program for aging is not required for animals to age, just as no program for aging is required for manmade machines to experience degradation with time (Hayflick 1994, 2000; Miller 1999).

Although unknown to Buffon, it was the underlying and invisible action of genes that control and establish the temporal regularity and predictability of growth, development, reproduction, and physical form that led to his speculations on a fixed life span. After all, it appears on the surface that life span is genetically programmed. Why else would mice tend to live, on average, 1,000 days, dogs 5,000 days, and humans 29,000 days. As it turns out, natural selection favored these life-history traits and biological clocks as ways to ensure that genes, having acquired the property of immortality, are passed on through time (Dawkins 1992). These biological phenomena were molded by the environments in which they arose. Their specific forms and functions were not actively designed in the same way that an engineer draws the plans for creating a machine and then constructs it. Instead, the biological attributes of individuals that influence duration of life are the product of a directionless and ongoing competition among preexisting genetic variants (alleles) in which “victors” are determined by their ability to propagate themselves.

Because evolution gave rise to orchestrated biological processes intended to perpetuate DNA in a world where indefinite survival of the soma (or, individual body) is not possible, genetically programmed aging does not exist and could not arise from the direct action of evolutionary forces (Olshansky, Hayflick, and Carnes 2002). Although Buffon lacked access to knowledge about evolution, his intuition that senescence and species-specific duration of life are related to a fixed period of growth and development can now be supported by evolutionary theory and biological evidence.

Significant declines in mortality rates and large increases in average and maximum life span have been achieved for some animals experimen-
tally through the manipulation of certain genes (e.g., Johnson 1987, 1990; Johnson et al. 2001) or through selective breeding (Luckinbill et al. 1984; Rose 1984). Without exception, however, the longer-lived animals in these experiments have never experienced a reversal or arrest of the inexorable increase in mortality rate that is one of the hallmarks of aging (Hayflick 2000; Olshansky, Hayflick, and Carnes 2002). What has accompanied the longer lives of these experimentally modified animals is an inadvertent change in other stages of life, such as growth and development. In support of this view, scientists have discovered a fundamental link between fecundity and longevity (Carnes, Olshansky, and Grahn 1996; Müller et al. 2002; Perls, Alpert, and Fretts 1997; Perls and Fretts 2001). These animal and human studies together represent important experimental evidence for the link between relatively fixed biological traits such as growth, development, and reproduction, and the duration of life. Hayflick (2000) has referred to these genetic forces that indirectly influence the life span of species as longevity determination genes, which are fundamentally different from the often theorized presence of aging genes or death genes, which cannot exist.

Conclusions

The life span of humans and other sexually reproducing species was portrayed by the French naturalist Buffon as a fixed trait that is directly proportional to the length of time from birth to sexual maturity. This biologically based perspective was in direct conflict with the long-held belief, still held by many in the lay population today, that the duration of life for humans and all other living things has been established by divine fiat. Buffon’s scientific approach to the question of life span was remarkably prescient given that his insights took place long before evolutionary theory, genetics, and biodemography had established the validity of linkages between life-history traits such as growth and development, and the duration of life. Although Buffon’s method of calculating the life span of species may have been incorrect, he was insightful enough to recognize that biology, not divinity, determines the life span of individuals.

The biodemographic approach to understanding the duration of life presented here leads to a fundamentally different outlook on the limited life span hypothesis and the limit-distribution hypothesis originally advanced in the field of demography (Wilmoth 1997). A biodemographically centered limit-distribution hypothesis would contain the following basic principles: 1) the variation and uniqueness generated by sexual reproduction eliminate the possibility of absolute limits for any biological attribute (e.g., life span) of individuals; 2) similarly, the absence of evolved genetic programs for aging and timing of death eliminates the possibility of an absolute limit on the maximum life span of a species; 3) there are, however, a multitude
of constraints—biochemical (Carnes and Olshansky 1997; Carnes et al. 1999), biomechanical (Dawkins 1992; Olshansky, Carnes, and Butler 2001; Thompson 1992), and biodemographic (Carnes, Olshansky, and Grahn 1996; Demetrius 2001; Olshansky, Carnes, and Cassel 1990; Olshansky, Carnes, and Désesquelles 2001; Weiss 1961)—that place probabilistic (practical) limits on the life span of individuals and the life expectancy of the populations they comprise; and 4) the inherent and inescapable distributive nature of all attributes associated with sexually reproducing organisms ensures that any population-level statistic (whether an estimate of the average or the extreme) has little or no demographic or biological relevance to the overwhelming majority of individuals in the population.

Buffon was right to suspect that the life spans of organisms are influenced by relatively fixed biological traits that are associated with the period of growth—traits that, in turn, establish effective constraints on how long individuals can live and how high life expectancy and maximum life span can practically rise. Today, aging and death are viewed as the inadvertent but inevitable byproducts of the degradation of biological structures and processes that evolved for growth, development, and reproduction rather than for extended operation. These structural and functional constraints exist at every level of biological organization (cells, tissues, organs, and organ systems) within an individual, and their existence imposes practical limits on the life span of individuals and the life expectancy of populations.

Notes

Funding for this work was provided by the National Institutes of Health/National Institute on Aging for Olshansky (AG13698-01) and Carnes (AG00894-01). The presentation on which this note was based was given at a conference on Life Span: Evolutionary, Ecological, and Demographic Perspectives, in Santorini, Greece (May 2001) with funding from the National Institute on Aging.

1 Life span potential should not be confused with the notion of a fixed limit to life. Rather, life span potential should be considered the maximum attainable age for an individual under ideal living conditions (which are acknowledged to vary from one person to the next). The presence of detrimental lifestyles, such as smoking and obesity, should be thought of as behaviors that shorten the life span of individuals below their potential. The adoption of healthier lifestyles enables people to more closely approach their particular life span potential.

2 The term life span was most often used in the historical literature as a single number intended to represent the expected duration of life of every member of a species. The concept of an average of individual life spans was antithetical, for it was believed that everyone had the same longevity potential and that most people did not live up to their longevity potential because of poor lifestyles or accidental mortality. Thus, until recently the concepts of life span and maximum life span were identical.

3 The vital principle represented an unspecified substance contained within the body that Cornaro and others at the time believed was used up during the course of life, the quantity of which determined how long humans are capable of living.
References


DATA AND PERSPECTIVES

Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence from Four Asian Countries

S. Philip Morgan
Sharon Stash
Herbert L. Smith
Karen Oppenheim Mason

The hypothesis that greater female power and autonomy produce lower fertility appears in many explanations of fertility differences and change (Dyson and Moore 1983; Cain, Khanam, and Nahar 1979; Basu 1992; Jeejeeboy 1995). This article examines the specific claim that the higher fertility of Muslims (compared to non-Muslims) can be traced to the lower level of power and autonomy (hereafter autonomy) afforded Muslim women.1 This lower autonomy reflects more rigid forms of patriarchy that characterize Muslim communities. Key elements of this argument “inhere at the systemic, institutional, aggregate level” and thus require analysis at the community level (Smith 1989: 173–174; see also Balk 1994; Jejeebhoy and Sathar 2001). From a set of surveys of more than 50 communities in four Asian countries, we identify 14 Muslim/non-Muslim pairwise community comparisons—that is, pairs of communities that share many characteristics but differ in that one is predominately Muslim and the other predominately non-Muslim. Although not representative of any country or region, these pairs of communities reflect substantial diversity of social and economic setting. Across most pairs of settings, we show that Muslims have more children, are more likely to want another child, and, if they want no more children, are consistently less likely to be using contraception. We test whether these differences parallel differences in married women’s autonomy.
We use data collected for the purpose of investigating women’s power, autonomy, and fertility: the Survey on the Status of Women and Fertility (SWAF). These data, collected in 1993 and 1994, include a number of potentially relevant dimensions of women’s autonomy: freedom of movement, economic autonomy, and exposure to intimidation/coercion. Direct measurement of multiple dimensions of autonomy avoids many of the criticisms of prior research on “women’s status” and fertility (as discussed in Mason 1984, 1986, 1987).

Religion, women’s autonomy, and reproductive behavior

Can one reasonably argue that the Islamic religion exerts consistent effects on demographic behavior? Caldwell proposes such an overarching effect of Islam, rooted in patriarchy. To the extent that Islam is more strongly patriarchal than other religions, demographic behavior could be influenced (also see Kirk 1968; Balk 1994). With regard to mortality differentials observed between Muslims and non-Muslims in a range of countries presented in the World Development Report 1984, Caldwell (1986: 175) writes,

> These mortality differences are not necessarily inherent in religions, nor immutable.... They are important at present, however. The central aspect of the relationship between Islam and mortality levels is undoubtedly the separate and distinctive position of women operating partly through their access to education but also in many other ways.

Although Caldwell’s argument is framed to address mortality experiences, it can be extended to fertility. Constraints on behavior, stemming from strongly patriarchal systems, could result in 1) a desire for more children, and, 2) given that no more children are desired, lower rates of contraceptive use. Such results could be produced by two related processes:

First, associations could operate at the aggregate level. Accordingly, Muslim communities would be characterized by less autonomy for women and greater pronatalism. Within communities, variance in autonomy would be modest and would be inconsequential for fertility outcomes.

Second, powerful individual-level associations could mediate the aggregate association between religion, women’s autonomy, and fertility. Specifically, women with greater autonomy might desire fewer children and be more likely to use contraception. Religion or ethnicity might operate by shifting the distributions of autonomy among women in Muslim versus non-Muslim settings.

Consistent with both processes, Cain, Khanam, and Nahar (1979: 432) described linkages between religion, women’s autonomy, and the demand for children in their study of class and patriarchy in Bangladesh:
Male dominance is...supported by interlocking and reinforcing elements of kinship, political, and religious systems. Powerful norms of female seclusion extend to labor markets, severely limiting women’s opportunities for independent income generation. The risk and insecurity that patriarchy imposes on women represent a powerful systemic incentive for high fertility.

In other words, patriarchal systems can increase the demand for children because they usually limit women’s nonfamilial opportunities for social status and economic support. Where women’s opportunities outside the home are severely constrained, their survival strategies focus inward on family and children. Bearing children, especially sons, solidifies a woman’s position in her husband’s or in-laws’ house; “respect, protection, or claim on family resources” can depend on high fertility (Mason and Taj 1987: 615). Sons may also be in a position to provide for their mother’s old-age security or for their care in the case of widowhood (Cain, Khanam, and Nahar 1979: 433).

Finally, hypotheses linking women’s autonomy to contraceptive use have long been advanced in the literature. For example, where group norms and practices limit women’s mobility and their contact with nonfamily members, women’s exposure to novel ideas or technological innovations, including contraceptives, may be constrained (Cleland and Wilson 1987). Opposition from husbands can also be a barrier to contraceptive use in patriarchal settings. Acquiring contraceptives may be especially difficult in situations where limitations are placed on women’s freedom of movement and access to economic resources.

A competing explanation argues that Muslim and non-Muslim fertility differences result from different levels of economic development or different socioeconomic levels. Jeffery and Jeffery (1997: 225; also see Weeks 1988) suggest that differences in fertility rates between Hindus and Muslims in India are generally the result of underlying differences in “region, residence, class and schooling,” rather than differences in religious orientation or in the autonomy of women. Our data will allow a test of this competing hypothesis.

A third explanation attributes reproductive differences to religious doctrinal differences, especially ones relating to the acceptability of contraception and abortion. Although generally perceived to be pronatalist, the Qur’an does not contain straightforward injunctions against the use of contraception. Obermeyer (1994a) concludes that, on the basis of religious dogma, it would be difficult to substantiate claims that Muslims are more pronatalist or less approving of contraception than are other groups. In keeping with this argument, Muslims do not consistently give reasons for nonuse of contraception that suggest they believe it is “against their religion.” Omran’s (1992: 102–111) review of key writings indicates that Allah directs adherents to have children and that Allah has granted provision for all His creatures, including any children that are conceived. However, marriage and
parenthood are not synonymous with unrestricted childbearing; and the Qur’an stresses the care and well-being of children over the bearing of large numbers of children (ibid.). Most important, supporters of family planning cite Islamic jurisprudence that interprets silence on the issue of contraception neither as an error of omission nor as a reflection of an absence of population pressures in past times. Rather, the Lawgiver is all-knowing and the Qur’an is for all-time. Further, withdrawal was practiced as a contraceptive measure at the time the Qur’an was revealed, and the Prophet offered no prohibition. The majority of Islamic theologians consider this to be unequivocal evidence that withdrawal and other nonpermanent methods of birth control are acceptable. Sterilization is more problematic in Islamic jurisprudence (see Omran 1992: Chapters 10 and 11).

In contrast to these broad explanations that might produce a general pattern of higher Muslim fertility, a fourth explanation is particularistic and interactive. The particular insecurities or constraints a group faces can produce fertility responses, either antinatalist or pronatalist ones. A substantial literature on such differences exists (e.g., Goldscheider and Uhlenberg 1969; Kennedy 1973; Johnson 1979; Johnson and Nishida 1980), but we maintain a focus on Asia and Muslims. Specifically, in a comparative study of a Hindu (Jat) and a Muslim (Sheikh) community in Uttar Pradesh, India, Jeffery and Jeffery (1997) found that Muslim/non-Muslim fertility differentials remained after socioeconomic controls. Moreover, Jeffery and Jeffery (1997: 161) found few differences between Jats and Sheikhs in the degree of “freedom of action” that women enjoy. Thus to explain fertility differentials, they adopt a context-specific (as opposed to a global) interpretation. They argue that the higher “fertility of the Sheikhs can be understood much more in terms of their marginalized position as part of a minority group within Indian society, rather than as a response to any ‘essential’ feature of Islam” (ibid.: 229). Identity issues and ideologies that justify or celebrate differences can arise from group competition and conflict. As Obermeyer (1994a: 51) notes, “Like other religious doctrines, Islam has been used to legitimate conflicting positions on gender and reproductive choice” (see also Omran 1992: 85–112). Likewise, in Thailand, Knodel et al. (1999) document substantial fertility differences between Muslims and Buddhists in some areas but moderate differences elsewhere. They argue that explanation requires attention to local historical, political, and cultural context.

We examine the fit of these various explanations to Muslim/non-Muslim differences across a range of settings. Are fertility differences pervasive, suggesting general or even global processes? Or are they idiosyncratic, suggesting context-specific explanations? If global explanations seem warranted, are differences in autonomy a plausible explanation? Or can socioeconomic disadvantage better account for differences?
Data and measurement

As stated earlier, the communities in our study are not necessarily representative of particular countries or regions. Even with random sampling, there is little chance that a handful of communities would be representative of a national population. Instead, the communities selected have a set of characteristics, primarily Muslim versus non-Muslim, conforming to our research design. The Muslim communities in the study are by no means homogenous, either within or between countries, and they are not uniformly inferior to their non-Muslim neighbors in measures of socioeconomic status. Our goal is not to give a precise measurement of Muslim versus non-Muslim differences in fertility expectations and contraceptive use in these countries, but rather to ascertain that such differences are (or are not) ubiquitous in a range of settings, and to ask whether such differences (or lack thereof) can be attributed to measurable differences in women’s status as between Muslim and non-Muslim communities. We acknowledge below several weaknesses of our design, but its strengths more than compensate for them. A useful referent would be the common strategy of choosing a single set of contrasting villages (e.g., Jeffery and Jeffery 1997; Dharmalingam and Morgan 1996; Morgan and Niraula 1995). Single comparisons make generalization difficult; more numerous comparisons, in diverse settings, allow broader generalization.

We use a subset of data from a five-country study of the relationship between fertility and the status of women in communities in South and Southeast Asia (SWAF). The countries in the original study were India, Malaysia, Pakistan, the Philippines, and Thailand. The communities in this investigation are restricted to Muslim communities and their logical comparisons, namely non-Muslim communities that share characteristics, including geographical proximity. Data from India are presented separately for the states in which they were collected (Uttar Pradesh and Tamil Nadu), owing to the well-known differences in fertility and family structure associated with north and south India (Dyson and Moore 1983). We omit data from Pakistan (in the absence of non-Muslim communities for comparison; but see Jejeebhoy and Sathar 2001) and from regions of Thailand other than the south (because only the south provides Muslim communities for comparison). A comparative organization of communities is shown in Table 1 and in the row structure of subsequent tables. Table 2 presents information on the communities’ social and economic organization.

The research settings

Within each country, the organizing sampling unit was the community, variously defined but having in common fixed geographic boundaries and homogeneity along relevant religious and/or ethnic dimensions. Primary sampling
TABLE 1 Controlled comparisons of Muslim and non-Muslim communities: Status of Women and Fertility data

<table>
<thead>
<tr>
<th>Country and communities</th>
<th>Matched characteristics</th>
<th>Religious or ethnic contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>India: Uttar Pradesh</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pratapgarh</td>
<td>Less developed subdistricts</td>
<td>Muslim vs. Hindu</td>
</tr>
<tr>
<td>2. Meerut</td>
<td>More developed subdistricts</td>
<td>Muslim vs. Hindu</td>
</tr>
<tr>
<td><strong>India: Tamil Nadu</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ramnathpuram</td>
<td>Less developed subdistricts</td>
<td>Muslim vs. Hindu</td>
</tr>
<tr>
<td>4. Coimbatore</td>
<td>More developed subdistricts</td>
<td>Muslim vs. Hindu</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Kelantan &amp; Selangor</td>
<td>Rural</td>
<td>Muslim/Malay vs. Hindu/Indian</td>
</tr>
<tr>
<td>6. Kelantan &amp; Selangor</td>
<td>Rural</td>
<td>Muslim/Malay vs. Chinese</td>
</tr>
<tr>
<td>7. Kelantan &amp; Selangor</td>
<td>Rural</td>
<td>Muslim/Malay market women vs. Hindu/Indian</td>
</tr>
<tr>
<td>8. Kelantan &amp; Selangor</td>
<td>Rural</td>
<td>Muslim/Malay market women vs. Chinese</td>
</tr>
<tr>
<td>9. Selangor</td>
<td>Urban</td>
<td>Muslim/Malay vs. Hindu/Indian</td>
</tr>
<tr>
<td>10. Selangor</td>
<td>Urban</td>
<td>Muslim/Malay vs. Chinese</td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Pattani/Trang</td>
<td>Rural, south</td>
<td>Muslim/Malay vs. Thai Buddhist</td>
</tr>
<tr>
<td>12. Songkhla/Nakhon Si Thammarat</td>
<td>Rural, south</td>
<td>Muslim/Thai vs. Thai Buddhist</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Zamboanga/Oriental Mindoro</td>
<td>Rural, similar subsistence</td>
<td>Muslim vs. Christian</td>
</tr>
<tr>
<td>14. Zamboanga/La Union, Camarines Sur</td>
<td>Rural</td>
<td>Muslim vs. Christian</td>
</tr>
</tbody>
</table>

units (PSUs) were variously provinces (Thailand, Philippines), states (Malaysia), or districts within states (India). Except in Thailand, these PSUs were not selected at random, but rather purposively along dimensions of interest in the study of the status of women (e.g., economic well-being, types of agricultural production, presence of Muslim communities). Subunits within PSUs were randomly selected and were variously municipalities and (below them) barangays (Philippines), districts, tambols, and villages (Thailand), districts, towns, and neighborhoods (Malaysia), and talukas (subdistricts) and villages (India). There was some aggregation of the lowest-level subunits for purposes of defining a community, for example villages in India and barangays in certain municipalities in the Philippines. Within subunits (or communities), sampling of women was random with occasional quota sampling to obtain a community-level sample of some fixed size, for example in the Philippines.

In India, several sites contained villages in which both Hindus and Muslims lived but where, despite their physical proximity, the groups ap-
<table>
<thead>
<tr>
<th>Country/community</th>
<th>Non-Muslim comparison</th>
<th>Married to a relative (percent)</th>
<th>Wife’s age at first marriage (years)</th>
<th>Wife’s education (years)</th>
<th>Husband’s education (years)</th>
<th>Household possessions index (0–10)</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>India: Uttar Pradesh</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pratapgarh</td>
<td>Hindu</td>
<td>33.8 2.3</td>
<td>28.2 27.1</td>
<td>15.4 12.3</td>
<td>2.0 2.6</td>
<td>5.3 8.1</td>
<td>2.8 2.0</td>
</tr>
<tr>
<td>2. Meerut</td>
<td>Hindu</td>
<td>16.4 1.8</td>
<td>26.7 28.1</td>
<td>15.3 16.3</td>
<td>0.0 3.1</td>
<td>3.4 8.3</td>
<td>1.1 3.6</td>
</tr>
<tr>
<td><strong>India: Tamil Nadu</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ramnathpuram</td>
<td>Hindu</td>
<td>80.2 71.0</td>
<td>28.9 28.9</td>
<td>17.1 17.9</td>
<td>3.0 1.9</td>
<td>5.2 3.8</td>
<td>1.8 1.4</td>
</tr>
<tr>
<td>4. Coimbatore</td>
<td>Hindu</td>
<td>35.7 41.8</td>
<td>29.1 29.1</td>
<td>17.9 18.6</td>
<td>4.2 4.1</td>
<td>5.5 5.4</td>
<td>2.4 2.5</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Rural Malays</td>
<td>Hindu</td>
<td>59.7 30.7</td>
<td>21.0 21.4</td>
<td>8.5 5.3</td>
<td>9.0 6.5</td>
<td>7.3 6.7</td>
<td>101 191</td>
</tr>
<tr>
<td>6. Rural Malays Chinese</td>
<td>23.7 9.2</td>
<td>30.0 30.7</td>
<td>19.8 21.0</td>
<td>8.5 5.3</td>
<td>9.0 6.5</td>
<td>7.3 6.7</td>
<td>101 191</td>
</tr>
<tr>
<td>7. Market Malays</td>
<td>Hindu</td>
<td>59.7 9.2</td>
<td>30.0 30.7</td>
<td>20.1 21.0</td>
<td>9.7 5.5</td>
<td>9.8 6.5</td>
<td>7.9 6.7</td>
</tr>
<tr>
<td>8. Market Malays Chinese</td>
<td>14.6</td>
<td>30.5 30.7</td>
<td>20.1 21.4</td>
<td>9.7 5.5</td>
<td>9.8 6.5</td>
<td>7.9 6.7</td>
<td>205 196</td>
</tr>
<tr>
<td>9. Urban Malays</td>
<td>Hindu</td>
<td>44.0 3.3</td>
<td>31.4 31.2</td>
<td>20.2 22.3</td>
<td>9.1 7.9</td>
<td>8.2 8.4</td>
<td>7.7 8.4</td>
</tr>
<tr>
<td>10. Urban Malays Chinese</td>
<td>23.3</td>
<td>31.4 31.2</td>
<td>20.2 22.3</td>
<td>9.1 7.9</td>
<td>8.2 8.4</td>
<td>7.7 8.4</td>
<td>210 183</td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Malay-speakers</td>
<td>Buddhist</td>
<td>30.8 1.8</td>
<td>29.5 29.6</td>
<td>16.9 20.7</td>
<td>5.2 7.2</td>
<td>4.4 7.5</td>
<td>4.3 6.0</td>
</tr>
<tr>
<td>12. Thai-speakers</td>
<td>Buddhist</td>
<td>41.9 5.3</td>
<td>30.1 29.3</td>
<td>18.8 19.2</td>
<td>5.8 5.6</td>
<td>5.7 6.2</td>
<td>6.2 4.7</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Zamboanga</td>
<td>Christian</td>
<td>37.5 3.5</td>
<td>28.7 28.9</td>
<td>18.7 20.2</td>
<td>4.5 7.1</td>
<td>5.3 6.6</td>
<td>2.8 2.2</td>
</tr>
<tr>
<td>14. Zamboanga</td>
<td>Christian</td>
<td>37.5 4.0</td>
<td>28.7 29.9</td>
<td>18.7 20.7</td>
<td>4.5 8.2</td>
<td>5.3 7.8</td>
<td>2.8 2.8</td>
</tr>
</tbody>
</table>
peared to form distinct social communities. There are four Muslim/non-Muslim contrasts in India, two in the north (Uttar Pradesh) and two in the south (Tamil Nadu). Within each state, two districts were selected, one relatively more developed and one relatively less developed, and communities were sampled from within subdistricts of each district, again with a socioeconomic development differential. Notwithstanding this attempt at stratification by socioeconomic status, there is one community—Muslims in a subdistrict of Pratapgarh, in Uttar Pradesh—where socioeconomic differences between neighboring Muslim villages exceed their aggregate differences relative to their Hindu neighbors.

The Malaysian communities are defined by religio-ethnic category and urban versus rural residence. The religio-ethnic categories are Malays, who are Muslim; Indians, Hindus only; and Chinese, who can be variously categorized with regard to religious affiliation. In Malaysia, unlike India, the distinctions among these groups are as much ethnic as they are religious (Leete 1996: Chapter 1). The urban samples come from a port city in the state of Selangor. The rural Indian and Chinese communities are found in the outskirts of this city; the rural Malay community comes from the state of Kelantan, near the border with Thailand. Also from this area is a community of Kelantanese market women, rural by origin but trading daily in an urban area. As can be seen in Table 2, these Malaysian communities are strongly differentiated by the extent of consanguineous marriage, which is most common among Hindus (with origins primarily in South India), less so among Malay Muslims, and least so among Chinese. There are comparatively few socioeconomic differences among the urban Malaysian groups. The comparison between rural Kelantanese Malays and their rural Chinese and Hindu “controls” (who are in Selangor) suffers from the geographic and provincial separation of the Malays from the other two groups; it has the compensating virtue that the rural Malays are advantaged in terms of education, thus giving them a theoretical “leg up” in prospects for fertility control.

Muslim communities in Thailand are found primarily in the country’s south—in our study, near the border with Malaysia. These Thai Muslim communities are ethnically Malay; they are best distinguished from their ethnic Thai neighbors by their high proportions married to relatives. Otherwise, as shown in Table 2, the Muslim community in Pattani has lower levels of education than the Muslim community in Songkhla, which is educationally similar to (and perhaps wealthier than) one of the two rural Thai Buddhist communities.

The Philippine data included rural Muslims from the country’s south but no Christians from that area. Thus, the Philippine data provide the weakest opportunity for a true controlled comparison. Given these data, Muslim and non-Muslim differences are not separable from regional differences. With this weakness in mind, we compare southern Philippine Muslims (from
zamboanga) with a rural population that has a similar economic base (Mindoro, in the central Philippines), and with two other rural communities aggregated (one from the north, from La Union, and one from the mid-central region, from Camarines Sur). The Philippine communities are uniformly poor, at least with regard to household possessions. Educational levels are, however, comparatively high but are lowest in the Muslim communities.

**Measurement of autonomy**

We consider three aspects of wives’ power and autonomy: 1) their freedom of physical movement, that is, whether wives need permission before going to various places; 2) their say in economic decisions; and 3) the interpersonal control exercised by husbands, both psychological and physical. While not exhaustive, these measures draw from many aspects of power and autonomy that wives confront daily.

The first aspect of women’s autonomy—their freedom of movement—is likely to be crucial if women are to translate a desire to end childbearing into effective contraceptive use. Freedom of movement is a signal feature of autonomy, namely the ability “to obtain information and to use it as the basis for making decisions about one’s private concerns and those of one’s intimates” (Dyson and Moore 1983: 45). Freedom of movement was measured by asking whether a woman must get permission before visiting various places: the community center, the local market, a health center or clinic, the fields around the village, and the homes of friends and relatives. Wives’ freedom of movement score is increased by 1.0 for each place she can go without permission. In the Thailand data, only a general question was asked: whether there was any place the woman cannot go without getting permission from her husband or other family members. For the Thai communities we substitute this dichotomous measure for the index described above.

Women’s say in economic decisions is measured through a seven-point scale created by summing responses to six dichotomous items. A woman was asked whether or not she 1) had any say in household decisions about major purchases; 2) had any say in decisions about whether she should work outside the home; 3) had the sole or greatest say in major purchasing decisions; 4) had the sole or greatest say in decisions about her employment; 5) felt free to buy a dress or sari without getting permission from other household members; and 6) felt free to buy a small item of jewelry without getting permission from other household members. Previous analysis of this scale has shown that it does not simply reflect the household’s income level (Mason, Smith, and Morgan 1998).

Third, the interpersonal controls exercised by the husband are measured through two items: the first asks a woman whether she is afraid to disagree with her husband for fear he will become angry with her. The sec-
ond item asks whether the husband ever hits or beats her. We combine these dichotomous items into a noncoercion scale with range 0–2 (i.e., 2 if not afraid to disagree and if husband has never hit or beat her).\(^{10}\)

Ghuman, Lee, and Smith (2000) have examined the measurement properties of these items by taking advantage of parallel reports from wives and husbands. Their analysis suggests that the items have similar meanings and metrics within countries but not between countries. Such a result provides an additional rationale for the paired within-country contrasts on which our analysis focuses.

**Findings**

In a review of dominant fertility theories Smith (1989: 171) writes, “The most important causal factors in these theories—typically social or cultural institutions, occasionally emergent properties of the collective behavior of individuals—are properly conceptualized at the macro level.” Our analysis follows Smith by adopting a comparative research design that features variation at the macro level. Smith also called for complementary analysis at the individual level, in recognition of the processes through which systemic properties are translated into individual behaviors. As such, our analysis begins with 14 community comparisons, focusing primarily on pairwise differences in community means with regard to measures of women’s autonomy and fertility. Subsequently, we test the association between religion, women’s autonomy, and the outcomes within matched community pairs to observe effects operating at the individual level. Our findings are organized around four general questions.

Across matched Muslim and non-Muslim communities,

1) Are there consistent differences in the fertility behavior of Muslims and non-Muslims?

2) Are there consistent differences in the levels of autonomy afforded women between Muslim and non-Muslim groups?

3) Are larger aggregate differences in autonomy found in the same settings as larger differences in fertility outcomes (i.e., a comparison of differences between differences)?

Within samples of matched communities,

4) Are individual-level differences in autonomy associated with fertility outcomes, and does their inclusion in a multi-level model attenuate the effects of religion on fertility outcomes?

With respect to the first question, Table 3 shows the mean number of children ever born to women married ten or more years,\(^{11}\) the proportion of all wives who want more children, and among those who do not want additional children the proportion not using contraception (i.e., those at a higher risk of an unwanted pregnancy). All estimates are standardized for age and marital duration or parity. Focusing first on column 1 (i.e., mean
TABLE 3  Mean number of children ever born, percent of women wanting more children, and percent of women not using contraception among those wanting no more children, for contrasting pairs of Muslim and non-Muslim communities

<table>
<thead>
<tr>
<th>Country/ community</th>
<th>Non-Muslim community comparison</th>
<th>Mean number of children ever born&lt;sup&gt;a&lt;/sup&gt; (1)</th>
<th>Percent wanting more children&lt;sup&gt;b&lt;/sup&gt; (2)</th>
<th>Percent not using contraception among those not wanting more children&lt;sup&gt;c&lt;/sup&gt; (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Non-Muslim</td>
<td>Non-Muslim</td>
<td>Non-Muslim</td>
</tr>
<tr>
<td></td>
<td>Prediction:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India: Uttar Pradesh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pratapgarh Hindu</td>
<td>Hindu</td>
<td>5.42</td>
<td>4.50</td>
<td>60</td>
</tr>
<tr>
<td>2. Meerut Hindu</td>
<td>Hindu</td>
<td>5.11</td>
<td>4.46</td>
<td>48</td>
</tr>
<tr>
<td>India: Tamil Nadu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ramnathpuram Hindu</td>
<td>Hindu</td>
<td>4.48</td>
<td>4.53</td>
<td>36</td>
</tr>
<tr>
<td>4. Coimbatore Hindu</td>
<td>Hindu</td>
<td>3.54</td>
<td>2.49</td>
<td>25</td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Rural Malays Hindu</td>
<td>Hindu</td>
<td>4.96</td>
<td>4.23</td>
<td>87</td>
</tr>
<tr>
<td>6. Rural Malays Chinese</td>
<td>Hindu</td>
<td>4.96</td>
<td>4.35</td>
<td>87</td>
</tr>
<tr>
<td>7. Market Malays Hindu</td>
<td>Hindu</td>
<td>3.99</td>
<td>4.23</td>
<td>89</td>
</tr>
<tr>
<td>9. Urban Malays Hindu</td>
<td>Hindu</td>
<td>4.61</td>
<td>3.84</td>
<td>69</td>
</tr>
<tr>
<td>10. Urban Malays Chinese</td>
<td>Hindu</td>
<td>4.61</td>
<td>3.82</td>
<td>64</td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Malay-speakers Buddhist</td>
<td></td>
<td>3.77</td>
<td>3.08</td>
<td>74</td>
</tr>
<tr>
<td>12. Thai-speakers Buddhist</td>
<td></td>
<td>2.97</td>
<td>3.15</td>
<td>35</td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Zamboanga Christian</td>
<td></td>
<td>5.32</td>
<td>5.13</td>
<td>77</td>
</tr>
<tr>
<td>14. Zamboanga Christian</td>
<td></td>
<td>5.32</td>
<td>4.55</td>
<td>77</td>
</tr>
<tr>
<td>Correct prediction and difference is significant&lt;sup&gt;e&lt;/sup&gt;</td>
<td></td>
<td>8 out of 14 contrasts</td>
<td>11 out of 14 contrasts</td>
<td>12 out of 14 contrasts</td>
</tr>
</tbody>
</table>

<sup>a</sup>Includes only women married ten or more years; standardized for age.
<br><sup>b</sup>Includes women currently pregnant, who were asked about additional children; standardized for age and parity.
<br><sup>c</sup>Excludes women currently pregnant; standardized for age and parity.
<br><sup>d</sup>Not standardized—sample too small.
<br><sup>e</sup>Counts only statistically significant differences (p<.05) in the predicted direction.

...differences in children ever born), we see substantially higher fertility among Muslims than Hindus in Uttar Pradesh, regardless of the socioeconomic level of the community. Fertility is substantially lower in Tamil Nadu for both Muslims and Hindus. Also note that in Tamil Nadu a sharp difference is observed between Muslims and non-Muslims only in contrast 4, that is, when communities from the more developed district or subdistrict are contrasted. Thus, these data show higher Muslim fertility in three of the four Indian settings.
In addition to these differences in parity, column 2 shows that Muslims compared to non-Muslims are more likely to report wanting more children in the north Indian contrasts (i.e., communities 1 and 2) but not in the south (communities 3 and 4). Finally, among women who want no more children, Muslims are more likely to be at high risk of an unwanted pregnancy (i.e., not wanting more children and not using contraception) in all four Indian contrasts. Female sterilization (surgical contraception) is a major form of birth control in all communities studied, both in India and elsewhere (results not shown here). Moreover, differences in the proportion sterilized compared to the proportion using other modern methods account for much of the observed differences in contraceptive use between Muslim and non-Muslim groups.

Results for other countries are generally similar to those for India, that is, Muslims are more likely to want more children, but there are exceptions. In Malaysia, Malays have the expected differences in desire for more children in both rural and urban areas over both Indians and Chinese. The Malay market women (with substantial freedom of movement, as we will document) have fertility levels that approximate those of Indian and Chinese women. On the subsequent measures, Malays are more likely to report a desire for more children, and, when they do not want more children, they are less likely to use contraception.

Results vary substantially across the two Thai contrasts. The first Thai contrast provides sharp differences in the expected direction (i.e., the Muslim community shows a desire for more children). The second contrast shows higher fertility among non-Muslims and a roughly equal proportion reporting a desire for more children. We do not understand why results differ so greatly, but Table 2 shows that the two sampled Muslim settings differ on a variety of dimensions. As in all previous contrasts, Muslim wives who want no more children are less likely to be using contraception. Finally, all Philippine contrasts conform to predictions of greater Muslim desires for more children.

Overall, then, these community contrasts show strikingly different levels of fertility, desires regarding additional children, and contraceptive use. The last row of Table 3 shows that 8 out of 14, 11 out of 14, and 12 out of 14 differences are statistically significant and conform to expectations that Muslims would indicate a desire for more children. Given that clear differences exist, these data provide an appropriate setting for exploring the reasons for observed differences.

Do Muslim and non-Muslim communities show parallel differences in levels of autonomy? Such differences would be consistent with arguments that Muslim communities are more patriarchal. Table 4 shows mean values for the freedom of movement, economic power, and noncoercion indexes for Muslims and non-Muslims in each of the 14 community comparisons.
Looking first at the Indian contrasts, we see large differences between Uttar Pradesh and Tamil Nadu on freedom of movement; as expected women in the south (i.e., Tamil Nadu) exhibit greater freedom of movement (Dyson and Moore 1983; Basu 1992; Jejeebhoy and Sathar 2001). But within regions, differences are modest; nevertheless in three of the four contrasts Muslims have lower freedom of movement scores (in the fourth the difference is trivial). In Malaysia, there are large differences between Muslims and Chinese, with Chinese women exhibiting very high scores for autono-

### TABLE 4  Mean scores for indexes of freedom of movement, economic power, and noncoercion, for contrasting pairs of Muslim and non-Muslim communities

<table>
<thead>
<tr>
<th>Country/Community</th>
<th>Non-Muslim Community</th>
<th>Freedom of movement index&lt;sup&gt;a&lt;/sup&gt; (1)</th>
<th>Economic power index&lt;sup&gt;a&lt;/sup&gt; (2)</th>
<th>Noncoercion index&lt;sup&gt;a&lt;/sup&gt; (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>India: Uttar Pradesh</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Pratapgarh Hindu</td>
<td>0.61 0.72</td>
<td>1.30 1.18</td>
<td>1.37 1.18</td>
<td></td>
</tr>
<tr>
<td>2. Meerut Hindu</td>
<td>0.28 0.29</td>
<td>1.24 1.34</td>
<td>1.02 1.08</td>
<td></td>
</tr>
<tr>
<td><strong>India: Tamil Nadu</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ramnathpuram Hindu</td>
<td>2.59 2.91</td>
<td>1.72 2.04</td>
<td>1.67 1.58</td>
<td></td>
</tr>
<tr>
<td>4. Coimbatore Hindu</td>
<td>2.06 2.85</td>
<td>1.89 2.32</td>
<td>1.40 1.60</td>
<td></td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Rural Malays Hindu</td>
<td>2.00 1.69</td>
<td>1.24&lt;sup&gt;b&lt;/sup&gt; 0.80&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.54&lt;sup&gt;c&lt;/sup&gt; 0.52&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>6. Rural Malays Chinese</td>
<td>2.09 4.34</td>
<td>1.24&lt;sup&gt;b&lt;/sup&gt; 1.51&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.54&lt;sup&gt;c&lt;/sup&gt; 0.75&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>7. Market Malays Hindu</td>
<td>2.80 1.69</td>
<td>2.71 2.61</td>
<td>0.58&lt;sup&gt;c&lt;/sup&gt; 0.52&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>8. Market Malays Chinese</td>
<td>2.80 4.34</td>
<td>2.71 3.13</td>
<td>0.58&lt;sup&gt;c&lt;/sup&gt; 0.75&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>9. Urban Malays Hindu</td>
<td>2.26 2.09</td>
<td>2.69 2.35</td>
<td>0.56&lt;sup&gt;c&lt;/sup&gt; 0.50&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>10. Urban Malays Chinese</td>
<td>2.26 4.76</td>
<td>2.69 3.63</td>
<td>0.56&lt;sup&gt;c&lt;/sup&gt; 0.84&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Malay-speakers Buddhist</td>
<td>0.13&lt;sup&gt;d&lt;/sup&gt; 0.49&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.64 3.71</td>
<td>1.27 1.11</td>
<td></td>
</tr>
<tr>
<td>12. Thai-speakers Buddhist</td>
<td>0.27&lt;sup&gt;d&lt;/sup&gt; 0.44&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.03 3.84</td>
<td>1.12 1.03</td>
<td></td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Zamboanga Christian</td>
<td>0.29 3.00</td>
<td>3.65 3.66</td>
<td>1.10 1.35</td>
<td></td>
</tr>
<tr>
<td>14. Zamboanga Christian</td>
<td>0.29 3.18</td>
<td>3.65 3.41</td>
<td>1.10 1.56</td>
<td></td>
</tr>
</tbody>
</table>

Correct prediction and difference is significant<sup>e</sup> contrasts

---

<sup>a</sup>Estimates for paired Muslim and non-Muslim groups are based on a common age distribution, i.e., standardized for age.

<sup>b</sup>Based on two items only: purchase of sari or dress, and purchase of jewelry.

<sup>c</sup>Based on single item only: fear of disagreeing with husband.

<sup>d</sup>Based on single item only: not free to go everywhere one chooses.

<sup>e</sup>Counts only statistically significant differences (p<.05) in the predicted direction.
mous movement. But in all three cases, Malays (Muslims) have higher values than Indians (Hindus) although these differences are not large. Further, the rural women who are engaged in market work, which requires substantial autonomous movement, show the expected higher values on the freedom of movement index compared with other rural Malay women. In Thailand and the Philippines, differences are large and consistent: Muslims have less freedom of movement than non-Muslims (Thai Buddhists and Christian Filipinos). In sum, Muslims have reduced freedom of movement compared to non-Muslims, but this finding is not without exceptions: only 9 of 14 contrasts show that Muslims have significantly less freedom of movement (see last row of Table 4).

Examination of differences on the other two measures shows less support for the claim of less autonomy among Muslim women. Only 4 out of 14 contrasts show Muslims with significantly less economic power; in only 6 out of 14 contrasts is the difference on the noncoercion index significant and in the predicted direction. These weak links between the Muslim/non-Muslim contrasts and measures of women’s autonomy are consistent with additional analyses reported elsewhere (Mason, Smith, and Morgan 1998).

We now ask the third and central question: Are larger religious/ethnic, aggregate differences in autonomy found in the same settings as larger differences in the fertility-related measures (i.e., a comparison of differences between differences)? A “yes” answer implies an aggregate-level association. In 9 out of 14 cases, differences calculated from the freedom of movement index (column 1 of Table 4) and differences in desire for additional children (column 2 of Table 3) are both in the predicted direction. That is, Muslims have lower freedom of movement and are more likely to desire additional children compared to their matched non-Muslim community. Similarly, differences in the economic power index and differences in being at risk of an unwanted pregnancy both conform to predictions in 8 out of 14 cases. Only limited evidence of an aggregate-level association can be found in these comparisons and in others not presented here. Figure 1 is illustrative and focuses on the autonomy and fertility measures that showed the greatest Muslim/non-Muslim difference. Using standardized means from Tables 3 and 4, Figure 1 shows a scatterplot of Muslim and non-Muslim differences (Muslim minus non-Muslim) on the freedom of movement scale by differences in the proportion at risk of an unwanted pregnancy. Lower autonomy among Muslims than non-Muslims (indicated by negative values on the x-axis) should be associated with larger differences in the proportions at risk of an unwanted pregnancy (indicated by larger positive values on the y-axis), that is, a negative association. No such association is visible.

Inspection of particular comparisons underlines this finding. The contrasting communities with the largest and smallest differences in the proportion at risk of unwanted pregnancy, on the vertical scale (respectively, community 8. Malaysia: Rural Malay market women vs. Chinese; and com-
munity 4. India, Tamil Nadu: Muslim/Hindu) show only modest differences on the autonomy measure (the horizontal scale). The Philippine communities (13 and 14) show the greatest Muslim deficit of freedom of movement (i.e., values of nearly –3) but have only a modestly higher risk of an unwanted pregnancy compared to Christians (approximately 16 percentage points higher). Two of the Malaysian controlled comparisons, community 5 (rural/Hindu) and community 7 (rural market Malays/Hindu), provide unusual settings where Muslim freedom of movement is greater than in the control group (in these cases a Hindu community). To be consistent with expectations, these Muslim settings should not show an excess proportion at risk of an unwanted pregnancy compared to groups that have less autonomy. Yet the excess proportion at risk, shown as the distance above the horizontal axis, is substantial. Moreover, the within-country comparison between communities 5 and 7 shows that rural Malay market women have a higher autonomy score and a higher excess proportion at risk of unwanted pregnancy. Again the hypothesis that greater female autonomy produces lower fertility would lead to the opposite result. Comparisons between communities 9 and 10 are urban Malaysian contrasts of Muslims with Hindus and Chinese, respectively. Here the Muslims show substantial defi-
icits in freedom of movement compared to Chinese but rough parity with Hindus (i.e., communities 9 and 10 differ substantially on the horizontal scale). In comparison, Muslims show approximately equal excesses in the proportion at risk of an unwanted pregnancy vis-à-vis both comparison groups (i.e., they are comparable on the vertical scale).

The Indian data provide the strongest design for testing our hypothesis in the sense of having better-matched controlled comparisons between Muslim and non-Muslim groups. However, Muslim deficits (compared to Hindus) on the freedom of movement scale are modest compared to some others observed. The variation observed across these four contrasts (communities 1 through 4) is positively associated with the proportion at risk of an unwanted pregnancy—a pattern counter to our hypothesis. In sum, there is little evidence in this figure of the predicted, negative association. The correlation calculated from these data is .15—not in the predicted direction and of very modest magnitude.

The shaded area of Table 5 shows similar correlation coefficients measuring the associations between differences on the full range of autonomy measures and differences on the fertility variables. As described above, negative correlations conform to expectations (that Muslims’ lower autonomy is associated with more pronatalist outcomes). Most correlations are modest in magnitude, and 4 out of 9 comparisons (in the shaded area) do not

<table>
<thead>
<tr>
<th>TABLE 5 Correlation of (Muslim/non-Muslim) differences on selected variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freedom of movement</strong> (1)</td>
</tr>
<tr>
<td>(1) 1.00</td>
</tr>
<tr>
<td>(14) (10) (6) (12) (12) (12)</td>
</tr>
<tr>
<td>(2) 1.00</td>
</tr>
<tr>
<td>(14) (12) (12) (12)</td>
</tr>
<tr>
<td>(3) 1.00</td>
</tr>
<tr>
<td>(14) (8) (8)</td>
</tr>
<tr>
<td>(4) 1.00</td>
</tr>
<tr>
<td>(14) (14) (14)</td>
</tr>
<tr>
<td>(5) 1.00</td>
</tr>
<tr>
<td>(14) (14)</td>
</tr>
<tr>
<td>(6) 1.00</td>
</tr>
<tr>
<td>(14)</td>
</tr>
</tbody>
</table>

^ Significant at .10 level

NOTE: Numbers in parentheses represent number of observations (i.e., matched communities listed in Table 1).
show the predicted negative sign. Only one correlation is significant at the .10 level—not impressive given that nine correlations are estimated. Overall, across multiple measures of autonomy and fertility, we find little evidence of an aggregate-level negative association between religious/ethnic differences in autonomy and differences on the fertility variables.

Our final question is whether aggregate-level associations result “via their effects on the conditional distributions of individual-level characteristics associated with fertility” or whether “community-level variables…account for the observed pattern of context effects” (Smith 1989: 181). This question is less interesting given the results above, namely that aggregate-level associations are, at best, modest. Our results suggest that differences between Muslims and non-Muslims in autonomy play only a limited role in explaining religious or ethnic fertility differences. Table 6 provides further evidence through a series of logistic regression models. We chose autonomy and fertility variables that were most strongly associated with religion or ethnicity in Tables 3 and 4: freedom of movement and being at risk of an unwanted pregnancy. (Results are very similar if we substitute other autonomy measures for freedom of movement or if we substitute desire for more children for contraceptive use.) For each of the 14 contrasting communities, we estimate the effect of religion or ethnicity net of age and parity (column 1). We then introduce the measure of the woman’s freedom of movement (column 2). The contrast of the two coefficients (i.e., 2.11 and 2.15, for the first community contrast) provides evidence on the role of freedom of movement as an intervening mechanism (producing a greater likelihood of being at higher risk of an unwanted pregnancy). In the case of the first community contrast (row 1), there is no attenuation of the religious/ethnic effect. Muslims are slightly more than twice as likely as Hindus to be at a higher risk of an unwanted pregnancy regardless of scores on the freedom of movement index. Columns 3 and 4 repeat the exercise with additional control variables for family income, an index of household possessions, and a measure of the wife’s educational attainment. Net of additional controls, the estimated religious/ethnic effect is larger (i.e., 2.56) than in column 1; but, as before, no attenuation of the effect accompanies the control on freedom of movement (comparing estimates in columns 3 and 4). Parallel results are obtained for all 14 contrasts.

Columns 5 and 6 show the effect of freedom of movement estimated in models given in columns 2 and 4. Our hypothesis is that these coefficients would be less than 1.0 (i.e., higher values on the freedom of movement index would be associated with a reduced likelihood of being at risk of an unwanted pregnancy). In neither model (column 5 or 6) and in none of the 14 contrasting communities is there a statistically significant effect of freedom of movement. Moreover, effects are as likely to be greater than 1.0 as less than this value. Thus, no strong or consistent evidence suggests that
freedom of movement influences the likelihood of being at a higher risk of an unwanted pregnancy.

While it has not been a focus of this analysis, some have argued that Muslim/non-Muslim differences reflect the disadvantaged socioeconomic position of Muslims. Data used here are strongest with respect to measurement of female autonomy but did include measures of education and a measure of income/wealth (presented in Table 2). These data did not show consistent Muslim disadvantage for the communities we studied. Consistent with this finding, the introduction of individual-level socioeconomic controls (in Table 6) does not attenuate the religious or ethnic effects. One can

| TABLE 6 Estimated effects of an individual’s religion or ethnicity and freedom of movement on being at risk of an unwanted pregnancy: Status of Women and Fertility data, Muslim/non-Muslim community contrasts |
|-----------------|------------------|------------------|------------------|------------------|------------------|
| Country/community | Non- Muslim | Age, parity controlsa | Age, parity, freedom of movementb | Age, parity, SES, movement controlsc | Age, parity, freedom of movementb |
|                  | comparison      | (1)              | (2)              | (3)              | (4)              |
| India: Uttar Pradesh |
| 1. Pratapgarh     | Hindu           | 2.11*            | 2.15*            | 2.56*            | 2.57*            | 1.06 | .98 |
| 2. Meerut         | Hindu           | 3.55**           | 3.65**           | 2.59**           | 2.67**           | .85  | .85 |
| India: Tamil Nadu |
| 3. Ramnathpuram   | Hindu           | 2.43**           | 2.43**           | 2.60**           | 2.60**           | .99  | 1.00 |
| 4. Coimbatore     | Hindu           | 1.41             | 1.40             | 1.52             | 1.50             | .98  | .97 |
| Malaysia          |
| 5. Rural Malays   | Hindu           | 3.12             | 3.28             | 4.39*            | 4.82*            | 1.08 | 1.06 |
| 7. Market Malays  | Hindu           | 8.10**           | 10.20**          | 8.13**           | 9.22**           | 1.05 | 1.03 |
| 8. Market Malays  | Chinese         | 18.20**          | 22.20**          | 34.10**          | 35.90**          | .99  | .94 |
| 9. Urban Malays   | Hindu           | 4.35**           | 4.78**           | 4.44*            | 4.95**           | 1.10 | 1.05 |
| 10. Urban Malays  | Chinese         | 3.27**           | 4.83**           | 2.27             | 2.90             | 1.13 | 1.06 |
| Thailand          |
| 11. Malay-speakers| Buddhist        | 25.50**          | 107.80d**        | 30.40**          | —e               | .09d | —e |
| 12. Thai-speakers | Buddhist        | 2.98**           | 3.06d*           | 3.86*            | 3.87d*           | .79d | .93d |
| Philippines       |
| 13. Zamboanga     | Christian       | 1.78             | 1.13             | 1.50             | .97              | .84  | .85 |
| 14. Zamboanga     | Christian       | 1.63             | 1.57             | 1.45             | 1.41             | .98  | .99 |

*aSignificant at .05 level; **significant at .01 level

a Estimates are net of age and parity. Age is controlled by introducing a third-order polynomial linear. Let x = (age – mean age), Y= b1 x + b2 x2 + b3 x3. Parity is represented by a linear term for number of children and a contrast between those having less than two children and those having two or more.
b Freedom of movement scale described in text.
c SES (socioeconomic status) controls include controls on family income, household possessions, and wife’s education.
d 1=can go all places without asking permission; 0 otherwise.
e Estimates are infinitely large.
see this by comparing coefficients in column 1 with those in column 3, or those in column 2 with those in column 4. If socioeconomic differentials were responsible for the observed fertility differences, then controls on these indicators (in columns 3 and 4) should have attenuated religious or ethnic differences shown in columns 1 and 2. No consistent attenuation is observed.

Summary and conclusion

In selected settings in four Asian countries, Muslim wives (compared to non-Muslim wives) usually have more children, are more likely to desire additional children, and are less likely to be using contraception when they desire no more children. Contrary to the primary hypothesis examined here, this greater pronatalist behavior/attitude cannot be accounted for by any general tendency of Muslim women to have less autonomy than non-Muslim women. We found very weak evidence for a link between religion or ethnicity and women’s autonomy (also see Jejeebhoy and Sathar 2001) and no evidence at the individual level that women’s autonomy was associated with fertility measures.

Despite credible theoretical arguments in support of the link between religion, women’s status, and fertility, we argue that our empirical evidence to the contrary is strong. First, the data from the Survey on the Status of Women and Fertility contain direct measurement of multiple dimensions of women’s autonomy. Regardless of whether one considers freedom of movement, economic power, or spousal coercion, results are consistent: autonomy differentials do not explain the greater pronatalist attitudes of the Muslim communities that we have studied. Second, our research design permitted multiple paired-comparisons across diverse settings. The literature contains many examples of comparisons of two settings. The weakness of such designs is that one is uncertain whether differences should be attributed to idiosyncratic explanations or to more general ones. With 14 comparisons we are in a stronger position to assess whether general explanations are appropriate. The fact that our comparisons span diverse sociocultural areas provides additional evidence that our findings can be generalized. Finally, our empirical work has examined the link of religion–autonomy–fertility at the appropriate conceptual level, the aggregate level. We have also considered the possibility that contextual-level effects could operate by shifting the distributions of important micro-level correlates of fertility.

While it has not been the focus of this analysis or the strength of the data we use, we have examined the hypothesis that greater pronatalist attitudes of Muslims result from greater poverty or other aspects of socioeconomic disadvantage. Controls on measures of women’s education and on measures of household consumption have not attenuated the greater pronatalist attitudes of Muslim groups compared to non-Muslims.
These empirical results beg the question: in the settings we studied, what caused the greater pronatalist attitudes of Muslim compared to non-Muslim groups? Two general explanations (one focusing on women’s autonomy, another on socioeconomic differences between groups) have found no support in our data. An alternative tack could focus on a set of separate explanations for these settings. As noted earlier, Jeffery and Jeffery (1997) offered a highly contextualized explanation for a single paired comparison of Muslims and Hindus in north India. No doubt differences in the social histories of these communities are relevant, but most of the communities we studied, like the pair studied by Jeffery and Jeffery, showed higher levels of childbearing among Muslims. Our future work will seek explanations for these similar outcomes despite unquestioned differences between these individual places. A possible explanation, suggested to us by various commentaries in the literature, links demographic difference to group identity and political disadvantage (e.g., Goldscheider and Uhlenberg 1969; Kreager 1986; Moghadam 1992; Siapno 1994; Basu 1997). To a great extent, religion is politics in this region of the world. Conflict between groups, drawn across explicitly religious lines, is central to South Asian cultures, and it is also relevant in Southeast Asia. The position of women and women’s roles in reproduction occupy central positions in religious, popular, and political discourse. It may be conjectured that the Muslim community response to these concerns, especially when they are a minority, is a stronger emphasis on aspects of family life conducive to childbearing or opposition to particular forms of birth control, for example sterilization. Larger family sizes, greater demand for children, and higher risks of unwanted pregnancies could be the unintended outcomes of these group struggles.

Even if this speculation is correct, these religious and political effects favorable to higher levels of childbearing—which may lend conformity to the present experiences of Muslims in India, Malaysia, Thailand, and the Philippines—are nonetheless susceptible to change. The linking of largely ascribed characteristics to behavioral outcomes does not imply perpetual group differences. Earlier we noted that Islam is open to various interpretations regarding the roles of women and the acceptability of contraception. The dominant Muslim position on these issues is not immutable, nor is the saliency of such differences in political debates. The way these forces manifest themselves may vary sharply between countries or across regions within countries where Muslims are minority members and where they are not. But globalization of the economy and of communication also raises the possibility of strong pan-Islamic influences and responses.

We did not test this concluding speculation in our current work; rather it constitutes a post hoc explanation for the fertility differences that we could not explain by differences in women’s autonomy or socioeconomic status.
Notes

This research was supported by Grants RO1 HD33757 and RO1 HD33791 from the National Institute of Child Health and Human Development to the East-West Center and the University of Pennsylvania. An earlier version of this article was presented at the 1998 Annual Meeting of the Population Association of America.

1 Muslims in certain regions of South and Southeast Asia have experienced recent and significant declines in fertility, e.g., in Indonesia. However, in the region overall there prevailed a general pattern for Muslims to display higher levels of fertility, a pattern that is still evident (see Kirk 1968; Weeks 1988).

2 In the SWAF data, respondents were asked why they did not use contraception. Muslims were generally more likely than Hindus to say “against religion,” but it was not a response given routinely. In contrast, Knodel et al. (1999) report substantial evidence that Thai Muslims see contraception as “against their religion.” Boonstra’s (2001) overview is consistent with our claim.

3 Although direct injunctions, or fatwas, against sterilization have been issued by Islamic jurists, opposition is not unanimous. Fatwas state that use of modern methods resulting in permanent infertility contradict the will of Allah. Some jurists refer to prohibitions against infanticide and equate birth control with infanticide. On the other hand, sterilization operations for medical indications are rarely objected to because these operations are viewed as methods of treatment.

4 Specifically, the Jat community is politically and economically dominant, making low fertility (which prevents land fragmentation) and education of children preferred strategies.

5 Data, codebooks, and other descriptive material are available at «http://www.pop.upenn.edu/swaf»

6 The Chinese reported their religion primarily as Taoist, secondarily as Buddhist, with a smattering of Christians, other, and none. We have not subdivided this group because the relevant comparison is Chinese (an ethnic group) versus Muslim Malay (a religio-ethnic group).

7 Provinces in Thailand are many, hence small; communities in the same province are therefore close to one another. Differences between Muslims and (ethnic Thai) Buddhists in Songkhla Province are inevitably confounded by differences between rural and urban communities. There were roughly a dozen Buddhists in the rural Muslim community, and a similar number of Muslims in the urban Thai Buddhist community—not enough to sustain explicit comparisons. These small minorities have not been included in our calculations.

8 For formal analysis of differences across paired settings (i.e., in Table 5), the Thai data on freedom of movement cannot be usefully compared with data for the other three countries and are excluded.

9 A reduced set of these items was asked in paired settings 5 and 6. Thus, these data are excluded from calculations in Table 5, as described in note 8.

10 The second item was not asked in the Malaysian paired settings. Thus, these comparisons are not included in calculations shown in Table 5.

11 We restrict the sample to women who have been married at least ten years so that differences in fertility behavior could accumulate over time. At short durations the potential for substantial fertility differentials is small.

References


Uncertainties in the Composition of World Population in the Twenty-First Century

MAX SINGER

For demographers and for the public at large, interest in long-range global population projections has been almost exclusively centered on future population size and, to some extent, on changes in the age structure. Population momentum, reflecting the influence of the initial age distribution on population dynamics, reaches far into the future and makes substantial population growth inevitable, hence broadly predictable, in countries in which fertility is still high or has declined only recently. This element of quasi-certainty notwithstanding, the unpredictability of future demographic behavior, especially fertility behavior when fertility is below replacement level, imparts major uncertainties in forecasting population size in particular countries, regions, and for the world as a whole. To some degree, the same is true about the future shape of the age structure. Such uncertainties rapidly widen as the time period contemplated is extended.

The customary method of dealing with such uncertainties is to prepare alternative population projections: projections incorporating varying assumptions about the future evolution of key demographic parameters. The best-known such projections, those of the United Nations Population Division, keep the complexity of the resulting calculations within manageable limits by preparing three variants only: a “medium” projection bracketed by “high” and “low” projections. These differ only in the assumed future trajectory of fertility rates. Assumed future mortality change and rates of international migration (the latter modestly affecting country and regional projections) are taken as identical in each of the three sets.

The divergence of the UN-style high and low variant projections from the most often cited medium projections tends to grow fairly rapidly over time. For example, in the most recent UN projections the global population total in 2050 is 9.3 billion according to the medium variant, but it is 10.9 billion in the high and 7.7 in the low variant. These figures, and correspond-
ing regional figures, are calculated as the sum of individual country-level projections. In presenting these projections, it is routinely assumed that while the specific parameters affecting the calculation differ from country to country, they move in a parallel fashion, fertility rates in each country following either high, medium, or low trajectories.

But thinking about future population changes along this line obscures the potential scope of another uncertainty in world population dynamics, in many ways as interesting and important as the potential variations in population size: uncertainty in the composition of the global total by the relative sizes of its constituting units. Of course, the differing impact of population momentum and, in general, the differences in the initial fertility and mortality conditions of the population generate shifts over time in the relative sizes of countries and regions. But the routine assumption that these shifts will occur as described within the variant projection families—high, medium, or low—is apt to greatly underestimate the true extent of the potential compositional changes within the global total.

The aim of this note is to briefly explore this aspect of future global population dynamics. The true extent of the future compositional variation (variation in relative population sizes of countries or regions at given points in time) is of course indeterminate, much as the true level of future fertility is unknown, hence variations in future population size over time are indeterminate. But just as the potential uncertainties concerning the latter can be illustrated by comparing the implications of alternative fertility trajectories, the potential uncertainties of population structure can be illustrated by assuming different combinations of high and low fertility trajectories as affecting component parts—countries and/or regions—of the global population.

In carrying out such illustrative calculations we use a set of long-range population projections prepared at the Hudson Institute. Results of these projections up to 2100 are presented in summary fashion in Table 1. To keep the exercise within manageable limits, the global population is represented as the sum of just six constituting units and only the results of high and low projections are shown in the table. Each of the world’s three largest countries is presented separately. The rest of the world is shown divided into three aggregates with reference to fertility conditions prevailing in 2000: countries with fertility below replacement level (consisting of 51 countries); countries with pretransitional—not-yet-declining—fertility (20 countries); and countries in which fertility is above replacement but has been declining (78 countries). A more detailed description of the projections is provided in the Appendix. As in the UN projections, only a single set of future mortality assumptions is used: high and low projections are distinguished solely by the assumed fertility trajectories. The preference for the Hudson set reflects the assumption that fertility trends, whether high or low, will be generally below those assumed by the latest UN projections (United Nations 2001). It is anticipated that key fertility assumptions in the forthcom-
ing revision of the UN set will be closer to those in the Hudson Institute projections than to the UN’s current projections.

Although our interest here is not in future population size per se, we may note that according to the Hudson Institute projections, the size of the global population at the end of the twenty-first century will be below its midcentury level even under the high fertility assumption, and the low fertility assumption implies a global population size in 2100 of some 22 percent smaller than the 2000 population. By 2100, the difference between the high and low projections is very large: for the global total amounting to 4.4 billion. There are substantial shifts in the relative shares of the six component regions/countries (as shown in the lower panel of Table 1), reflecting the effects of population momentum and the differing starting points in fertility levels that constrain the boundaries within which future fertility trends can be reasonably envisaged. Yet the percentage point differences in these shares under the high and low projections in both 2050 and 2100 are remarkably modest—as they would be in almost any set of projections using parallel fertility trajectories. It is the plausibility of the latter results that we wish to question here.

We do so through a series of simple illustrative calculations the mechanics of which are set out in Table 2. The table shows projected populations for the six countries/regions referred to above in absolute terms and as

### TABLE 1  World population as constituted by six countries/regions in 2000 and projections to 2050 and 2100 under two fertility assumptions, high and low

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2050</th>
<th>2100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Millions</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>China</td>
<td>1.280</td>
<td>1.440</td>
<td>1.170</td>
</tr>
<tr>
<td>India</td>
<td>1.010</td>
<td>1.480</td>
<td>1.260</td>
</tr>
<tr>
<td>United States</td>
<td>280</td>
<td>420</td>
<td>330</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td>1,110</td>
<td>1,170</td>
<td>900</td>
</tr>
<tr>
<td>Pretransitional 20</td>
<td>280</td>
<td>1,110</td>
<td>680</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td>2,040</td>
<td>3,580</td>
<td>3,060</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>6,000</td>
<td>9,200</td>
<td>7,400</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>21.3</td>
<td>15.7</td>
<td>15.8</td>
</tr>
<tr>
<td>India</td>
<td>16.8</td>
<td>16.1</td>
<td>17.0</td>
</tr>
<tr>
<td>United States</td>
<td>4.7</td>
<td>4.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td>18.5</td>
<td>12.7</td>
<td>12.2</td>
</tr>
<tr>
<td>Pretransitional 20</td>
<td>4.7</td>
<td>12.1</td>
<td>9.2</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td>34.0</td>
<td>38.9</td>
<td>41.4</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

SOURCE: See Appendix.
<table>
<thead>
<tr>
<th>Country</th>
<th>Millions</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RoW</td>
<td>1,440</td>
<td>18.8</td>
</tr>
<tr>
<td>Low RoW</td>
<td>1,170</td>
<td>13.1</td>
</tr>
<tr>
<td>High</td>
<td>1,170</td>
<td>15.4</td>
</tr>
<tr>
<td>Low</td>
<td>1,440</td>
<td>15.6</td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RoW</td>
<td>1,260</td>
<td>16.4</td>
</tr>
<tr>
<td>Low RoW</td>
<td>1,480</td>
<td>16.6</td>
</tr>
<tr>
<td>High</td>
<td>1,260</td>
<td>16.8</td>
</tr>
<tr>
<td>Low</td>
<td>1,480</td>
<td>16.2</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RoW</td>
<td>900</td>
<td>11.7</td>
</tr>
<tr>
<td>Low RoW</td>
<td>900</td>
<td>11.8</td>
</tr>
<tr>
<td>High</td>
<td>1,170</td>
<td>12.0</td>
</tr>
<tr>
<td>Low</td>
<td>900</td>
<td>12.8</td>
</tr>
<tr>
<td>Pretransitional 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RoW</td>
<td>680</td>
<td>4.3</td>
</tr>
<tr>
<td>Low RoW</td>
<td>1,110</td>
<td>4.7</td>
</tr>
<tr>
<td>High</td>
<td>680</td>
<td>5.6</td>
</tr>
<tr>
<td>Low</td>
<td>1,110</td>
<td>3.6</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RoW</td>
<td>3,060</td>
<td>39.9</td>
</tr>
<tr>
<td>Low RoW</td>
<td>3,580</td>
<td>40.1</td>
</tr>
<tr>
<td>High</td>
<td>3,060</td>
<td>39.9</td>
</tr>
<tr>
<td>Low</td>
<td>3,580</td>
<td>40.1</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>7,670</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>8,930</td>
<td>100.0</td>
</tr>
<tr>
<td>High</td>
<td>7,620</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>8,980</td>
<td>100.0</td>
</tr>
<tr>
<td>High</td>
<td>7,490</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>9,110</td>
<td>100.0</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1,170</td>
<td>15.3</td>
</tr>
<tr>
<td>Low</td>
<td>900</td>
<td>14.9</td>
</tr>
<tr>
<td>High</td>
<td>1,170</td>
<td>15.6</td>
</tr>
<tr>
<td>Low</td>
<td>900</td>
<td>14.8</td>
</tr>
<tr>
<td>Pretransitional 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1,110</td>
<td>15.3</td>
</tr>
<tr>
<td>Low</td>
<td>680</td>
<td>14.2</td>
</tr>
<tr>
<td>High</td>
<td>1,110</td>
<td>15.5</td>
</tr>
<tr>
<td>Low</td>
<td>680</td>
<td>7.8</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>3,580</td>
<td>39.9</td>
</tr>
<tr>
<td>Low</td>
<td>3,060</td>
<td>40.1</td>
</tr>
<tr>
<td>High</td>
<td>3,580</td>
<td>39.9</td>
</tr>
<tr>
<td>Low</td>
<td>3,060</td>
<td>40.1</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>High</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>High</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>High</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Low</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>India</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>RoW:</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Millions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>1,210</td>
<td>640</td>
</tr>
<tr>
<td>India</td>
<td>770</td>
<td>1,330</td>
</tr>
<tr>
<td>United States</td>
<td>320</td>
<td>540</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td>520</td>
<td>1,090</td>
</tr>
<tr>
<td>Pre-transitional 20</td>
<td>550</td>
<td>1,380</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td>1,900</td>
<td>3,550</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>5,270</td>
<td>8,530</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>23.0</td>
<td>7.5</td>
</tr>
<tr>
<td>India</td>
<td>14.6</td>
<td>15.6</td>
</tr>
<tr>
<td>United States</td>
<td>6.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td>9.9</td>
<td>12.8</td>
</tr>
<tr>
<td>Pre-transitional 20</td>
<td>10.4</td>
<td>16.2</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td>36.1</td>
<td>41.6</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
percentages of the global total in 2050 and 2100. The projections assume that serially, one-by-one, the high projection of each of the six countries/regions is combined with the low projection in the rest of the world, and vice versa. In the upper panels of the projections for 2050 and 2100 the pair-wise absolute figures along the main diagonal (set in boldface) of course replicate the high and low projected population numbers by country/region as already shown in the corresponding columns of Table 1. The figures for the world totals implied by the assumption just stated are, however, different: in line with the logic of the exercise, their varying magnitudes fall between the limits of the high and low global populations shown in Table 1.

The main output of Table 2 for present purposes is shown in the lower panels of the projections for 2050 and 2100, which give the distribution of the country/regional populations within the global total in percentage terms. The twin entries in the main diagonal in those panels (also set in boldface) show the maximum and minimum shares for each of the six units for 2050 and 2100 as implied by the assumptions explained above. For greater clarity, these main results are recapitulated in Table 3, which also shows the percentage point differences between maximum and minimum shares at those two dates and, for comparison, also the percentage distribution of the world population by the six constituting units in 2000.

In comparison to Table 1, in which the governing assumption is that the component parts of the global population all proceed in lock-step (that is, simultaneously all follow either the high or the low fertility trajectory), the range between maximum and minimum share values shown in Table 3 is far wider. Thus, for example, India’s share in the total world population in 2050 under the high and low projection shown in Table 1 ranges from

**TABLE 3** Percentage share of the population of six countries/regions within the world total in 2000, and minimum and maximum percentage shares in 2050 and 2100 based on projections assuming a combination of low and high fertility projections in each country/region with low and high fertility projections in the rest of the world

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>2000</th>
<th>2050</th>
<th>2100</th>
<th>Range in percentage points</th>
<th>Range in percentage points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min-</td>
<td>Max-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mum</td>
<td>mum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>21.3</td>
<td>13.1</td>
<td>18.8</td>
<td>5.7</td>
<td>7.5</td>
</tr>
<tr>
<td>India</td>
<td>16.8</td>
<td>14.0</td>
<td>19.4</td>
<td>5.4</td>
<td>9.0</td>
</tr>
<tr>
<td>United States</td>
<td>4.7</td>
<td>3.6</td>
<td>5.6</td>
<td>2.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Below replacement 51</td>
<td>18.5</td>
<td>10.0</td>
<td>15.3</td>
<td>5.3</td>
<td>6.1</td>
</tr>
<tr>
<td>Pretransitional 20</td>
<td>4.7</td>
<td>7.8</td>
<td>14.2</td>
<td>6.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Declining fertility 78</td>
<td>34.0</td>
<td>35.3</td>
<td>45.2</td>
<td>9.9</td>
<td>25.5</td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Click to return to Table of Contents
16.1 percent to 17.0 percent. The calculation shown in Table 3 suggests that the share may be as low as 14.0 percent and as high as 19.4 percent. By 2100 the corresponding figures are 14.6 and 16.4 percent in the conventional projection and 9.0 percent versus 25.3 percent under the maximum and minimum share calculation.

The degree of plausibility of the assumptions that produce the prima facie startling results of Table 3 may of course be questioned, much as the plausibility of conventional high and low population projections are often questioned. Could India’s population follow a high projection while the rest of the world follows a low trajectory? In pondering that question, one should keep in mind that India’s high trajectory assumes a continuing fertility decline until fertility settles at the below-replacement level total fertility rate (TFR) of 1.9 (see Appendix), entailing an absolute population shrinkage between 2050 and 2100 of 150 million. It would be difficult to rule out such a population development in India in the twenty-first century as implausible. Rejecting the percentage share results would then require rejecting the assumed low trajectory for the rest of the world. This, however, would not be a notably easier task.

Similar comments may be applicable in defense of the other projected percentage range figures, including the seemingly most extreme result shown in Table 3, the difference between the maximum and minimum shares for the pretransitional group of 20 countries. Fertility thus far has not been falling in these countries: the high projection, perhaps with no extravagant caution, assumes that the fertility decline will start in 2010 and decrease by 0.8 child per decade until fertility settles at the below-replacement level TFR 1.9. (For further detail see Appendix.) Could not such a development be combined with a low-fertility trajectory in the rest of the world—apparently reflecting trends that are already well established there? Arguably, the correct answer is affirmative, albeit perhaps with a probability that is fairly low. An argument asserting the plausibility of the reverse combination could be equally cogently adduced.

Table 3, as it distinguishes only six subunits within the world’s total population, can illustrate only a very limited, though perhaps exceptionally interesting, subset of possible changes in the composition of the world’s population. Following the pattern outlined in Table 2, the reader could readily proceed with further exploration of such possible structural shifts, including shifts within the demographically still highly heterogeneous groups of 51 low-fertility and 78 declining-fertility countries. We provide here one more illustration, based on collapsing the six units shown in the tables above to just two: countries with fertility below replacement level in 2000 and countries with a 2000 fertility above that level. The former includes 53 countries: China, the United States, and the group of 51 countries, consisting essentially of the countries of Europe (including Russia) and Japan, Canada,
Australia, New Zealand, Thailand, and the two Koreas. The latter group is obtained as a residual. The calculation shown in Table 4 for these two groups is analogous to the calculation followed in Table 2. It suggests that the low-fertility group, which in 2000 constitutes some 45 percent of the global population, by 2050 may comprise as low as 28 percent of the global total or as high as 38 percent. (In the conventional projection, shown in Table 1, the range is between 32 percent and 33 percent.) By 2100, the minimum–maximum range may go from 18 percent to 47 percent. (In the conventional projection the corresponding range is between 29 percent and 31 percent.)

The structural changes whose potential scope we presented above are not intended as forecasts of the actual upper and lower percentage shares for countries/regions that can be expected in the twenty-first century. We would maintain, however, that they do indicate the major future uncertainties in the evolution of the size composition of the world population. We may note in this context that the record of population projections prepared in the last four decades has been remarkably good at the global level, but the high accuracy of the projected global totals masked considerable errors in the regional and country-level projections. There the errors varied in sign and were, on balance, compensating. Thus the shifts in relative population sizes that actually occurred were poorly predicted (Bongaarts and Bulatao 2000). Arguably, there is a lesson here for the future as well. And of course population history, as it can be documented with reasonable accuracy for the past 200 years, demonstrates the pervasiveness of major shifts in the relative population sizes of individual countries and regions.

**TABLE 4  Population of 53 countries below replacement level and of 99 countries above replacement level in 2000 projected to 2050 and 2100 under high and low fertility assumptions, showing combination of the high projection of the below-replacement group with the low projection of the above-replacement group and conversely, and percentage shares of the two groups within the world population under these assumptions**

<table>
<thead>
<tr>
<th></th>
<th>2050</th>
<th></th>
<th></th>
<th>2100</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>53 high</td>
<td>53 low</td>
<td>2000</td>
<td>99 low</td>
<td>99 high</td>
</tr>
<tr>
<td>Millions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below replacement 53</td>
<td>2,670</td>
<td>3,030</td>
<td>2,400</td>
<td>2,840</td>
<td>1,360</td>
<td></td>
</tr>
<tr>
<td>Above replacement 99</td>
<td>3,330</td>
<td>5,000</td>
<td>6,170</td>
<td>3,220</td>
<td>6,260</td>
<td></td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>6,000</td>
<td>8,030</td>
<td>8,570</td>
<td>6,060</td>
<td>7,620</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below replacement 53</td>
<td>44.5</td>
<td>38</td>
<td>28</td>
<td>47</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Above replacement 99</td>
<td>55.5</td>
<td>62</td>
<td>72</td>
<td>53</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>World (152 countries)</td>
<td>100.0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
The dominant public and policy interest in population projections has in the past focused on the future evolution of absolute population size and on the shifting age distributions of the projected populations. This interest was prompted by the classic concerns about the adequacy of the resource base—food and raw materials—in relation to population size, and by the more recent worries about possible deleterious effects of rapid population growth on economic development and about the looming prospect of the heavy economic burdens thought to be imposed by the disproportionate growth of the elderly population. Legitimate as such concerns may be, they diverted attention from the kind of compositional changes discussed in this note. The relevance of such changes, too, may be a matter of contention: they may affect vexed issues of geopolitics, international competition, and relative national and regional power, or the poverty burden on the world. Greater attention to the demographic factors affecting such issues is called for.

Appendix

The data and projections shown in Table 1 have been extracted from a detailed set of projections prepared at the Hudson Institute. The projections were elaborated for the period 2000 to 2100 in three variants: high, medium, and low. The population covered consists of 152 countries with a 2000 total population of 6 billion, that is, comprising slightly over 99 percent of the 2000 global total as estimated by the United Nations.

The projections were done individually for countries with a population of 30 million or more either in 2000 or in 2050 according to the UN medium projections (1998 revision). Other countries with populations larger than one million were divided into groups according to fertility status (below replacement, pretransitional, and declining) and by region. The populations of these countries in each group were combined and projected as if the group were a single country. The calculations were carried out using the Interactive Population Statistical System (IPSS) model by Senecio Software Inc. Current population figures and mortality assumptions were based on UN data and estimates.

The below-replacement fertility group includes China and the United States and 51 other countries. The last group comprises all countries in Europe (including Russia) except Turkey and Albania. Also included in this group are Canada, Japan, Thailand, the two Koreas, and 12 smaller countries outside Europe with a total 2000 population of 84 million.

The 20 countries where fertility had not started falling in 2000 are all in sub-Saharan Africa except Yemen and Afghanistan. The most populous of these are Ethiopia, Congo, Uganda, Angola, and Burkina Faso. The remaining 13 have a total population in 2000 of 82 million.

The 78 countries where fertility is declining (with India excluded) are spread all over the world, but only Turkey and Albania are in Europe.

For long-range projections the dominant uncertainty is future fertility. The population of the 53 countries where fertility is below replacement was projected
by assuming average fertility for the twenty-first century of 1.9 for the high variant and 1.4 for the low variant. The Central Projection, not shown in Table 1 above, assumed a fertility halfway between the high and low projections. (These assumptions are comparable to those the UN is expected to use in its 2002 projections.) Since fertility in this group in 2000 varied from 1.1 to nearly 2.1, these assumptions are obviously fairly arbitrary. But greater refinement would have been inconsistent with the uncertainties of projections covering a period of 100 years.

For the group with declining fertility in 2000, an additional variable had to be specified: the length of time until fertility decline stops. The projections assumed continuation of past rates of fertility decline to a TFR of 1.9 in the high variant projections and a decline to a TFR of 1.4 in the low variant projections. Specifically, in the high projections it was assumed that each country’s decline would slow by a TFR of 0.15 per decade from its past rate and continue until fertility fell to 1.9. In the low projections it was assumed that each country’s fertility decline would accelerate by a TFR of 0.15 per decade and continue until fertility fell to 1.4. (The Central Projection was a continuation of past rates of fertility decline to a TFR of 1.65.) However, the rate of decline did not have a major influence on the results.

For the 20 countries (for which the mortality projections take into account UN adjustments for the expected effects of AIDS) where fertility had not yet started falling there were two additional problems, given the fact that these countries have no past experience of fertility decline. When will fertility start falling? And, how fast will it fall? For the high projection it was assumed that on average fertility would not start falling until 2010 and would fall at a rate that diminished the TFR by 0.8 child per decade until it reached a TFR of 1.9. But since these reasonably plausible assumptions produce such implausible results as Yemen with 218 million population and Ethiopia with 424 million in 2100, arbitrary limits were set that reduced the total high projection for the group by nearly 600 million (29 percent) in 2100 and by 110 million in 2050. For the low projection it was assumed that on average fertility would start falling in 2005 and would fall at the same pace per decade until it reached a TFR of 1.4. Obviously these numbers do not bound the full range of possibilities. But it is difficult to see any compelling argument that the actual range of possibilities is narrower than the one indicated.

A full description of the Hudson Institute projections is available upon request from Max Singer at the Hudson Institute (max@hudsondc.org).

Note

This work and the Hudson Institute projections were made possible by a grant from the Earhart Foundation. They were performed by the author in collaboration with Joseph W. Boesch.

References


Societies, virtually by definition, are in the business of social reproduction. They maintain institutional forms and cultural patterns more or less intact, though not of course unchanged, as their individual members age and die and the young are acculturated and assume adult roles. Social reproduction also takes place at the family level—through the social and biological processes entailed in family succession—but there the outcomes owe much more to fortuity, to the luck of the draw. Nonetheless, families become adept at doing the best they can with whatever hands they are dealt—if need be bending the rules, hedging, bluffing, and coercing. How they do so is highly contingent on each society’s circumstances and cultural repertoires, but traditionally marriage decisions offered the principal opportunities and held the major potential risks. The case study of family marriage strategies in a village of the French Pyrenees by Pierre Bourdieu, excerpted below, gives an exceptionally lucid and illuminating dissection of this domain of life—as it had persisted perhaps for centuries and into the 1950s and 1960s.

Pierre Bourdieu was born in 1930 in a Béarn village of the Atlantic Pyrenees like that described. He held an appointment at the University of Algiers in the 1950s, during the years of colonial conflict leading up to independence, and his early research was on Algeria. From 1964 he taught at the École des Hautes Études en Sciences Sociales and later also at the Collège de France as professor of sociology (succeeding Raymond Aron), and became one of France’s most prominent public intellectuals—exercising an influence that would be virtually unknown among English-speaking sociologists. His major interests, in some respects prefigured in the present study, concerned aspects of cultural reproduction, particularly how educational systems reproduce class and privilege. His major works include Distinction (1979), The Logic of Practice (1980), and The Rules of Art (1992). He died in January 2002 at the age of 71.

The case study excerpted below was published as “Les stratégies matrimoniales dans le système de reproduction,” Annales: Économies, Sociétés, Civilisations (Paris),
Let us imagine that in the society under consideration here the marriage of every one of its children represented the equivalent of a round in a card game for a family. In this way we can see that the value of this round (measured according to the criteria of the system) depended on the quality of the game in its double sense, that is, on the nature of the hand the family had been dealt, whose strength was defined by the rules of the game, and on the greater or lesser degree of skill with which this hand was played. In other words, given the fact that marriage strategies (at least in well-situated families) were always designed to bring about a “good marriage” rather than just a marriage, that is, to maximize the advantages or to minimize the economic and symbolic cost of the marriage as a transaction of a very special kind, these strategies were in every case governed by the value of the material and symbolic patrimony committed to that transaction and by the mode in which the patrimony was transmitted. The latter established the systems of interests of the claimants by assigning differential claims to the property to each one of them according to sex and order of birth. In short, the matrimonial opportunities generically open to the descendants of the same family by virtue of that family’s position in the social hierarchy—a position that was mainly, though not exclusively, based on the economic value of its patrimony—were specified by the mode of succession that introduced such criteria as order of birth.

While it was the first and most direct function of the marriage strategy to reproduce the lineage and thereby its work force, it also had to assure the safeguarding of the patrimony, and that in an economic environment dominated by the scarcity of money. Since the share of the property to which a descendant was entitled by tradition and the compensation paid at the time of marriage were one and the same, the value of the property determined the amount of the *adot* (from *adoutà* = to make a donation, to give a dowry) which, in turn, determined the matrimonial ambitions of its holder. By the same token, the size of the dowry demanded by the family of the future husband depended on the size of its own property. It follows that, through the mediation of the adot, marriage exchanges were a matter of economics and that marriages took place between families on the same economic level.

---

1 The investigation on which these analyses are based was conducted in 1959 and 1960 and again in 1970 and 1971 in a village of Béarn we shall call Lesquire. It is situated in the center of the hill country, between the two Gave rivers.
Marriage strategies were determined by a combination of the principles of male supremacy and primogeniture and those principles which, through the adot, tended to rule out marriages between overly unequal families on the basis of an implicit “cost analysis” aimed at maximizing the material and symbolic profit to be derived from the matrimonial transaction within the limits of the family’s economic means. We shall see that the privilege accorded to the eldest son, a simple genealogical retranslation of the absolute primacy conferred upon the continued integrity of the patrimony, together with the recognized precedence of the male members of the lineage, amounted to favoring a strict homogamy since it did not permit males to marry “upward,” despite the fact that such marriages would maximize their material and symbolic advantages. An eldest son must not marry too high, not only because he might some day have to return the adot, but also and especially because such a marriage would threaten his position in the domestic power structure. Nor must he marry too low, because a misalliance was apt to dishonor him and also would make it difficult for him to dower his younger brothers and sisters. And a younger son, for whom the risks and the material and symbolic costs of a misalliance were even greater than for an eldest son, could not yield to the temptation of marrying too obviously above his condition without incurring the risk of finding himself in a dominated and humiliating position. To the extent that it afforded peasant families one of the most important opportunities for monetary and also symbolic exchanges that asserted the family’s position in the social hierarchy and thereby confirmed that hierarchy itself, marriage, an institution that had a direct bearing on the improvement, conservation, or dissipation of a family’s material and symbolic capital, was no doubt one of the mainstays of both the dynamic and the static elements of the entire social system. All of this, to be sure, pertains only within the limits of the traditional mode of production.

But how could younger sons who, after all, were sacrificed to the imperatives of the land, be made to consent to that which not even the heir, the privileged of the system, was always willing to do? We should certainly not forget—as we might if we considered marriage strategies as autonomous—that fertility strategies could also contribute to solving the problem, simply by eliminating it. This would be the case if, due to a biological chance by which the first child happened to be a boy, the succession could be entrusted to an only child. And indeed, parents could manipulate their “hand” by limiting the number of cards, if they were satisfied with those they had been dealt. Hence the capital importance of the order in which
these cards were dealt, that is, the biological chance that made a first-born child either a boy or a girl. Given the close interrelation between these two reproductive strategies, marriage and fertility, a family could limit the number of its children to one in the first instance but not in the second. If the birth of a girl was never greeted with enthusiasm ("When a girl is born in a house," the proverb says, "one of the main beams comes falling down"), it was because she invariably represented a bad card. This was true even though she could move upward and, unhindered by the social strictures a boy had to respect, could marry legally and in fact above her station. If she was an heiress, i.e., an only child (and this was very rare, since families kept hoping for an "heir"), or if she was the eldest of one or several sisters, she could only ensure the preservation and continuity of the patrimony at great risk to the lineage. For if she married an eldest son, her "house" was in a sense annexed by another, and if she married a younger son, domestic power fell to a stranger—at least after the death of her parents. If she was a younger daughter, the only thing to do was to marry her off and, therefore, dower her, since, unlike a boy, she could not very well be sent away or kept, unmarried, at home; the reason being that the labor she could furnish would not be commensurate with the cost of her upkeep.

Now let us consider the situation if the progeny included at least one boy, whatever his position in the order of birth. The heir may or may not be an only child. In the latter case, he may have one or several brothers, one or several sisters, a brother and a sister, or several brothers and sisters in varying proportions. In themselves, these combinations offered very unequal chances for success when dealt with under the same strategy. Each one of them therefore called for a different strategy, but some of them were easier to apply and more profitable than others.

When the heir was an only son, one would assume that the marriage strategy would stake everything on obtaining as high an adot as possible through a marriage with a wealthy younger daughter, thus bringing in money without giving up anything. However, these efforts at maximizing the material and symbolic advantages to be derived from a marriage, if need be by bluff (although this was a difficult and risky business in an environment where people knew practically everything about each other), were limited by the economic and political risks inherent in an unequal or, as it was called, upward marriage. The economic risk was the tournadot, the return of the dowry, which could be demanded should the husband or the wife die before the birth of a child, an eventuality that aroused fears not justified by its probability. "Suppose a man marries a girl from an important family. She brings him a dowry of 20,000 francs. His parents tell him: ‘You take the 20,000 francs and you think you have done well. But..."
you are really taking a chance. You have received a dowry by contract. You are going to spend part of it. What if something goes wrong? How are you going to give it back, if you have to? You can’t!’ After all, a marriage is expensive, the groom must pay for the celebration, he must get things for the house, etc.”.* Most people did not touch the dowry for fear that one of the spouses might die before children were born.

The risk that can properly be called political was undoubtedly more directly considered in these strategies, since it involved one of the fundamental principles of all marriage practices. Due to the bias in favor of the male in the cultural tradition, which judged every marriage from the male point of view (“upward” thus always implicitly meant between a man of lower and a woman of higher status), there was no reason, aside from economic considerations, why the eldest daughter of a modest family should not marry a younger son of an important family, while the eldest son of a modest family was prevented from marrying the younger daughter of an important family. More generally, among all the marriages made for economic reasons, only one kind was fully acceptable, namely, an alliance in which the arbitrary cultural bias in favor of the male was confirmed by a corresponding discrepancy in the social and economic status of the spouses. The size of the adot thus definitely reinforced the position of the spouse who brought it into the marriage.

Although we have seen that power within the household had relatively little to do with economic power, the size of the adot did represent one of the factors in the balance of authority, particularly in the structural conflict opposing mother-in-law and daughter-in-law. A mother who, as mistress of the household, would normally use every means at her disposal to prevent a “downward” marriage for her son, would be the first to oppose his marriage with a woman of relatively higher status, being very well aware that it would be much easier to exert her authority over a girl from a modest background than over one of those girls from an important family who, as the saying went, “take over (qu’ey entrade daune) the moment they come into their new families.” An “upward” marriage threatened the principle of male preeminence, which the group recognized not only in a social context but also in the context of work and domestic af-

---


1Of an authoritarian woman it was said, “She does not want to give up the ladle,” the symbol of authority over the household. Wielding the ladle was the prerogative of the mistress of the house. When the meal was ready and the pot was boiling, she would place the “soups” of bread into the tureen, pouring the soup and the vegetables over them. Then, when everyone was seated, she would bring the tureen to the table, stir the soup with the ladle in order to soak the bread, then turn the handle toward the head of the family (grandfather, father, or uncle) who would serve himself first. Meanwhile the daughter-in-law was occupied elsewhere. To remind the daughter-in-law of her rank, the mother would say, “I have not yet given you the ladle.”

2To evoke the marriage settlement was the supreme argument in the struggle for domestic power: “One who has brought what you have brought” (dap go qui as pourtat). At times the initial imbalance was such that only after the death of her mother-in-law it could be said of the young wife: “Now the young woman is the mistress of the household (daune).”
The influence wielded by each of the spouses in the domestic power structure is, in fact, a very important factor in the family’s marriage strategies. Obviously, the mother is in a much better position to profit from the opening made by her own marriage and to marry her son in her native village or neighborhood, thereby enhancing her own position in the family, if she has brought an important dowry. This means—and we shall prove this point further—that the entire matrimonial history of the lineage had a bearing on every marriage.

The risk of imbalance was greatest when an eldest son married a younger daughter of a large family. Given the approximate equivalence between the adot and a share of the patrimony (which is attested by the double meaning of the word *adot*), the adot brought by a girl from a very rich but very large family might well not be higher than that of a younger daughter of a modest family who had only one brother. Despite the apparent balance between the value of the dowry and the new family’s patrimony, this situation could disguise a discrepancy that could lead to conflict, for authority and claims to authority were based as much on the material and symbolic capital of a spouse’s original family as on the size of the actual adot.

The question of the political authority within the family became most acute, however, when an eldest son married an eldest daughter, especially if the heiress was the wealthier of the spouses. Except in cases where it united two properties because the spouses were neighbors, this type of marriage tended to create a permanent back-and-forth between the two homes or even led the spouses to maintain their separate residences. What was at stake in this open or hidden conflict over the place of residence was, again, the predominance of one or the other lineage and the extinction of a “house” and its name.

Possibly because it approached the question of the economic basis of domestic power more realistically than other societies and therefore came closer to the objective truth in its statements and strategies, the society of Béarn suggests that the sociology of the family, which is so often depicted as based on sentiment, might be nothing but a specific aspect of political sociology. The position of the spouses in the domestic power structure, or, to use Max Weber’s vocabulary, their chances of success in the competition for authority over the family, that is, for the monopoly of legitimately exercising power in domestic affairs, are definitely related to the material and symbolic capital they bring into the marriage (although the nature of that capital may vary according to time and society).

However, one male heir without siblings was a relatively rare phenomenon. In all other cases, the marriage of the heir largely determined the size of the adot that could be given to younger siblings, hence the kind of marriage they could make and even their chances of marrying at all. The best strategy, therefore, consisted of obtaining from the parents of the bride an

---

*The influence wielded by each of the spouses in the domestic power structure is, in fact, a very important factor in the family’s marriage strategies. Obviously, the mother is in a much better position to profit from the opening made by her own marriage and to marry her son in her native village or neighborhood, thereby enhancing her own position in the family, if she has brought an important dowry. This means—and we shall prove this point further—that the entire matrimonial history of the lineage had a bearing on every marriage.*
adot sufficiently large to pay the adots of younger sons and daughters without having to divide or mortgage the property, yet not so large as to threaten the patrimony with the restitution of a dowry beyond the means of the family. This, incidentally—contrary to the anthropological view that every marriage is an autonomous unit—means that every marriage transaction can only be understood as one element in a series of material and symbolic exchanges, since the economic and symbolic capital a family is able to commit to the marriage of one of its children is largely determined by the position this particular exchange occupies in the entire matrimonial history of the family. Although it is not readily apparent, the case of the eldest son who had a sister (or sisters) was quite different from that of one who had a brother (or brothers). All our informants have indicated that the adot of girls was almost always higher than that of boys, so that their chances of marriage were greater. The reason, as we have seen, was that families had no choice but to marry off these useless mouths, and as quickly as possible.

In the case of younger sons the strategies could be more complex, the first reason being that an abundant, even superabundant, supply of labor will create a great desire for land that can only be beneficial to the patrimony. It follows that families were less anxious to marry off a younger son (except, perhaps, the first of the younger sons in an important family) than a younger daughter or even an eldest son. One way would be to marry him to an heiress, a course that was very normal and best suited to his own interests, though not necessarily to the interest of the lineage: If he married into a family of the same rank (and this was usually the case), brought a good adot, and made his mark in terms of fertility and work, he was honored and treated as the true master. If, on the other hand, he married “upward,” he was made to sacrifice everything to the new house where his parents-in-law were determined to “remain in charge”; “everything” meaning his adot, his work, and sometimes his very family name (“Jean Cazenave,” for example, could become “Jean dou Tinou”: “Jean of the Tinou family”). There were very few younger sons willing to face the prospect of a marriage with a younger daughter, one of those “marriages between hunger and thirst,” sometimes also called esterlou (“sterile”), which the very poorest among them could only avoid by hiring themselves and their wives out as “pensioned servants” (baylets à pensiou). On the other hand, the possibility of founding a family while staying in the paternal home was a privilege for eldest sons only. For these reasons, those who were unable to marry an heiress, thanks to their adot, possibly supplemented by a small, laboriously accumulated nest egg (lou cabau), had only two options: they could either emigrate to the city or to America in the hope of establishing themselves in some craft or else they could forego marriage and become servants either to their own family or (in the case of the very poorest) to others. It is therefore understandable that for the family it was much better to have younger sons than younger daughters, since it was rather less costly to marry them
off and even more advantageous for them to remain unmarried. And, of course, the advantage of having boys rather than girls became increasingly great with the size of the family. Indeed, the burden of providing for the marriages of three or four younger daughters created almost insurmountable difficulties even for the wealthiest houses and could even lead to breaking up the property. This amounts to saying that in the last analysis the entire system was based on fertility strategies. A negative proof for this contention can be found in the fact that the very poorest—the smallest holders, domestic servants, day laborers—who could not play at this game anyway, excluded themselves by the excessive size of their families.

In short, it is not enough to say that families were not anxious to have younger sons marry; we should say that they did not press the matter. In a world where marriages were arranged, such a “hands-off” policy was enough to lessen their chances of marriage considerably. Some families went so far as to make the payment of the adot conditional upon the younger son’s working for his brother for a certain number of years, some signed veritable work contracts with him, and some families even deferred payment by making him hope for a higher sum. No doubt there were other ways in which a younger son could become a confirmed bachelor, from the marriage that did not materialize to a gradual process of getting used to the situation until it was “too late to marry,” all of this taking place with the complicity of families who were, consciously or unconsciously, glad to keep such an “unpaid servant” in their service, at least temporarily.

In opposite ways both the younger son who left home to make his living in the city or to seek his fortune in America, and the younger son who stayed at home supplying his labor without adding to the expenses of the household or detracting from the property, made a contribution to the preservation of the patrimony. Younger sons had learned since childhood to embrace the traditional values and the customary distribution of tasks and powers among brothers. They had a deep attachment to the family patrimony, to the house, the land, the family, and perhaps especially, the children of the eldest son. Many of them might therefore be willing to accept this kind of life which, to use the frankly functionalist formulation of Le Play, “gave [them] the peace and quiet of bachelorhood as well as the joys of family life.”* Being inclined, for all these reasons, to give himself totally to a family and a patrimony he had every reason to consider his own, a younger son who stayed at home represented (to the family—that is, to the system) the “ideal” outer limit of a servant. For the servant, too, was often treated as a “member of the family,” his private life invaded and virtually taken over by

---

*Among other things, belated marriage, which tends to limit fertility. Thus, the average age at marriage between 1871 and 1884 was 31.5 years for men and 25 years for women compared to 29 years and 24 years respectively for the period 1941–60.

*Frédéric Le Play, L’organisation de la famille selon le vrai modèle signalé par l’histoire de toutes les races et de tous les temps. 3rd ed. Paris, 1884.
the family life of his employer. He too was consciously or unconsciously encouraged to give a large part of his time and affection to his borrowed family and usually paid for the economic and affective security afforded by this inclusion in family life by foregoing marriage. Thus the younger son was, if you will permit this expression, the structural victim, that is, the socially primed and therefore willing victim of a system that lavished a panoply of protective devices upon the “house,” a collective entity and also an economic unit or, better, a collective entity based upon its economic unity.

It was as if marriage strategies attempted to correct the failures of fertility strategies. There were, however, hands that defied the skill of even the best player—for example, a family with too many children, including too many daughters. A really well-designed marriage strategy had no need to become explicit in order to operate, for if it worked, it tended to avoid conflicts between duty and feeling, between reason and passion, between collective interest and individual interest. Like the norm intended to resolve and overcome them, these conflicts arose from a “breakdown” of that socially induced instinct which was the end product of a certain habitus inculcated by a particular way of life; a way of life that was itself perpetuated and glorified in the injunctions and precepts of morality and education. For this reason it is artificial or quite simply beside the point to ask questions concerning the relationship between the structure and individual feelings. While individuals and even families may not have admitted to an interest in anything but the outwardly respectable criteria such as the virtue, the beauty, and the good health of a girl or the dignity and zest for work of a young man, they were quite aware of the criteria that were truly pertinent to the system, namely, the value of the patrimony and the size of the adot.

There are several reasons why in the great majority of cases the system functioned ostensibly on the basis of the least pertinent criteria relative to the true principles of that system. First, family upbringing tended to ensure a very close correlation between the basic criteria demanded by the system and the primordial characteristics in the eyes of the individuals involved: just as the eldest son of an important family was called upon to embody the virtues of a “man of honor” (*homi d’aunou*) or “good peasant” more than anyone else, so it would not do for a “great heiress” or “younger daughter of a good house” to settle for the conventional virtue that might be good enough for a girl from an ordinary family. Furthermore, the earliest learning experiences of children, reinforced as they were by all of their social experiences, tended to model their schemes of perception and appreciation, in a word, their *tastes*, which, since they played as large a role in their selection of a sexual partner as in other areas, led them to avoid improper alliances, even aside from considerations of a properly economic or social nature. Here as elsewhere, a happy love, that is, a socially approved and therefore success-bound love, was the same thing as the *amor fati*, love of one’s own social
destiny, which brings together socially compatible partners by way of a free choice that is unpredictable and arbitrary in appearance only. And it is as if only the most patent discrepancies—the scandal created when a poor man marries a rich but ugly, or much older, heiress—represented a situation precarious enough to bring about the misrecognition of such preestablished harmony and the transfiguration of fate into free choice.

The constraints surrounding every matrimonial choice are so numerous and appear in such complex combinations that the individuals involved cannot possibly deal with all of them consciously, even if they have mastered them on a different level. They can therefore not be expressed by a set of mechanical rules; and if practices are implicitly represented as the execution of explicit or express norms or of subconscious models, an infinite number of rules would have to be invented in order to account for the infinite variety of practices, especially for all the strategies that enable families to reconcile, counterbalance, or even cancel out these constraints. Faced with the constant danger that the compensation accorded younger children might necessitate the breaking up of the patrimony—precisely the eventuality the privilege accorded the eldest son was designed to avert at all costs—families can always counter the potential threats every marriage poses to the property and, by implication, to the family that is perpetuated by its ownership, by deploying a whole array of “parries” and “moves” similar to those of fencing and chess. Far from being simple procedures, analogous to those invented by the legalistic imagination in its efforts to bend the law, far also from being reducible to formal and explicit rules, these strategies are the product of **habitus**, meaning the practical mastery of a small number of implicit principles that have spawned an infinite number of practices and follow their own pattern, although they are not based on obedience to any formal rules. Hence, since these patterns emerge “spontaneously,” it is unnecessary to make them explicit or to invoke or impose any rules. **Habitus** is thus the product of the very structures it tends to reproduce. Predicated upon a “spontaneous” compliance with the established order and with the will of the guardians of that order, namely, the elders, **habitus** is the principle that will generate the different solutions (such as the limitation of family size or the emigration or enforced celibacy of younger sons) which individuals, depending on their position in the social hierarchy, their place in the family’s order of birth, their sex, and so forth, can bring to the practical dilemmas created by the various systems of exigencies that are not necessarily mutually compatible. Marriage strategies as such must therefore not be seen in the abstract, unrelated to inheritance strategies, fertility strategies, and even pedagogical strategies. In other words, they must be seen as one element in the entire system of biological, cultural, and social reproduction by which every group endeavors to pass on to the next generation the full measure of power and privilege it has itself inherited.
ANGUS MADDISON

The World Economy: A Millennial Perspective

Angus Maddison has once again brought us a tempting feast. It is no less than global, regional, and, in a few cases, national estimates over the last two millennia of gross domestic product, population, and per capita income. It builds upon his 1989 publication, The World Economy in the 20th Century, and his 1995 Monitoring the World Economy, 1820–1992, both also published by OECD. Readers inevitably turn to the tables and cite them, because, after all, what else is there to compete with Maddison’s figures over most of that period? And they focus, as does the author, on his conclusion that, although during the first millennium world population increased by only one-sixth and per capita income not at all, during the second millennium population grew 22-fold, per capita income 13-fold, and GDP nearly 300-fold.

Demographers will be attracted by the proposition that “The strongest and most comprehensive evidence is that for population, and the population component is of greater proportionate importance in analysis of centuries when per capita income growth was exiguous” [i.e., small, but perhaps also implying not certain] (p. 229). Having just coauthored an examination of the empirical basis for historical population estimates (Caldwell and Schindlmayr 2002), I wondered about the quality of the economic estimates. Our article concluded that the near consensus on population figures since 1650 rested essentially on the work of Walter Willcox, first published in 1931 and drawing heavily for the earlier years of that period on contemporary estimates of uncertain origin mostly gathered together by Johann Süssmilch in the eighteenth century. There is now an even more shakily based agreement on population estimates over the last 2,000 years. Of those participating in this effort, Maddison has curiously elected to follow closely the work of McEvedy and Jones (1978), a highly derivative compilation, perhaps solely because they present their work in the context of modern national borders and dates suited to his approach.

Maddison seems more concerned with providing estimates in “a common currency” than with the derivation of the basic economic measures. Parity purchasing power is provided by conversion into 1990 international Geary-Khamis dollars (i.e., US dollars in that year). In contrast, the explanation of the derivation of his basic economic measure (GDP per capita) for the thousand years up to AD 1000 is given in a page (pp. 259–260). The explanation refers readers to his earlier work on China (Maddison 1998), which concluded that there was little evidence of change in its level of prosperity over the first millennium and that the rest of Asia and the Roman Empire were probably not dissimilar. Economic growth estimates for the period 1500–1820 derive for much of the world from a wide range of sources on agricultural change, levels of urbanization, and prosperity. For Europe, recent modifications by Kuznets (1973) are employed. For both periods the conclusions often rest on assumptions about rates of growth of per capita income; this intro-
duces a dangerous circularity because the purported significant findings are then often those of economic growth.

Maddison’s main conclusion is that the economic growth of Europe after 1000 and, strikingly, after 1820 drove global economic and population increase. In the latter period this impetus was also imparted by the “Western offshoots” (United States, Canada, Australia, and New Zealand) and, increasingly, Japan. This was the result of the expansion of trade, followed by proto-capitalism and then by real capitalism. The West’s economic success was explained by “(a) Conquest or settlement of relatively empty areas which had fertile land, new biological resources, or a potential to accommodate transfers of population, crops and livestock; (b) international trade and capital movements; (c) technological and institutional innovation” (p. 18). The proof of Europe’s success was the relative growth in the numbers of people of European descent and ultimately the transfer of its medical technology that enabled non-European populations to grow even faster. This is the same argument Walter Willcox (1985 [1906]) put forward almost a century ago; Willcox, in turn, said that he was broadening John Seeley’s thesis on “The expansion of England,” written a quarter-century earlier. None of these authors spared much thought for the fate of aboriginal peoples.

Maddison (p. 18) rather rashly justifies his numbers, which for the earlier periods rest heavily on views and surmises: “Quantification clarifies issues which qualitative analysis leaves fuzzy.” Whether stylized facts or pictures one sees in a fire, the tables can keep one absorbed for hours. If they in any way approximate what really happened in the past, then Western Europe, and indeed the whole world, 2,000 years ago enjoyed a per capita income ($444) five-sixths of that of Bangladesh in 1950. France’s fertility transition began in the late eighteenth century with a per capita income (in constant 1990 Geary-Khamis dollars) of about $1,100. This can be contrasted with the onset of the British fertility decline in the 1870s when per capita income was $3,200 and those of China and India a century later with per capita incomes of about $850. One can follow Willcox’s and Maddison’s central thesis over time. Europe and the Western offshoots had over the first millennium 15 percent of both the world’s population and its total GDP; 21 percent of population and 24 percent of income in 1500; 34 percent of population and 68 percent of income in 1913; 30 percent of population and 68 percent of income in 1950; and 19 percent of population and 51 percent of income at the end of the second millennium. In the final period much higher developing-country population growth in conjunction with industrialization in East Asia was beginning to drag back the West’s economic share, although not its lead in per capita incomes. Maddison’s own engine of growth is geographically even narrower, being restricted to his Group A countries—Western Europe, Western offshoots, and Japan.

In the reconstruction of historical populations, Walter Willcox came first and strongly influenced those who followed. Maddison may play a similar role in the long-term history of economic growth, unless economists prove to be a more skeptical breed than demographers.
References


ANNA TREVES

Le nascite e la politica nell’Italia del Novecento


In 1927 Gaetano Salvemini, anti-Fascist exile and later professor of history at Harvard University, criticized Mussolini’s regime for encouraging population growth while simultaneously invoking national demographic growth as an excuse for colonial and imperial expansion. In the current volume, Anna Treves, who teaches at the University of Milan, provocatively posits various links between the situation under Fascism and the present day and asks how Italy can now, as a country of immigration, justify its recently adopted pronatalist policy. Obviously one can pose the same question to various other Western European states, but Treves implies that it takes on special import in Italy given the legacy of Mussolini’s population policy.

The book does much more than that. It is a carefully and exhaustively researched study of, as its title states, Births and policy in twentieth-century Italy. Treves’s work covers the periods of Fascist pronatalism (1927–43), republican agnosticism in matters of fertility (1945 to the mid-1980s), and a recent return to a more cautious pronatalism.

It is divided into three parts. The first explores the European interwar context of population policy and thought. Although occasionally overstating her case, Treves offers an interesting and well-argued discussion. I think, for example, that she exaggerates the influence of R. R. Kuczynski’s net reproduction rate, with its suggestion of the eventual depopulation of Europe, in effecting a wholesale conversion from the neo-Malthusianism of Margaret Sanger and her ilk to the widespread pronatalism that characterized the period after about 1925. Importantly for Italy, she establishes in part one that while Fascist demographic policy may have been different in tone, it certainly bears comparison with the other, largely forgotten, pronatalist attitudes and policies that characterized much of interwar Europe, both totalitarian and democratic. Given the overall length and specificity of this book, part one will likely not reach a broad readership. That is a pity. Expanded to cover the postwar period as well, it would be an excellent candidate for translation and would fill a notable gap in the literature.
Fascist demographic policy is at the center of Treves’s work, in part two, and occupies nearly half the text. Her focuses are three: interwar fertility studies, racial policy, and the links between Italy’s “demographic culture” and the regime. That fertility dominated the demographic agenda at the time is not news. Likely that emphasis came in part as a response to Fascist interest in the topic, although, as part one shows, fertility (and its decline) was the order of the day in other countries as well. Treves speculates about the role demographers may have had in the various phases of Fascist policy (its launching in 1927 and re-launching in 1937) but concedes there is no documentation to support definite claims.

Primarily on offer here is an in-depth study of Italian interwar assessments of fertility—regional and social differences, specific studies and measures—and the debate over the causes of fertility decline. Certainly no one else has explored that work with such care, albeit there are surprising gaps: no description of Corrado Gini’s cyclical theory of population, for example. And while there is no doubt that fertility dominated the emerging demographic discipline, Treves’s exclusive focus may leave the reader with the mistaken impression that Fascist population policy was concerned only with fertility and race, whereas it also included measures to control emigration and internal migration (the latter is the topic of a 1976 book by Treves), demographic colonization in Italy and Africa, and maternal and infant care. Indeed, given the general spread of pronatalist ideas in interwar Europe, it is these other features—combined with Mussolini’s rhetoric of expansion and imperialism—that mark Fascist policy as unique.

It was of course in the context of Fascist population policy that the demographic discipline came of age in Italy, as evidenced by the creation of schools of thought, university chairs, faculties, and consultative bodies. In the context of this Fascist promotion of demography, the discipline’s enthusiastic support for the regime’s pronatalism, carefully documented here, comes as little surprise. The situation grew complicated in 1938 when Mussolini introduced racial laws and cast them specifically as yet another aspect of population policy. Treves’s most original contribution in this section—complementing other recent work on the reaction of Italian academics to Fascist racism—may be to document the silence of Italian demographers on racial issues from not long after the Nazi seizure of power in 1933, in spite of their traditional rejection of eugenic arguments. Initially, for example at the 1935 IUSSP conference in Berlin, that silence would seem to have been ordered by Mussolini himself, evidence of the scientists’ obedience to the regime. Subsequently, it served—in Treves’s reading—as a tacit acceptance or approval of Fascist racism. Although her detailed study of the publications of prominent demographers (in particular Livio Livi and Corrado Gini) in the period 1938–43 leads, seemingly inevitably, to ambiguous conclusions, Treves argues that by condoning the appendage of racism to the existing demographic structure, some notable Italian population experts offered a cover of scientific legitimacy to the Fascist embrace of Nazi anti-Jewish policy and all that entailed.

In part two, Treves concentrates on the work of individual demographers—examining, for example, the degree to which each may or may not have embraced racial ideas—more than she explores the policy side of her topic. It may seem unnecessary, but there is little discussion of how and why racial policy was part of population policy. That emphasis is reversed in part 3, which looks at the period
1945–2000. The overriding theme in this final part is the continued legacy of Fascist population policy. For the discipline of demography, compromised by its association with Fascism and Fascist racism, it meant the end of a public role, relegation to the ivory tower, and a deemphasis of fertility studies. For politics instead it meant a turn to demographic agnosticism in spite of what emerged as a prevailing postwar sense of overpopulation. That agnosticism was favored both by Church opposition to birth control and by Communist ambiguity in the face of Stalinist pronatalism. Ultimately, in the context of Italy’s remarkable economic achievements, Malthusian fears declined and the battles for birth control—the Fascist anti-contraceptive law was only overturned in 1971—and abortion were fought and won in terms of individual rights and women’s liberation.

Underlying Treves’s work are some contestable assumptions. She suggests, for example, that given the general consensus that emerged in the 1970s regarding the negative evaluation of the consequences of low fertility, “the logic of the situation argued for the promotion of an openly pronatalist policy” (p. 474). Yet the experience of Italy and other countries in the twentieth century suggests the very limited impact of those policies, especially it would seem when pursued in strictly populationist terms. Recognition of the social and economic costs of low fertility need not lead to calls for birth prizes, though of course it has often done so. Treves also at times seems to find it odd that demographic analysis should reflect political concerns and be conditioned by them (though this may be a rhetorical device on her part). If so, she is betraying a belief in value-free science of a sort long discredited among historians and sociologists of science.

The work is also characterized by a number of imbalances. Part one, as described above, provides a useful and interesting European context for the interwar discussion in part two. Yet we get no similar context for the period after 1945. That lacuna reinforces the author’s insistence that we understand postwar developments in Italy primarily as they relate to Fascist policy rather than, say, to contemporary political developments in Europe and other parts of the globe. On a more mundane level, Treves explores in considerable detail the work of some Italian demographers before 1945, including discussions of single articles running several pages; yet postwar work does not receive anything resembling such scrutiny. And the role of the Church, while examined at length for the postwar period, is largely ignored during Fascism. These changes of emphasis throughout the course of this long book are likely the result of having taken fertility as the organizing principle, a topic one can approach from any number of angles.

Treves ends with the recent overcoming of the Fascist legacy in Italy and so the fact that since about 1990 it has become politically feasible to advocate and even pursue pronatalist policies. Italian demographers have, indeed, since the mid-1970s reacquired a public role thanks to both private (for example the Agnelli Foundation) and public (the National Research Council, or CNR) patronage. They even meet with prime ministers these days and seem to be near unanimity in describing the dangers of Italy’s low fertility. In particular, Treves focuses on the frequent divorce of fertility and immigration policy and, when not divorced, the statements of politicians and scientists alike that the demographic deficit created by low fertility cannot possibly be filled by immigration alone (which would imply for Italy a level of several hundred thousand immigrants per year). According to
Treves that claim betrays a concern for ethnic or racial preservation and so harks back to the policies of 1938–45. This is a vexed issue. Hopefully, historical experience has shown the considerable limits of pronatalist policy and argues for policies aimed not at encouraging fertility but (as some Italian demographers advocate) at removing the obstacles that may prevent couples from having the children they might otherwise want. On the issue of immigration instead, a strongly proimmigration position is of course politically untenable for democratically elected leaders in Europe today. Public opinion is too strongly opposed. And while there may well be an element of traditional European (or Italian) racism in that public opinion, immigration is also a pressing social issue and high levels of it create social disruption along with enriching society by introducing cultural diversity. Treves offers no solutions, but that may be why historians are so infrequently consulted by prime ministers.

Department of History
Indiana University

CARL IPSEN

CAROL BLUM

Strength in Numbers: Population, Reproduction, and Power in Eighteenth-Century France

In the seventeenth century, the dominant mercantilist ideology professed that the power of the prince resided in the number of his subjects. Louis XIV of France, who died in 1715, epitomized the absolute monarch whose visions of grandeur and fiscal irresponsibility bankrupted the state. The end of his reign was a period of economic crisis and hardship resulting from a cycle of expensive foreign wars. Influential precursors of political economy such as Vauban and Boisguilbert implicitly criticized the administration of Louis XIV for the sorry state of agriculture, a cause in their view of depopulation. Cantillon, the author of the first treatise on political economy, explored the interconnections of population, wealth, and social organization and exerted a profound influence on the physiocrats and encyclopedists of the eighteenth century. In the absence of statistics, it was logical to assume that population had been declining. Montesquieu’s Lettres persanes of 1721 in France, and Robert Wallace’s 1753 Dissertation on the Numbers of Mankind in Ancient and Modern Times in England claimed that the population of the world was greatly diminished since antiquity. They blamed it partly on the Church’s advocacy of clerical celibacy.

The thesis of the present book is that populationism remained a concept of great moral and political significance in eighteenth-century France until the Revolution. Moreover, the notion, however erroneous, that ecclesiastical taboos and institutions had led to a catastrophic decline of population was a major argument used by opponents of the Church. By midcentury, however, the problem had lost much of its sense of urgency, and the first rigorous investigations of population growth (including Jean-Baptiste Moheau’s 1778 Recherches et Considérations sur la
Population de la France) had laid to rest the notion of population decline. Carol Blum shows that the idea nevertheless retained some importance until the Revolution and that a steady flow of pamphlets extolled the need to promote reproduction and attacked Christian principles (such as the indissolubility of marriage) that were seen as opposed to population.

Strength in Numbers has the merit of considering a great number of writings on the subject of population and reproduction, two concepts that were not clearly distinguished in the eighteenth century. It fails, however, in the task of demonstrating that populationism was a dominant intellectual force on the eve of the Revolution. In the seventeenth century, the size of the population had been a major object of public policy. By the mid-eighteenth century, it was only one argument among many, evoked by many authors in passing, but without true political power. Blum devotes one chapter to the contradictions in the thinking of Rousseau on population. Contradiction was rife among all authors on the subject, and they expressed their view in pamphlets and utopian projects, rather than through coordinated action or state policy. Moreover, their enthusiasm for a large population was not necessarily reflected in their personal behavior. The book shows that many of the populationist statements emanated from men who may have had illegitimate offspring, but no large families.

Inevitably, the book raises the issue of the beginning of family limitation in France during the eighteenth century. Blum treats it as one of the consequences of depopulation attendant upon luxury that the philosophers kept excoriating, rather than as one of the new modes of behavior that reflected the anti-religious and anti-authoritarian spirit of the time. Lynn Hunt, in a 1992 book entitled The Family Romance of the French Revolution, has gone over much of the same cultural and literary materials, focusing on the micro aspect of the family rather than the macro aspect of population. Her story is a useful complement to the one told here, and it fits better with the early decline of French fertility in comparison with other countries such as England. Family symbolism, an ideology of paternalism, and the identification of the king as the father of his people were essential features of the Old Regime. Enlightenment philosophers and revolutionaries substituted an ideology of brotherhood and liberty for the religious and paternal absolutism of the past. The father disappeared from the literature at the same time that royalty was overturned. Both Blum and Hunt discuss the ambiguous place reserved to women in the revolutionary discourse.

However interesting her argument, Blum takes liberties with her evidence and has a tendency to over-interpret the references to declining fertility and to contraception. For example, she mentions a host of authors who denounce the taste for luxury as responsible for prompting couples to practice coitus interruptus (a medical term of the late nineteenth century), even though none of the authors cited alludes unequivocally to the practice of withdrawal (p. 50). The notion of a condom, she says, was unnerving to Malthus (p. 191). She frequently resorts to other anachronisms, such as “schemes to improve the birthrate” (p. 42). She slants some translations to make them mean more than the original. On p. 158 she even quotes a text of 1790 to the effect that France should no longer tolerate clerical celibacy “for reasons both moral and demographic,” some 65 years before Achille Guillard coined the term “demography.” There are a number of unfortunate spell-
ing mistakes in the book, such as in Mme de Maintenant (for Madame de Maintenon, the mistress and morganatic wife of Louis XIV). These kinds of mistakes weaken the authority of an otherwise valuable contribution to the early history of the population debate.

Population Studies Center
University of Pennsylvania

ETIENNE VAN DE WALLE

JAMES Q. WILSON
The Marriage Problem: How Our Culture Has Weakened Families

It has long been a staple of American conservative thought that the problems of the poor are attributable to their moral failings. And of late, many conservative thinkers have argued that these moral failings result from the massive changes in American family life during the latter half of the twentieth century and, in particular, from the decline of marriage. In The Marriage Problem, James Q. Wilson, a distinguished political scientist, presents this case with clarity. Enough clarity, indeed, to make plain the argument’s strengths and weaknesses. For there is a marriage problem; but its effects are less powerful than Wilson maintains, and its solution does not lie in the program he offers.

The facts of family change are not in dispute. Marriage has declined as a social institution throughout most of Northern and Western Europe and the overseas English-speaking countries. And although Wilson seems unaware, changes in marriage are now a source of concern in the rest of Europe and in many countries in Asia. Marriage used to be the dominant mode in which sexual partnership and fertility were structured. It has lost some of its dominance to increases in cohabitation, divorce, and nonmarital childbearing. Nevertheless, as Wilson acknowledges, it is far from fading away. In the United States about 90 percent of whites marry, and in 1996 70 percent of white children were being raised by two biological or adoptive, married parents. The American divorce rate, while still high, has not increased in 20 years. The birth rate among adolescents declined in the 1990s.

What, then, is the heart of the problem? Wilson equivocates about mothers working outside the home, tacitly acknowledging that research shows little harm to their children, except possibly for infants. And although he laments the more widespread acceptance of divorce, he argues that most people (himself included) would reject punitive measures that might reduce its incidence, such as refusing to give public aid to single mothers. What’s left is having children outside of marriage, especially among the poor. That’s what Wilson is ultimately concerned about, particularly among African-Americans.

Over the past few decades, African-Americans have postponed or forgone marriage even more than other Americans. At current rates, only about two-thirds of African-Americans would ever marry. But they have not postponed or forgone childbearing to the same extent. About 70 percent of African-American children are born to unmarried mothers. Consequently, in 1996, only 31 percent of African-
American children were being raised by two biological or adoptive, married parents. Scholars disagree on the causes of this decline. The evidence suggests that part of it can be ascribed to declining labor market opportunities for men with little education. The rest is usually ascribed to the catch-all concept of culture.

Wilson makes a cultural argument that the main cause of nonmarital childbearing among African-Americans is the disruption of family life that occurred under slavery. Here he rehabilitates E. Franklin Frazier, the African-American sociologist who coined the phrase “the heritage of slavery” in his 1939 book, The Negro Family in the United States, and Daniel Patrick Moynihan, who relied on Frazier’s argument in his controversial 1965 report, “The Negro family: The case for national action.” The slavery argument was rebutted forcefully by historians such as Herbert Gutman and Eugene Genovese in the 1970s, although a later group of scholars, with whom Wilson sides, have since tried to rebut the rebutters. Perhaps more important than slavery are inheritances from West African kinship structure (which Wilson also mentions), where marriage is a process in which children may be born before the process is complete, where children are frequently raised by foster parents, and where the married couple is less important than the larger kinship group. Under economically trying times in the 1970s and 1980s, African-Americans may have relied on their African-based cultural repertoire to sustain their family lives.

Wilson ably reviews the evidence that being raised by a single parent is harmful to children. But he ignores a revisionist literature in the 1990s suggesting that even if poor adolescents postponed childbearing until their 20s, their life chances would not greatly improve. For example, a study by Mary Corcoran and James Kunz (1997) of pairs of sisters in low-income families, one of whom bore a child as a teenager and then received welfare and one of whom did not, shows smaller differences in subsequent levels of poverty than one would expect from national statistics. The implication is that unless the life chances of poor young women are improved, postponing childbearing until marriage may still leave them poor.

Nevertheless, children raised by a single parent are, on average, disadvantaged compared to children in two-parent families. What should be done about this? To Wilson, a central problem is that women are making the wrong decisions. In particular, too many women are rejecting or postponing marriage in favor of an economically independent lifestyle but are having children anyway. He endorses an evolutionary model in which men are by nature promiscuous, and marriage is the cultural invention that restrains them. Women are by nature more interested in raising children, and marriage is the institution that provides them and their children protection and support. Thus, more women need to make marriage their first priority and career their second. Wilson offers sympathy, but little more, for the difficulty of this choice. That is the way the world works, he writes. Women’s lot in life is to make the selfless choice for the good of their children.

Wilson pays little attention to anything men might do to make women’s choices easier. He never mentions domestic violence, for example, except for a passing swipe at the concept of marital rape. Yet poor women (and, to a lesser but still disturbing extent, middle-class women) suffer from high levels of violence and sexual abuse at the hands of husbands and romantic partners. Studies suggest that levels of domestic violence are higher among African-Americans. Wilson implic-
itly tells women to turn the other cheek in the name of children’s well-being. But if we really want fewer poor women to depend on jobs or welfare payments in order to remain independent of men, shouldn’t we try to teach men other ways of resolving conflicts?

After all, even if our genes influence our behavior, there is plenty of room for further change. For instance, Wilson argues that older women lose out because men always prefer to marry younger women; yet in the United States the age gap between spouses in first marriages decreased by more than half during the twentieth century. Who is to say that the gap won’t shrink further; and who is to say that men and women can never rise above their evolutionary imperatives?

The rest of Wilson’s program includes greater reliance on religion, a rehabilitation of orphanages for children of single mothers who can’t raise them adequately (which was the purpose of many orphanages a century ago), and restoration of the stigma and shame of bearing or fathering a child outside of marriage. It is, perhaps intentionally, a backward-looking agenda. It is based in part on Wilson’s view of marriage as ideally consisting of a man who specializes in work and who protects his children and a woman who specializes in child care and who civilizes her husband. That was, indeed, the ideal of the mid-twentieth-century American family—formalized in the specialization models of Talcott Parsons in sociology and Gary Becker in economics.

But the point Wilson misses is that the basic marital bargain has changed. Men now prefer women who can contribute to household income; and women with greater education (and hence greater labor market potential) are more likely to marry. Couples now seek to pool their incomes rather than fully specialize. If women are now expected to work for pay, they can justly demand that men do more of the work in the home and not seek to control them by force. And studies show that men’s share of housework and child care has increased somewhat. Here again, there is no reason to think we can’t go further. Encouraging a more equitable division of labor at home and reducing the threat of domestic violence are probably better ways—and certainly fairer ways—to ease the problem of marriage.

Department of Sociology
Johns Hopkins University

ANDREW J. CHERLIN

Reference


SYLVIA ANN HEWLETT
Creating a Life: Professional Women and the Quest for Children

Sylvia Ann Hewlett has written a lively and engaging book on the supposed widespread regret of high-achieving American women who forgo fulfilling family lives

Click to return to Table of Contents
in order to excel in the workplace. Her book isn’t meant to be a scholarly treatise. It is one of a genre of new books that see negative fallout from women’s push toward market success.

Hewlett begins with a preface on her own extraordinary fertility history: her fourth child was delivered when she was age 51 after years of medical intervention. This “late” birth is not a child borne of the distress that most of the book focuses on—that of women who worked so much they never married, never had children, or were never able to have more than one child. Hewlett had three older biological children, all by the same father, at the time of the birth of her fourth.

This preface is followed by testimonials to regret: a chapter of vignettes and interviews with career superstars who lament what they have given up for their success or bemoan the battle scars from their long, drawn-out infertility treatments that finally gave them the child they wanted. In chapter 2, we get to Hewlett’s data, “a nationally representative sample of 1168 high-achieving career women aged 28–55 years, a nationally representative sample of 479 high-achieving non-career women aged 28–55, and a nationally representative sample of 472 high-achieving men aged 28–55...[with interviews] self-administered on-line through the Internet” (p. 310, n1). Very little information is provided on this sample; there is no indication of response rates; and the reader is referred elsewhere for more detail. The survey turns out, in any event, to be tangential to the book: it is used to give percentages of childlessness among the “high-achieving” women who are the focus (and intended readers) of the book, but little more is done with the survey data.

Despite the limited empirical evidence in the book, Hewlett has gotten many things right. It is difficult for men and women, but especially women, to achieve balance between time for children and the demands of high-profile careers. Difficulty with work–family balance is not unique to Hewlett’s high-achieving women, however; it is also difficult to work long hours in low-paying jobs in order to support one’s family at some minimal level and also meet the demands of childrearing. Yet many American women somehow combine the two spheres, and most do it with far fewer resources than the women Hewlett interviewed. Thus, many will be skeptical of the depth of the problem here.

Hewlett also highlights the gendered nature of the divide: high-achieving men more often “have it all” (successful careers, wives, and children). Men can more easily find a partner who is a “nurturer” (Hewlett’s chapter on this theme is provocatively titled “Predators and nurturers”), someone who compromises her own career ambitions to facilitate her partner’s market achievements. Yet the costs of careers are real for men as well as women—many don’t see their children often. Proponents of Gary Becker’s view of the family will nod their heads and say, “See, specialization works best.” Feminists will continue to see unfairness in the “double standard” for career men and career women. Time is what is at issue. Children take time. Lucrative, rewarding careers take time. Choices and compromises have to be made by all, often under severe constraints imposed by the nature of workplaces.

Finally, Hewlett emphasizes the low probabilities of success with infertility treatments for women who delay having children until their 40s. Here lies an inconsistency between the message and her own story of giving birth at age 51. Obviously the biological limits on fertility are real. Yet, don’t most women know this already? Hewlett claims they do not. She argues that baby boom women’s pursuit of career
success has cost them dearly if one judges by the high numbers remaining child-
less. She fears that their younger sisters are not getting the message about how
lonely life is at the top for single, childless, middle-aged women. Maybe if she tells
the stories of baby boom women, younger women will change their ways and
workplaces will be forced to be more flexible. Or maybe not.

Although I share some of Hewlett’s concerns about inflexible career trajecto-
ries, long work hours, and the quality of family life, the “problem” of the privi-
leged few is only a narrow part of the story of how work and family life are chang-
ing. And the picture she provides of the privileged few is one-sided: there is little
attention to men except for the attempt to figure out why they don’t want to
marry these high-achieving women. It is hard to imagine that men are cast in
only one mold and also unchanging. The behaviors and regrets of the women as
characterized in this book make for interesting reading, but reading that must be
accompanied by a good dose of skepticism. Surely some women feel as Hewlett
describes those feelings, but how pervasive the regrets, how representative the
women interviewed, howunchanging the family lives of women, high achieving
or not, are hard to gauge from the evidence presented here.

Center on Population, Gender, and Social Inequality
University of Maryland

Suzanne Bianchi

Rose E. Frisch

Female Fertility and the Body Fat Connection

This book is essentially addressed to biologists, but it will appeal to those demog-
raphers interested in relationships between nutrition and fertility. For more than
a generation the two disciplines have often been at loggerheads. Demographers
have shown with persuasive statistics that increased income brings about lower
fertility. But even more confidently, biologists have shown that increased expen-
diture of energy—that is, through the use of more fat that supplies fuel to the
human body—is required to maintain pregnancies, something on the order of
50,000 kilocalories over and above normal metabolic requirements, as Frisch re-
ports. If one carries the argument a stage further, however, and proposes that in-
creased income and increased fat are positively related, one ventures into the field
of human behavior, where generalizations are necessarily uncertain. Far more
firmly grounded is the relation of income and fertility, as demonstrated by statisti-
cal evidence on the so-called demographic transition, the term that describes the
passage from high birth and high death rates to low birth and low death rates. No
one can doubt that as mediated by the diffusion of contraception, this transition is
occurring before our eyes, and will continue until the whole world has the knowl-
dge of contraception and the cultural support for its use.

The thesis of Frisch’s book, announced clearly in her title, is that producing a
new human being is a process requiring the conversion of energy within the body
of the mother. Why, for instance, are lean women athletes often infertile? Pre-
sumably so that they may devote their energy to other purposes than childbear-
ing. Why does primitive art give us so many examples of the kind of woman—
graceless, with a thoroughly rounded figure—that cultures wanting children find
desirable? Presumably to encourage, throughout most of human history, mainte-
nance of high birth rates in the face of high death rates and short life spans.

While readers of this journal might be most interested in Frisch’s chapter on
population, food intake, and fertility, insights are also to be found in her discus-
sions of the consequences of physical activity and too little body fat and of the
connections between exercise and lowered risk of breast cancer and osteoporosis.

For reasons this reviewer finds difficult to understand, Frisch’s work has often
been overlooked during most of the roughly four decades in which she has de-
voted her attention this topic. Frisch collaborated frequently with Roger Revelle,
former director of the Harvard Center for Population and Development Studies
(with which she is affiliated) and they found, for example, that menarche was
closely related to a critical body weight, or peak weight gain. I find it of interest
that much of her work first gained acceptance in Europe. Years ago at a profes-
sional dinner in Hungary I was asked about her work, at a time when it had scarcely
been heard of in the United States.

Cambridge, Massachusetts

NATHAN KEYFITZ

SHORT REVIEWS

by Sajeda Amin, John Bongaarts, John B. Casterline, Susan Greenhalgh, Geoffrey
McNicoll, Michael P. Todaro

LAUREL BOSSEN

Chinese Women and Rural Development: Sixty Years of Change in Lu Village,
Yunnan
Lanham, MD: Rowman & Littlefield, 2002. xxvii + 391 p. $80.00; $29.95 (pbk.).

In 1938, China’s most eminent anthropologist, Fei Hsiao Tung, conducted a field
study of land tenure and rural development in the southwestern province of
Yunnan. The result, Earthbound China: A Study of Rural Economy in Yunnan (1945,
with Chang Chih-I), remains a classic in the anthropology of rural China. In the
meticulously researched monograph under review, Laurel Bossen, associate pro-
fessor of anthropology at McGill University, records the results of her fieldwork
on the gender dynamics of development in one of those villages over the 60 years
from 1938 to 1998. The study is based on six field visits of varying duration made
between 1990 and 1999. A somewhat conventional ethnography in a day of unconventional ethnographies, the book documents changes and continuities in such areas as farm practices, employment, income, politics, and a wide range of demographic issues, from marriage to household organization, birth planning, and sex preference. Tying the pieces together are a concern with the interrelations of family economy, family demography, and gender relations and an interest in locating Lu Village in the context of other Chinese farm communities that have been intensively studied. Bossen finds that inequalities by gender are less severe in Lu Village than in places others have studied, and she seeks explanations in local economic organization and practices. She learns, for example, that footbinding declined because of the demise of the textile industry and the rise of new transportation networks tying Yunnan to the world outside. She notes, as others have, a high incidence of female suicide and roots it in overwork and difficult family situations. Unfortunately, despite the collection of substantial demographic data, key issues in the demography of gender remain poorly illuminated here. On the question of the sex ratio at birth, for example, the author finds too much fluctuation to detect a trend, yet the tables reveal suggestive connections between years of strong birth planning enforcement and years of high sex ratios. (The author’s measure of strong enforcement is an inappropriate one.) Although the inductive approach adopted yields interesting results, this book will frustrate many readers, for the author expresses “reluctance” to reach firm conclusions though she “suspects” that a particular finding might be warranted. Perhaps the problem is one of too much of a good thing, that is, the author sought to understand so many topics that her treatment of each was necessarily limited. For those interested in rural gender dynamics and development in China, however, Bossen’s study will be a welcome addition. It offers fresh observations on the north–south divide in China and fills in some of the material dimensions of gender that have been largely neglected in recent years. Glossary, bibliography, index.—S.G.

Fabrizio Butera and Gabriel Mugny (eds.)
Social Influence in Social Reality: Promoting Individual and Social Change

Social influence and social conformity have been the subject of considerable theory and research in the field of social psychology. This collection of studies applies knowledge from social psychology to selected social problems. Intrinsic to most social interventions are deliberate efforts on the part of some persons to modify the knowledge, attitudes, and behaviors of others—that is, to effect change through social influence. The editors argue that social interventions would be far more effective if they were informed by the social psychology of social influence. Nineteen brief chapters, each addressing a specific area of social policy, are grouped into four categories: political and economic behavior, discrimination, education, and health. Most of the contributors are social psychologists. Despite the avowed intention of offering the reader an applied social psychology, those who design and manage programs will struggle to find much in this volume that they can apply to such endeavors. Social psychology does not travel easily from the laboratory and the attitude survey to social policy. The chapters on health behaviors (smoking, HIV risk be-
behaviors) are the exception. A major conclusion that emerges from this collection is that deliberate efforts to produce social change through social influence will be ineffective unless they are attentive to social and economic circumstances and to personal identities. The determining power of the first set of factors is well recognized by all social science disciplines, whereas the potentially decisive role of personal identity is a valuable insight from social psychology.—J.B.C.

HAROLD COWARD AND DANIEL C. MAGUIRE (EDS.)
Visions of a New Earth: Religious Perspectives on Population, Consumption, and Ecology

The aim of this volume is to draw insights from various religious traditions on the problems of environmental degradation and economic inequality. A guiding assumption is that these problems are closely related and that both are the consequence of over-consumption by a minority (roughly one-sixth) of the world’s population. A second assumption is that technical fixes alone will not suffice. Rather, the values and beliefs of the affluent minority must first change, and this in turn will transform lifestyles and lead to patterns of consumption that will be less damaging to the environment and will permit more-equitable distribution of economic wealth. The editors are a historian with an interest in comparative religion (Coward) and a Catholic ethicist (Maguire). The other contributors are historians, social scientists, and theologians. An introduction by Maguire is followed by two chapters on the ethical assumptions and implications of contemporary economic reasoning. Individual chapters consider particular religious traditions: Catholicism, Protestantism, Judaism, Hinduism, Islam, Buddhism, Chinese religions, and indigenous African religions. Some of these chapters provide a concise summary of a tradition’s stance on economic inequality, reproduction, and the physical environment. Others are more determined to derive from that tradition ethical imperatives to curb consumption and protect the environment. This volume places greater emphasis on economic inequality than the title suggests; indeed, poverty is a more salient concern for most of these authors than environmental degradation. This collection is a helpful reminder that moral assumptions and aims, whether explicitly articulated or not, influence discourse about population and development. Index.—J.B.C.

MARTHA C. NUSSBAUM
Women and Human Development: The Capabilities Approach
New York and Cambridge: Cambridge University Press, 2000. xxi + 312 p. $28.00; $20.00 (pbk.).

Martha Nussbaum’s book is a welcome elucidation of the philosophical underpinnings of an approach to political principles. Nussbaum’s name has long been associated with the capabilities approach along with Amartya Sen, with whom she has written extensively. She begins by spelling out the ways in which this new discussion differs from her own earlier work as well as from Sen’s. In fact, a major ob-
jective seems to be to address three main critiques of the capabilities approach. Some of these criticisms may well apply to feminist notions of social justice more generally. In chapter 1, a “defense of universal values,” Nussbaum counters the allegation that the capabilities approach—which identifies the task of development actors as ensuring that citizens are provided with capacities and opportunities—is a Western, alien import, hence neither relevant nor culturally appropriate to most of the developing world. Here she also distinguishes between the capabilities approach and other more familiar notions of social justice such as the rights approach, suggesting that the capabilities approach is more nearly universal and less culturally specific to Western traditions. Chapter 2 further describes the inadequacies of preference-based social choice and how the capabilities approach addresses these limitations. Chapters 3 and 4 offer an approach to social justice that is sensitive to issues of religion and family. The book is written for an interdisciplinary audience and should be of interest to development practitioners and feminist activists. The example of two Indian women Nussbaum met during recent visits to India is used throughout to illustrate points. This device and extensive reference to Indian literature, particularly to the writings of the early-twentieth-century Bengali poet Rabindranath Tagore, situate the general notions of social justice within the realities and sensibilities of the developing world.—S.A.

Fred C. Pampel
The Institutional Context of Population Change: Patterns of Fertility and Mortality across High-Income Nations

That changes in relative cohort size affect the economic well-being and behavior of cohort members was hypothesized by Richard Easterlin and has been explored in many subsequent studies—most recently in Diane Macunovich’s Birth Quake. The behavioral effects plausibly extend to fertility and even some aspects of mortality. The effects of rising female labor force participation—through women’s greater autonomy and work force commitment—might similarly be felt on fertility and mortality. In both cases, the demographic effects are not automatic: the relationships are shaped by broader social and economic conditions and political contexts. The present volume constitutes a series of forays into this subject. The conditions that shape the relationships are taken to be the extent of social protection (whether a country’s institutions are individualist or collectivist), measured by indexes of corporatism, consensus government, and years of leftist rule, and the degree of gender equality, evidenced by the state of legal equality and by schemes of maternity leave and child support. The data used are for 18 industrial democracies from the 1950s to the 1990s, drawn from an eclectic array of sources that are not very clearly spelled out. The broad contrast between Scandinavian countries and the rest tends to dominate along both the social protection and the gender equality dimensions, which would devalue the multivariate analysis. Fortunately, the country picture is actually more variegated: Japan and Switzerland, for example, emerge as collectivist but gender-unequal, the United States as individualist but gender-equal.
The study’s principal result is that while both larger relative cohort size and higher female labor force participation have negative effects on fertility, in both cases the effects are substantially stronger in individualist and gender-unequal countries than in collectivist and gender-equal ones. The mortality investigations pertain only to suicide and homicide, the causes of death for which the behavioral input is most clear-cut. The findings here are fairly intricate and most of the relationships uncovered are weak. The strongest one is that large cohorts have higher male suicide rates at young ages but lower rates at older ages, a difference that is more marked in individualist countries. Generally, the study’s payoff on the mortality side appears to be quite modest. The author concludes that the findings “make [institutionally] contingent what many consider to be invariant relationships and challenge the validity of unconditional generalizations about the determinants of fertility and mortality.” Fred C. Pampel is with the Institute of Behavioral Science at the University of Colorado, Boulder. Bibliography, index.—G.McN.

Demetrios G. Papademetriou and Deborah Waller Meyers (eds.)
Caught in the Middle: Border Communities in an Era of Globalization

Two interrelated phenomena in international economic and political relations have emerged over the past decade: globalization and cross-border migration. At a time when borders have become more porous and national politics inexorably more restrictive, the issue of how border communities adapt and adjust to rapid changes in their economies and work forces has received little research attention. This volume attempts to provide a more realistic understanding of how increased international migration affects border communities. Its main focus is on the inner workings of border communities along five international boundaries: the United States–Canada, United States–Mexico, Germany–Poland, Russia–China, and Russia–Kazakhstan. The contributors’ goals are threefold: (1) cataloguing and understanding local initiatives toward greater cooperation between border communities located on opposite sides of an international border; (2) understanding how border communities respond in similar or diverse ways to their growing predicaments; and (3) discerning the most effective policies for dealing with cross-border matters.

After an informative overview by the editors, the book is divided into three parts. Part one contains three essays, two dealing with US–Mexican border issues and the other analyzing self-governance along the US–Canada border. Part two deals with Europe while part three focuses on border interactions between Russia and China and Russia and Kazakhstan. The research suggests that most border communities share a surprising number of attitudes and practices, the most notable being a belief that central governments give inadequate attention to their particular problems but focus instead on issues of “state.” Additional findings point to inconsistent national policies toward border controls, a tendency by governments to use symbols and language that reinforce the imagery.
of borders as “zones of exclusion,” and the difficulties that many border communities face in coping—politically, economically, and socially—with their rapidly changing situations.

Contributors include Gustavo del Castillo V. from Mexico; Malgorzata Irek from Germany; Grigorii G. Kosach, Alexei S. Kuzmin, and Viktor Larin from Russia; and John Salt and Sandra Schmidt from the United Kingdom. The editors were both associated with the Carnegie Endowment’s International Migration Policy Program until 2001, when this volume was published.—M.P.T.

PER PINSTRUP-ANDERSEN AND EBBE SCHIOLER

*Seeds of Contention: World Hunger and the Global Controversy over GM Crops*

Baltimore: Johns Hopkins University Press, 2001. xii + 164 p. $13.95 (pbk.).

A contentious debate has surrounded the rising use of genetically modified (GM) crops in agriculture. Critics express concern about consumer safety, the risk of damage to ecosystems, and the growing control exerted by agribusiness and biotechnology companies over the world’s food supply. Advocates cite the potential benefits of producing higher-quality food at lower cost. This volume reviews recent trends in the development of GM crops and summarizes the views of both sides in the debate on whether to curb the spread of this new biotechnology. The risks associated with the further spread of GM crops are described, but the authors argue persuasively that these are manageable with suitable regulation. The authors’ main concern is that the needs of the developing world are given insufficient attention in this debate. A huge increase in food production is needed in the next few decades to satisfy the growing demand for food. Overall demand is rising rapidly because of continued growth in population size, in per capita caloric intake, and in the proportion of food consisting of animal products. In many parts of the world, nearly all potential arable land is now in use, hence increases in crop yields will have to be the main source of rising food output. Such yield increments can in part be obtained by further application of known green revolution technologies, but this approach is unlikely to be sufficient. New bioengineering innovations are therefore needed if the desired reduction in hunger is to be achieved. New biotechnology is seen as essential to producing higher-yielding crops that are more nutritious, more resistant to disease and insect attacks, and better able to survive on less water and in poor soils. Aimed at a nonspecialist audience, this volume succeeds well in explaining the technical issues involved and in presenting a balanced view of competing views. English-language translation of earlier Danish version.—J.B.

WALTER SCHEIDEL (ED.)

*Debating Roman Demography*


Ancient demography was once a wholly detached subfield within population studies, characterized by massive inferences from the most fragmentary data. Epigra-
phy figured prominently. Volumes such as this are evidence of the extent to which at least some areas of ancient demography—here Roman Italy from about two centuries BC to about the sixth century AD—have become historical demography proper. Only its practitioners’ recourse to levels 1 and 2 of the Coale–Demeny life tables lends it a certain distinctiveness. (The study of still more ancient times, demographic prehistory, has also advanced greatly, but in directions that may increasingly take it out of demographers’ grasp: paleodemography’s findings and insights must compete with those of the emerging field of archeogenetics.)

Scheidel’s book comprises a critical review of the field by the editor, three chapters on estimating population size, and one on the seasonality of births. Although this is at first sight an odd and esoteric collection, historical demographers should find much of interest in it. Scheidel’s survey, “Progress and problems in Roman demography,” is a bracing tour through what is now a substantial literature—much of which, in the author’s view, does not pass muster. He perceives ideology entering arguments over population size (hinging on the number of slaves and on rates of military mobilization) with broad implications for the interpretation of Roman history. There is even an ideological element in the debate over the extent of Roman childlessness and its role, if any, in the empire’s decline and fall—as a cautionary tale for modern Europe. On birth control Scheidel leans to a natural fertility view, but is well aware of the parallel debate going on for preindustrial China and various other regions. The chapters on estimating population size show the detectives at work or ruminating. Their hazardous feats of imputation are here in open view rather than, as for estimates of present-day populations in statistically vacant regions, discreetly hidden. The study of seasonal birth patterns, based mainly on an analysis of funerary epitaphs, is scholarship applied to a less than first-order problem. It is discovered that Romans of the fourth through sixth centuries “engaged in more intense and successful procreative activity” between March and May, with secondary peaks in August and November; elsewhere in Italy a different seasonal cycle prevailed. Biological and cultural explanations are discussed. The volume derives from a 1997 conference on Population Size and Demographic Structure in the Ancient World. Consolidated bibliography, index.—G.McN.
People’s Republic of China
Law on Population and Birth Planning

Plans by the Chinese government for drafting and passing a national law on population and birth planning were first reported in 1978. Progress toward that politically sensitive goal has been, however, very slow. During the past two decades, the legal basis of China’s birth planning program was limited to provincial legislation. By the late 1990s, birth planning was the only major national policy area that did not have national enabling legislation.

In January 2000 the State Birth Planning Commission sent a draft of the law on population to the State Council for interagency review and party approval. At the end of 2000, the National People’s Congress placed the law on its 2001 agenda. After the required multiple reviews, and with some changes, the Standing Committee of the NPC passed the Law on Population and Birth Planning on 29 December 2001, and on the same day President Jiang Zemin signed and promulgated the Law. The Law is to come into effect on 1 September 2002.

The background and significance of this legislation are discussed in detail in the opening article in the present issue of this journal. The author of the article, Edwin A. Winckler, also prepared an English translation of the Law on Population and Birth Planning. This translation is reproduced below. It is followed by a note by the translator.

Chapter One  General principles

ARTICLE 1  This Law is enacted on the basis of the Constitution, in order to achieve coordinated development of population on the one hand, and the economy, society, resources, and environment on the other; to promote birth planning and safeguard citizens’ legitimate rights and interests; and to advance family happiness, national prosperity, and social progress.

ARTICLE 2  China is a populous country, [so] practicing birth planning is a basic national policy of the State.

The State shall employ comprehensive measures to control population quantity and improve population quality.

In developing (kaizhan) population and birth planning work, the State shall rely on propaganda and education, scientific and technological progress, comprehensive services, and the establishment and improvement (jianli jianquan) of rewards and of a social security system.

ARTICLE 3  The development of population and birth planning work should be mutually linked with increasing the opportunity of women for education and employment, improving women’s health, and raising women’s status.

ARTICLE 4  While carrying out the work of promoting birth planning, people’s governments and their functionaries at all levels should conduct administration strictly in ac-
cordance with the law (yange yifa xingzheng), should enforce the law in a civilized manner (wenming zhifa), and must not infringe upon citizens’ legitimate rights and interests.

In lawfully discharging official duties, birth planning administrative departments and their functionaries shall receive the protection of the law.

**Article 5** The State Council shall lead (lingdao) the work of population and birth planning in the whole country.

Local people’s governments at all levels shall lead the work of population and birth planning within their administrative jurisdictions.

**Article 6** The birth planning administrative departments of the State Council shall be responsible for (fuze) national birth planning work and [national] population work that is related to birth planning.

The birth planning administrative departments of local people’s governments at and above the county level shall be responsible for the work of birth planning, and for population work related to birth planning, within their administrative area.

Other relevant departments within local people’s governments at and above the county level shall be responsible for related population and birth planning work, within the scope of their responsibilities.

**Article 7** Social organizations (such as Trade Unions, Communist Youth Leagues, Women’s Federations, and Birth Planning Associations), [as well as] business and public-service organizations (qiye shiye zuzhi) and citizens, should assist (xiezhu) the people’s governments in developing population and birth planning work.

**Article 8** The State shall reward organizations and individuals having outstanding achievements in population and birth planning work.

### Chapter Two  Formulation and implementation of population development plans

**Article 9** The State Council shall formulate (bianzi) a national population development plan and incorporate it in the national economic and social development plan.

Local people’s governments at and above the county level—based on the national population development plan and the population development plan of the people’s government at the next higher level, and according to their actual local conditions—shall work out a population development plan for their administrative jurisdictions, and incorporate it in the [local] economic and social development plan.

**Article 10** Local people’s governments at and above the county level, based on the [local] population development plan (zuohuo), shall formulate an implementation plan (fang'an) for population and birth planning and shall organize its implementation.

The birth planning administrative departments within local people’s governments at and above the county level shall be responsible for implementing the day-to-day work of the [local] implementation plan for population and birth planning.

People’s governments of townships, nationality townships, or towns, and urban neighborhood administrative offices, shall be responsible for the work of population and birth planning in their administrative jurisdictions and shall thoroughly carry out the [local] implementation plan for population and birth planning.

**Article 11** The implementation plan for population and birth planning should stipulate measures (guiding…cuoshi) for controlling population quantity, for strengthening maternal and child health, and for improving population quality.

**Article 12** Villagers’ committees and residents’ committees should do a good job (zuohao) of birth planning work, in accordance with the law.

Administrative organizations, military units, social organizations, and business and public-service organizations [all] should do a good job of their units’ birth planning work.

**Article 13** [Government] departments—such as birth planning, education, science and technology, culture, public health, civil affairs, news and publication, and radio and television—should organize propaganda-education for developing population and birth planning.

Mass media have a duty to [carry] social public-service propaganda (shehui gongyixing xuanquan) for developing population and birth planning.

Among students, schools should develop education on physiology and health, educa-
tion on puberty, and education on sexual health, in a planned way and using methods that are appropriate to the characteristics of those receiving the instruction.

**ARTICLE 14** Birth planning work for the migrant population shall be the joint managerial responsibility of the people’s government of the place where their household is registered and of the place where they currently reside, with [the government of] the current residence playing the main role.

**ARTICLE 15** The State shall, based on the situation of national economic and social development, gradually raise the overall level of funding (jingfei touru) for population and birth planning. People’s governments at all levels should guarantee the funds necessary for population and birth planning.

People’s governments at all levels should give targeted assistance (zhongdian fuchi, literally “keypoint support”) for the development of population and birth planning work in poverty-stricken and minority-nationality districts.

The State shall encourage social organizations, business and public-service organizations, and individuals to provide support for population and birth planning work.

No unit or individual whatsoever may withhold, deduct, or misappropriate funds for population and birth planning work.

**ARTICLE 16** The State shall encourage scientific research and international exchange-and-cooperation that develop the field of population and birth planning.

**Chapter Three Regulating Reproduction**

**ARTICLE 17** Citizens have the right to have a child (shengyu, “give birth”) and also have a duty to practice birth planning according to the law. Husbands and wives bear joint responsibility in practicing birth planning.

**ARTICLE 18** Couples of childbearing age should conscientiously practice birth planning measures for preventing pregnancy and controlling birth and should accept guidance on birth planning technical services.

**ARTICLE 19** The practice of birth planning should take contraception (biyun) as the main [method].

The State shall create conditions guaranteeing citizens informed choice of safe, effective, and appropriate measures for preventing pregnancy and controlling birth (biyun jieyu cuoshi). Personnel performing operations for preventing pregnancy and controlling birth should protect the safety of the person undergoing the operation.

**ARTICLE 20** Couples of childbearing age who practice birth planning shall enjoy, free of charge (mianfei xiangshou), the technical services that the State stipulates as basic items (guojia guiding de jiben xiangmu).

The funds necessary for the items stipulated in the above provision shall be listed in the financial budget or guaranteed from social insurance, in accordance with relevant national stipulations (guiding).

**ARTICLE 21** Couples of childbearing age who practice birth planning shall enjoy, free of charge (mianfei xiangshou), the technical services that the State stipulates as basic items (guojia guiding de jiben xiangmu).

The funds necessary for the items stipulated in the above provision shall be listed in the financial budget or guaranteed from social insurance, in accordance with relevant national stipulations (guiding).

**ARTICLE 22** It is forbidden to discriminate against or mistreat women who give birth to female infants and women who do not give birth [i.e., are infertile].

It is forbidden to discriminate against, mistreat, or abandon female infants.

**Chapter Four Incentives and Social Insurance**

**ARTICLE 23** The State shall reward couples who practice birth planning, according to the [relevant] stipulations.

**ARTICLE 24** In order to promote birth planning, the State shall establish and improve various social insurance systems, such
as basic pension insurance (yanglao, literally “care for the old”), basic medical insurance, childbirth insurance, and social welfare.

The State shall encourage insurance firms to introduce insurance items that are beneficial to birth planning.

Localities with the necessary conditions can, based on the principle of government guidance and farmers’ willingness, implement various forms of pension-guarantee methods in villages.

**Article 25** Citizens who postpone marriage and childbearing may obtain (keyi huo) longer wedding leave, longer maternity leave, and other beneficial treatment (fuli daiyu).

**Article 26** During the period of pregnancy, birth giving, and breastfeeding, women shall enjoy special labor protection (teshu laodong baohu) and can obtain assistance and compensation (buchang), in accordance with the relevant State stipulations.

Citizens undergoing a birth planning surgical operation shall enjoy State-stipulated leave. Local people’s governments may give [them] rewards.

**Article 27** [To] couples who voluntarily decide to have only one child during their lifetime, the State shall issue a “Certificate of Honor for One-Child Parents.”

Couples who obtain a “Certificate of Honor for One-Child Parents” shall enjoy a reward for one-child parents, in accordance with the relevant national, provincial, autonomous region, or municipal stipulations.

[A couple’s unit] should provide [the couple] with [any rewards] that are provided by their unit, among the [many possible] measures that are stipulated by laws, regulations, or rules for rewarding couples who voluntarily decide to have only one child during their lifetime.

[If] an only child suffers accidental disability or death, and [if] its parents do not have another [child] or adopt [another] child, the local people’s government should give [any] necessary aid.

**Article 28** People’s governments at all levels shall give—to rural households that are practicing birth planning [and that wish to] develop [their household] economies—support and preference (zhichi youhui) in the area of funds, technology, and training. Impoverished households that practice birth planning shall be given priority treatment in the area of poverty relief loans (fupin daikuan), work relief (yigong daizhen), poverty relief items (fupin xiangmu), or social relief (shehui jiuji).

**Article 29** Specific implementation methods for the reward measures stipulated in this chapter may (keyi) be formulated by the people’s congresses or their standing committees of the provinces, autonomous regions, directly administered cities, or relatively large cities, in accordance with this Law and the stipulations of [other] relevant laws and administrative regulations, and according to actual local conditions.

**Chapter Five  Birth planning technical services**

**Article 30** The State shall establish systems for premartial health care and for health care during pregnancy and childbirth, [in order] to prevent or reduce birth defects and improve the standard of health of newborn infants.

**Article 31** People’s governments at all levels should take measures to guarantee that citizens enjoy birth planning technical services, in order to raise the standard of citizens’ reproductive health.

**Article 32** Local people’s governments at all levels should rationally allocate and comprehensively utilize health resources, establishing and improving a birth planning technical service network (formed from birth planning technical service organs (jigou) and from medical and public health organs that provide birth planning technical services), improving technical service facilities and conditions, and raising the standard of technical services.

**Article 33** Birth planning technical service organs and medical and public health organs that provide birth planning technical services, should—within their respective area of responsibility and targeting people of childbearing age—conduct propaganda and education on basic knowledge about population and birth planning. [They should also] develop pregnancy checkups and follow-up (suifang) service work for married women of childbearing age. [They should also assume
the burden of providing (chengdan) information, guidance, and technical services for birth planning and reproductive health.

Article 34 Birth planning technical service personnel should guide citizens practicing birth planning to select safe, effective, and appropriate contraceptive measures (biyun cuoshi).

[It is] recommended (tichang) that couples who have already had a child choose long-term (changxiao, literally “long effective”) contraceptive measures.

The State shall encourage research, utilization, and dissemination of new birth planning technologies and products.

Article 35 [It is] strictly forbidden to use ultrasound technology or other technological means to conduct examinations of the sex of fetuses, other than as medically necessary. [It is] strictly forbidden to terminate a pregnancy [for the purpose of sex selection], other than as medically necessary.

Chapter Six  Legal responsibilities

Article 36 [Anyone who] violates this Law by one of the acts listed below shall—by the birth planning or public health agency, based on their authority (yijiu zhiquan)—be ordered to rectify the situation (zeling gaizheng), given a warning, and have illegal income confiscated.

If the illegal income is 10,000 yuan or more, a fine shall be imposed of no less than two times and no more than six times the illegal income. If there is no illegal income or the illegal income is less than 10,000 yuan, a fine shall be imposed of no less than 5,000 yuan and no more than 20,000 yuan. Acts constituting a crime shall be referred for criminal prosecution according to the law.

1) Illegally performing a birth planning surgical operation for [the benefit of] another [person] (wei taren or tuoren)

2) Using ultrasound technology or other technology for [the benefit of] another [person] to detect the sex of a fetus other than as medically necessary, and artificially terminating a pregnancy [for the purpose of] sex selection

3) Conducting a fake (jia) birth planning surgical operation, conducting a fake medical appraisal (jianding), and issuing a fake birth planning certificate.

Article 37 [If there is] forging, altering, or trafficking (maimai) in birth planning certificates, any illegal income shall be confiscated by an administrative department in charge of birth planning. If the illegal income is 5,000 yuan or more, a fine shall be imposed of no less than two times and no more than ten times the illegal income. If there is no illegal income, or the illegal income is less than 5,000 yuan, a fine shall be imposed of no less than 5,000 yuan and no more than 20,000 yuan. Acts constituting a crime shall be referred for criminal prosecution according to the law.

Anyone obtaining a birth planning certificate by improper means shall have the birth planning certificate revoked by an administrative department in charge of birth planning. [If] the unit that issued the certificate was at fault (yu guozuo de), an administrative punishment shall be imposed on the supervisory officials directly responsible and on other directly responsible personnel, according to the law.

Article 38 Birth planning technical service providers who, with serious [medical] consequences, act against the rules (weizhang caozuo) or delay emergency response, diagnosis, or treatment shall assume corresponding legal responsibility (chengdan xiangying de falu zeren), according to the relevant stipulations of laws and administrative regulations.

Article 39 A State functionary who commits one of the acts below in the course of birth planning work, if the act constitutes a crime, shall be prosecuted according to the law. Or, if the act does not constitute a crime, [the functionary] shall be given administrative punishment according to the law. Any illegal income shall be confiscated.

1) Infringing upon a citizen’s rights of person, property rights, or other legitimate rights and interests

2) Abuse of power, dereliction of duty, or graft

3) Demanding or accepting a bribe

4) Withholding, deducting, misappropriating, or embezzling birth planning funds or social compensation fees

5) Distorting, underreporting, fabricating, altering, or refusing to report population and birth planning statistics.
ARTICLE 40 Anyone [unit or person] who violates this Law or does not perform the duty to assist in the management of birth planning shall be ordered by the relevant local people’s government to correct the situation and shall be criticized in a circular [by that government]. Administrative punishment shall be given to supervisory personnel directly responsible, and to other directly responsible personnel, according to the law.

ARTICLE 41 Citizens who give birth to a child in violation of Article 18 of this Law should pay a social compensation fee (shënhui fuyang féi, literally “social bringing-up fee”).

Those who do not pay the full amount of the social compensation fee within the stipulated time period shall, from the date of default, be levied a late-payment penalty according to relevant State stipulations. In the case of those who still do not pay, the birth planning administrative department that decided to levy [the social compensation fee] shall petition the people’s court for enforcement (qiángzhì zhíxíng, literally “forceful implementation”), according to the law.

ARTICLE 42 Among personnel (rényuán) who pay a social compensation fee in accordance with Article 41 of this Law, those who are State staff (guójia gōngzuò rényuán) should also be given administrative punishment (xíngchéng chufen) according to the law. Other personnel [who are not State staff] should also [in addition to the social compensation fee] be given disciplinary punishment (jílù chufen) by their own unit or organization.

ARTICLE 43 Anyone who refuses or obstructs (jujue zu-ài) a birth planning administrative department or its personnel while they are lawfully performing their official duties shall be given criticism-and-education and be stopped by the birth planning administrative department. Anyone whose conduct constitutes a violation of public security management (weifan zhían guanlì) shall be given public-security-management punishment. Anyone [whose acts] constitute a crime shall be referred for criminal prosecution.

ARTICLE 44 Citizens, legal persons, and other organizations which deem that an administrative agency has infringed on their legal rights and interests in the process of implementing birth planning management may appeal for administrative reconsideration or may initiate litigation.

Chapter Seven Supplementary provisions

ARTICLE 45 The State Council shall formulate specific management methods for birth planning work among migrants, specific management methods for birth planning technical services, and management methods for collecting social compensation fees.

ARTICLE 46 Specific measures for implementing this Law by the Chinese People’s Liberation Army shall be formulated by the Military Commission [of the Central Committee of the Chinese Communist Party] based on this Law.

ARTICLE 47 This Law shall go into effect from 1 September 2002.

Translator’s note: This translation is based on the official Chinese text, as published by the China Population Publishing House. In making it, I consulted two other translations (see Law 2001a and Law 2001b in the References to the article at the beginning of this issue). One was published by the Foreign Broadcast Information Service (FBIS) at the time the Law was promulgated. The FBIS translation conveys the general sense of the Law but evidently it had to be done quickly and it contains language that would permit significant misreadings on crucial points. The other was an early draft of a translation, some form of which was later adopted by the State Birth Planning Commission (SBPC), some form of which reportedly was in turn endorsed by the National People’s Congress (NPC). The translation process for this version was slow and thoughtful, but with revisions by a succession of agencies and individuals, so that some key Chinese terms are not translated consistently or precisely. In any case, to the best of my knowledge, neither the SBPC nor the NPC has yet issued an official English version to the public, so no final official version is available.
For a matter as controversial as Chinese birth planning, translation should avoid the problem of saying one thing in one language and something else in another, inadvertently or otherwise. This problem is aggravated for this Law by the fact that Chinese terminology and syntax are often cryptic and by the fact that the Law is often deliberately vague and sometimes poorly drafted. Moreover, understanding the intent of many of the terms in the Law requires knowledge of birth program policies and practices, of the commentaries that the SBPC has published separately to explain this Law, and of other current Chinese public programs or administrative practices. Therefore on many crucial points even a perfect literal translation would fail to convey what the Law is intended to mean in practice, unless accompanied by annotations. Accordingly, this translation adds English words in brackets to clarify or explain the Chinese original where necessary. (All instances of “shall” and “shall be” are only implicit in the Chinese but, for readability, have not been placed in brackets.) This translation also adds Chinese words in parentheses to identify the Chinese original of terms that are particularly important, controversial, ambiguous, or technical (usually only on first occurrence, in the official pinyin romanization).

In addition, throughout, the following conventions apply. Because the Chinese birth limitation program remains poised between state planning of births and family planning of births, jihua shengyu (literally “planned birth”) is translated as “birth planning,” not “family planning.” The “work” of population and birth planning, referred to throughout the Law, usually means administrative work by state agencies. In “protecting citizens’ legitimate rights and interests” (weihu gongmin de hefa quanyi), the rights and interests might be narrower or broader depending on whether “hefa” is construed literally as “legal” or generously as “legitimate” (Articles 1, 4, and 39). “Improving population quality” (tigau renkou suzhi) means not just avoiding unhealthy births but also increasing individuals’ education and well-being and even avoiding macro-demographic distortions (Articles 2 and 11). “Technical services” include not only physical treatment but also information and counseling. “Measures for preventing pregnancy and controlling birth” (biyun jieyu cuoshi) strongly emphasize contraception, they include sterilization as a voluntary option, and they include safe abortions only as a last resort, after contraception fails (Articles 19, 20, and 34). I am grateful to Jason Wang of the Public Media Center, San Francisco, for providing relevant materials and discussing translation issues.—E.A.W.
Demographic Data on the Victims of the September 11, 2001 Terror Attack on the World Trade Center, New York City

The magnitude of the death toll resulting from the attack on the World Trade Center is without precedent in the history of terrorist acts. Because of the scale and destructiveness of the buildings’ collapse, a final list of the victims required a lengthy process, more so than was the case at the other sites of terrorist violence on the same day—at the Pentagon, Virginia (193 killed, 68 of these on American Airlines Flight 77), and near Shanksville, Pennsylvania (45 killed in the crash of United Airlines Flight 93). After the passing of a year, the list of the victims in New York, while essentially complete, is still not officially closed. On August 19, 2002, the city’s medical examiner’s office issued a list containing 2,819 names. Reproduced below are some data, released by the city’s office of vital statistics, on the demographic characteristics of 2,723 victims (59 of these on United Airlines Flight 175 and 89 on American Airlines Flight 11) for whom a death certificate had been issued—an exacting procedure—as of August 16, 2002. The cause of death, in each instance, was entered as homicide. The age distribution reflects the character of the World Trade Center—a workplace—and the time of day—early for tourist visits. The youngest victims perished as passengers in the two airplanes flown into the twin towers.
## Distribution of deaths by age and sex

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5–9</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>10–14</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>15–19</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>20–24</td>
<td>69</td>
<td>36</td>
<td>105</td>
</tr>
<tr>
<td>25–29</td>
<td>227</td>
<td>92</td>
<td>319</td>
</tr>
<tr>
<td>30–34</td>
<td>372</td>
<td>109</td>
<td>481</td>
</tr>
<tr>
<td>35–39</td>
<td>430</td>
<td>89</td>
<td>519</td>
</tr>
<tr>
<td>40–44</td>
<td>371</td>
<td>96</td>
<td>467</td>
</tr>
<tr>
<td>45–49</td>
<td>264</td>
<td>76</td>
<td>340</td>
</tr>
<tr>
<td>50–54</td>
<td>181</td>
<td>50</td>
<td>231</td>
</tr>
<tr>
<td>55–59</td>
<td>110</td>
<td>37</td>
<td>147</td>
</tr>
<tr>
<td>60–64</td>
<td>45</td>
<td>24</td>
<td>69</td>
</tr>
<tr>
<td>65–69</td>
<td>18</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>70–74</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>75–79</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>80–84</td>
<td>—</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>85+</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>2,100</td>
<td>623</td>
<td>2,723</td>
</tr>
</tbody>
</table>

## Deaths by United States residence

<table>
<thead>
<tr>
<th>Residence</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manhattan</td>
<td>337</td>
</tr>
<tr>
<td>Bronx</td>
<td>91</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>291</td>
</tr>
<tr>
<td>Queens</td>
<td>257</td>
</tr>
<tr>
<td>Staten Island</td>
<td>192</td>
</tr>
<tr>
<td>New York State outside of New York City</td>
<td>593</td>
</tr>
<tr>
<td>United States outside of New York State</td>
<td>935</td>
</tr>
<tr>
<td>Foreign country</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>2,723</td>
</tr>
</tbody>
</table>

## Deaths by state of residence

<table>
<thead>
<tr>
<th>State</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>1,761</td>
</tr>
<tr>
<td>New Jersey</td>
<td>674</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>89</td>
</tr>
<tr>
<td>Connecticut</td>
<td>63</td>
</tr>
<tr>
<td>California</td>
<td>29</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>27</td>
</tr>
<tr>
<td>Other US states</td>
<td>53</td>
</tr>
<tr>
<td>Foreign country</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>2,723</td>
</tr>
</tbody>
</table>

## Deaths by date of death

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 11, 2001</td>
<td>2,713</td>
</tr>
<tr>
<td>September 15, 2001</td>
<td>2</td>
</tr>
<tr>
<td>September 16, 2001</td>
<td>1</td>
</tr>
<tr>
<td>September 30, 2001</td>
<td>1</td>
</tr>
<tr>
<td>October 9, 2001</td>
<td>1</td>
</tr>
<tr>
<td>October 14, 2001</td>
<td>1</td>
</tr>
<tr>
<td>October 22, 2001</td>
<td>1</td>
</tr>
<tr>
<td>October 26, 2001</td>
<td>1</td>
</tr>
<tr>
<td>October 30, 2001</td>
<td>1</td>
</tr>
<tr>
<td>November 28, 2001</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>2,723</td>
</tr>
</tbody>
</table>

## Deaths by ethnic background, by sex

<table>
<thead>
<tr>
<th>Ethnic Background</th>
<th>Male</th>
<th>Female</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic, white</td>
<td>1,657</td>
<td>407</td>
<td>2,064</td>
</tr>
<tr>
<td>Non-Hispanic, black</td>
<td>135</td>
<td>79</td>
<td>214</td>
</tr>
<tr>
<td>Hispanic</td>
<td>177</td>
<td>81</td>
<td>258</td>
</tr>
<tr>
<td>Asian and Pacific Islander</td>
<td>122</td>
<td>54</td>
<td>176</td>
</tr>
<tr>
<td>Other</td>
<td>—</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>9</td>
<td>—</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>2,100</td>
<td>623</td>
<td>2,723</td>
</tr>
</tbody>
</table>
Deaths by place of birth

<table>
<thead>
<tr>
<th>Country</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2,155</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>56</td>
</tr>
<tr>
<td>India</td>
<td>36</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>34</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>26</td>
</tr>
<tr>
<td>Japan</td>
<td>25</td>
</tr>
<tr>
<td>Jamaica</td>
<td>21</td>
</tr>
<tr>
<td>China</td>
<td>18</td>
</tr>
<tr>
<td>Colombia</td>
<td>18</td>
</tr>
<tr>
<td>Canada</td>
<td>17</td>
</tr>
<tr>
<td>Germany</td>
<td>16</td>
</tr>
<tr>
<td>Philippines</td>
<td>16</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>15</td>
</tr>
<tr>
<td>Ecuador</td>
<td>14</td>
</tr>
<tr>
<td>Guyana</td>
<td>14</td>
</tr>
<tr>
<td>Italy</td>
<td>13</td>
</tr>
<tr>
<td>Ukraine</td>
<td>11</td>
</tr>
<tr>
<td>Korea</td>
<td>10</td>
</tr>
<tr>
<td>Ireland</td>
<td>8</td>
</tr>
<tr>
<td>Pakistan</td>
<td>8</td>
</tr>
<tr>
<td>Poland</td>
<td>8</td>
</tr>
<tr>
<td>Russia</td>
<td>8</td>
</tr>
<tr>
<td>Cuba</td>
<td>7</td>
</tr>
<tr>
<td>Haiti</td>
<td>7</td>
</tr>
<tr>
<td>Taiwan</td>
<td>7</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>6</td>
</tr>
<tr>
<td>All other places</td>
<td>149</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,723</td>
</tr>
</tbody>
</table>
Chinese Reproductive Policy at the Turn of the Millennium: Dynamic Stability

EDWIN A. WINCKLER

In the 1990s, as fertility fell below replacement, China’s state birth planning program began reforms, first to improve its state-centric approach to birth limitation and then to incorporate some elements of a more client-centered approach. In 2000 and 2001, as part of a regime shift toward “rule by law,” China both further institutionalized and further reformed the program. A March 2000 Decision and a December 2001 Law reaffirm the need for state planning of population and births but mandate a shift in both methods and goals. Methods should shift from direct to indirect regulation, reducing negative effects such as coercion and corruption and increasing positive benefits such as helping poor women develop. Goals should shift from just limiting births toward also delivering reproductive health services. Reforms are occurring also through supporting regulations and changes of procedure within existing regulations. These policies chart a new course for implementation over the next decade.

The End of the Fertility Transition in the Developed World

JOHN BONGAARTS

By the late 1990s the average period total fertility rate in the developed world had declined to 1.6, a level substantially lower than projected in the 1970s and 1980s. This article examines recent trends and patterns in fertility in the developed world with particular emphasis on the effects and implications of changes in the timing of childbearing. The main objective is to demonstrate that while fertility in these countries is indeed low, women’s childbearing levels are not as low as period measures such as the total fertility rate suggest. To obtain a full understanding of the various dimensions of fertility change, several indicators are examined, including period and cohort fertility by birth order and childbearing preferences. An analysis of these indicators demonstrates that period fertility measures in many developed countries are temporarily depressed by a rise in the mean age at childbearing. The distortion of the TFR is as great as 0.4 births per woman in Italy and Spain. These effects have been present in many developed countries since the 1970s and could continue for years into the future. But tempo effects are temporary, and once the postponement of childbearing ends—as it eventually must—the corresponding fertility-depressing effect stops, thus putting upward pressure on period fertility. Countries with very low fertility and substantial tempo effects may well experience rises in fertility in the near future if the timing of childbearing stabilizes. Even if this happens, however, it seems unlikely that fertility will rebound to the replacement level.

Production, Reproduction, and Education: Women, Children, and Work in a British Perspective

HEATHER JOSHI

This article reviews findings of studies by the author and colleagues on relationships between women’s work and the reproduction of the British population based on data for female birth cohorts 1922–70. The studies address three questions: (1) How do children affect women’s paid work and lifetime earnings? (2) How does women’s employment affect the quantity of children born? (3) How does women’s employment affect the “quality” of children? The answers are affected by the woman’s educational attainment. On question 1, childrearing may often halve lifetime earnings, but seldom for the well educated. By contrast, any effects from employment to childbearing are most apparent in the late motherhood of the well educated. Child quality, as assessed by indicators of child development, benefits from maternal education and suffers little from maternal
employment. The economic advantages for children in dual-career families are thus unabated. A widening gulf between mothers will tend to polarize the life chances of their children, unless there are more options to combine employment and childrearing, especially including good-quality child care for those who cannot afford the market price. Education is a powerful influence, but does not alone solve all issues of equity, whether between families or between sexes.

**Children’s Economic Roles in the Maya Family Life Cycle: Cain, Caldwell, and Chayanov Revisited**

Ronald D. Lee  
Karen L. Kramer

This article examines the relationship between household demographic pressure and interage transfers for a group of Maya subsistence agriculturists in Yucatán, Mexico. The authors use data from a field study conducted in 1992–93 on individual time allocation, relative productivity by age and sex, and caloric costs of activities to estimate age schedules of average consumption and production. Using these, they investigate the net costs of children to their parents and find that children have a negative net asset value up to the time they leave home. The direction of net wealth flows in this group is downward, from older to younger, and in economic terms the internal rate of return to children is highly negative up to the time they leave home. Nonetheless, children play a critically important role in the family’s economic life cycle. On average, girls offset 76 percent of their consumption costs before leaving home at age 19, and boys offset 82 percent before leaving home at 22. Without the contributions from children as a group, parents would have to double or triple their work effort during part of the family life cycle if they were to raise the same number of children. By the thirteenth year of the family life cycle, children as a group produce more than half of what they consume in every year, and after the twentieth year children produce more than 80 percent of what they as a group consume. The authors also find that the elderly in the sample, ages 50 to 65, produce more than they consume. Thus while children have a negative net asset value to parents, the timing of their children’s economic contribution across the family life cycle plays a key role in underwriting the cost of large families.

**A Biodemographic Interpretation of Life Span**

S. Jay Olshansky  
Bruce A. Carnes  
Jacob Brody

The life span of individuals and the life expectancy of the populations they comprise have always been topics of interest to scientists and the lay population. In modern times, forecasts of life span and life expectancy have become particularly important public policy issues because of their influence on the future solvency of age-entitlement programs. The authors present a brief discussion of the origin of the notion of life span, discuss its relevance and importance in light of recent developments in the emerging field of the biodemography of aging, and explore the theoretical and biological forces that influence the duration of life of sexually reproducing species.

**Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence from Four Asian Countries**

S. Philip Morgan  
Sharon Stash  
Herbert L. Smith  
Karen Oppenheim Mason

On the basis of research on paired Muslim and non-Muslim communities selected in India, Malaysia, Thailand, and the Philippines, the authors test the hypothesis that greater observed Muslim pronatalism can be explained by less power or lower autonomy among Muslim women. Indeed, wives in the Muslim communities, compared to the non-Muslim ones: 1) had more children, 2) were more likely to desire additional children, and 3) if they desired no more children, were less likely to be using contraception. However, the authors do not find that Muslim communities consistently score lower on dimensions of women’s power/autonomy. Thus, aggregate-level comparisons provide little
evidence of a relationship between lower autonomy and higher fertility. Individual-level multivariate analysis of married women in these paired settings similarly suggests that women’s autonomy differentials do not account for the higher fertility, demand for more children, and less use of contraception among Muslim wives. These results suggest that explanations for Muslim/non-Muslim fertility differences lie elsewhere.

Uncertainties in the Composition of World Population in the Twenty-First Century

MAX SINGER

Past interest in long-range global population projections has been almost exclusively centered on future population size and, to some extent, on changes in the age structure. Uncertainties concerning future demographic dynamics are typically dealt with by preparing multiple projections, distinguished by differing fertility trajectories ranging from high to low. The usual assumption, that the constituting units of the global population—countries and regions—all follow the same variant projection (such as high or low), masks another potential uncertainty of future population dynamics: uncertainty in the composition of the global total by the relative sizes of its constituting units. Using a set of long-range population projections covering the period 2000–2100, this note explores plausible ranges of this uncertainty with reference to six constituting units of the global population.

Politique de reproduction en Chine au tournant de l’an 2000 : stabilité dynamique

EDWIN A. WINCKLER

Au cours des années 1990, alors que son taux de fécondité s’était abaissé au-dessous du seuil de renouvellement des générations, la Chine a amorcé une réforme de son programme de planification des naissances à l’échelle nationale en vue, dans un premier temps, d’améliorer son approche de contrôle des naissances centrée sur l’État, puis d’incorporer certains éléments pour une approche plus axée vers le client. En 2000 et 2001, dans le cadre d’un virage de régime orienté vers la législation, la Chine a institutionnalisé et réformé davantage le programme. Une décision rendue en mars 2000 et une loi passée en décembre 2001 ont réaffirmé le besoin de planifier à l’échelle nationale les programmes de régulation démographique et de naissances mais aussi de mandater un changement de méthodes et d’objectifs. Les méthodes devraient être modifiées, de réglementation directe à indirecte, de manière à réduire les effets négatifs comme la coercition et la corruption et augmenter les avantages positifs (par exemple, l’aide au développement pour les femmes pauvres). Les objectifs devraient être élargis : en plus des services de contrôle des naissances, des services de santé de la reproduction devraient être fournis. Des réformes touchant les réglementations actuelles sont également en cours grâce à des règlements de soutien et des modifications de procédures. Ces politiques offrent un nouveau tracé pour la mise en œuvre au cours de la prochaine décennie.

La fin de la transition de la fécondité dans les pays développés

JOHN BONGAARTS

Vers la fin des années 1990, l’indice synthétique de fécondité moyen dans les pays développés avait chuté à 1,6, niveau sensiblement plus faible que prévu dans les années 1970 et 1980. Le présent article examine les tendances récentes et les taux de fécondité des pays développés en mettant l’accent sur les effets et les implications des changements dans le choix du moment de la procréation. L’objectif principal est de montrer que, bien que le taux de fécondité dans ces pays soit en réalité faible, les niveaux de procréation chez la femme ne sont pas aussi faibles que les mesures de fécondité du moment, comme l’indice synthétique de fécondité le
suggère. Si l’on veut bien comprendre les différentes variables du changement du taux de fécondité, plusieurs indicateurs sont examinés, y compris la fécondité du moment et la fécondité d’une cohorte selon le rang de naissance et les préférences de procréation. Une analyse de ces indicateurs démontre que les mesures du taux de fécondité du moment dans bon nombre de pays développés sont temporairement à la baisse à cause de la hausse de l’âge moyen au moment de la procréation. La distorsion de l’indice synthétique de fécondité est aussi élevée que 0,4 naissances par femme en Italie et en Espagne. Ces effets ont été dénotés dans bon nombre de pays développés depuis les années 1970 et risquent de perdurer pendant des années encore. Mais ces effets ne sont que temporaires car, une fois terminée la période de retardement de la procréation—qui doit éventuellement se terminer—l’effet inhibiteur de fécondité correspondant cesse et une pression à la hausse est mise sur la fécondité du moment. Les pays affichant un taux de fécondité très faible et des effets de cadence importants peuvent se retrouver avec des hausses de leur taux de fécondité dans un avenir prochain si le moment choisi pour la procréation se stabilise. Mais, même si cela se produit, il est peu probable que le taux de fécondité revienne au niveau de remplacement.

Production, reproduction et éducation : femmes, enfants et travail—perspective britannique

Heather Joshi

Le présent article examine les résultats d’études effectuées par l’auteur et des collègues sur les rapports entre le travail des femmes et la reproduction de la population britannique, à partir de données sur les cohortes de naissances des filles, de 1922 à 1970. Les études ont été centrées sur trois questions : (1) De quelle façon le fait d’avoir des enfants influe-t-il sur le travail rémunéré de la femme et sur ses revenus de toute une vie ? (2) De quelle façon le travail de la femme influe-t-il sur le nombre d’enfants qu’elle a ? (3) De quelle façon le travail de la femme influe-t-il sur la qualité de l’éducation des enfants ? Les réponses à ces questions sont fonction du niveau de scolarisation de la femme. À la question 1, l’éducation des enfants peut amputer de moitié les revenus d’une vie, sauf si la femme est bien instruite. Par contre, les conséquences de l’emploi sur l’éducation des enfants sont plus apparentes dans les maternités tardives chez les femmes instruites. Les indicateurs du développement de l’enfant indiquent qu’il y a des effets de la procréation sur la qualité de l’éducation maternelle et qu’il est impossible de la remplir. Les avantages économiques sur les enfants de familles à double revenu sont aussi forts. Le fossé qui se creuse entre les femmes aura tendance à polariser les chances d’épanouissement de leurs enfants, à moins que plus d’options ne soient créées qui combinent l’emploi de la mère et l’éducation de ses enfants, particulièrement dans les familles à double revenu. Les avantages économiques sur les enfants de familles à double revenu sont aussi forts. Le fossé qui se creuse entre les femmes aura tendance à polariser les chances d’épanouissement de leurs enfants, à moins que plus d’options ne soient créées qui combinent l’emploi de la mère et l’éducation de ses enfants, particulièrement dans les familles à double revenu.

Les rôles économiques des enfants dans le cycle de vie de la famille maya : Cain, Caldwell, et Chayanov réévalués

Ronald D. Lee
Karen L. Kramer

Le présent article examine la relation entre la pression démographique sur les ménages et les transferts entre les âges chez un groupe d’agriculteurs de subsistance maya dans le Yucatan, au Mexique. Les auteurs ont utilisé des données provenant d’une étude sur le terrain menée en 1992–93 sur l’allocation du temps individuel, le taux de productivité relatif selon l’âge et le sexe, et les dépenses caloriques par activité dans le but d’évaluer les composantes par âge de la consommation et la production moyennes. À l’aide de ces données, les auteurs ont recherché les coûts nets des enfants pour leurs parents : il est découvert que les enfants avaient une valeur d’actif net négative jusqu’au moment où ils quittent la maison familiale. La direction de la valeur des actifs nets de ce groupe est en baisse, des plus vieux aux plus jeunes; le taux de rendement interne des enfants est forte-
ment négatif jusqu’au moment où ils quittent la maison. Toutefois, les enfants jouent un rôle très important dans le cycle de vie économique de la famille. En moyenne, les filles compensent 76 pour cent de leurs coûts de consommation avant de quitter le toit familial à 19 ans, tandis que le taux de compensation chez les garçons est de 82 pour cent avant de partir à 22 ans. Sans la contribution des enfants en tant que groupe, les parents devraient doubler et même tripler leur effort de travail pendant une partie du cycle de vie de la famille pour élever le même nombre d’enfants. À la treizième année du cycle de vie d’une famille, les enfants en tant que groupe produisent plus de la moitié de ce qu’ils consomment à chaque année, et après la vingtième année, ils produisent plus de 80 pour cent de ce qu’ils consomment en tant que groupe. Les auteurs ont également découvert que les plus vieux de l’échantillonage, entre 50 et 60 ans, produisent plus qu’ils ne consomment. Ainsi, bien que les enfants représentent une valeur d’actif net négative pour leurs parents, la contribution économique des enfants à différents stades du cycle de vie de la famille joue un rôle important dans le soutien financier des familles nombreuses.

Interprétation biodémographique de la longévité

S. JAY OLSHANSKY
BRUCE A. CARNES
JACOB BRODY

La longévité des individus et l’espérance de vie des populations dont ils font partie ont toujours suscité l’intérêt des scientifiques et des profanes. À l’ère moderne, les prévisions sur la longévité et l’espérance de vie font partie intégrante des questions stratégiques d’intérêt public, vu leur influence sur la solvabilité future des programmes d’admissibilité selon l’âge. Les auteurs discutent brèvement de l’origine de la notion de longévité, de sa pertinence et de son importance compte tenu des développements récents dans le nouveau domaine de la biodémographie du vieillissement; ils exploitrent aussi les forces théoriques et biologiques qui influent sur la durée de vie des espèces se reproduisant par voie sexuée.

Les différences d’autonomie et du taux de fécondité chez les Musulmanes et les non Musulmanes : information provenant de quatre pays d’Asie

S. PHILIP MORGAN
SHARON STASH
HERBERT L. SMITH
KAREN OPPENHEIM MASON

À partir de recherches effectuées dans des communautés jumelées musulmanes et non musulmanes en Inde, Malaisie, Thaïlande et Philippines, les auteurs ont analysé l’hypothèse que le pronatalisme dominant chez les Musulmans peut s’expliquer par le fait que les femmes musulmanes jouissent d’une autonomie moindre. En effet, les femmes mariées de communautés musulmanes, comparées aux femmes mariées des communautés non musulmanes, avaient plus d’enfants, désiraient généralement plus d’enfants et, s’ils n’en désiraient plus, étaient moins susceptibles d’utiliser la contraception. Cependant, les auteurs ont découvert que dans les communautés musulmanes, les femmes n’avaient pas moins de pouvoir ni d’autonomie, ce qui porte à croire que les comparaisons du niveau d’agrégat offrent peu de preuve de la relation entre une moins grande autonomie et une fécondité plus élevée. À un niveau individuel, l’analyse à variables multiples des femmes mariées de ces communautés jumelées suggère que l’autonomie de la femme ne justifie pas le taux de fécondité élevé, le désir de plus d’enfants et le peu d’utilisation de la contraception parmi les femmes mariées musulmanes. Ces résultats suggèrent que les différences du taux de fécondité chez les Musulmanes et les non Musulmanes pourraient être expliquées par d’autres facteurs.

Incertitudes dans la composition de la population mondiale au XXIe siècle

MAX SINGER

Dans le passé, l’intérêt pour les prévisions démographiques mondiales à long terme a été centrée presque exclusivement sur la taille de la population future et, jusqu’à un certain
Política reproductiva china a fines del milenio: Estabilidad dinámica

EDWIN A. WINCKLER

En la década de 1990, cuando la fecundidad descendía bajo el nivel de reemplazo, China comenzó a reformar su programa estatal de planificación de nacimientos, primero mejorando el enfoque céntrico-estatal de limitación de nacimientos y luego incorporando algunos elementos de un enfoque más centrado en el cliente. En los años 2000 y 2001, como parte de un cambio de posición del régimen que ponía énfasis en “gobernar por ley,” China institucionalizó aún más el programa y a su vez lo reformó adicionalmente. Una Decisión de Marzo de 2000 y la Ley de Diciembre de 2001 reafirman la necesidad de planificación estatal de la población y de los nacimientos pero ordenan un cambio tanto de métodos como de objetivos. Los métodos deberían mudar de regulación directa a indirecta, así reduciendo los efectos negativos tales como la coerción y corrupción, y aumentando los beneficios positivos como ser ayudar a las mujeres pobres a mejorar su condición. Los objetivos deberían modificarse no sólo limitando nacimientos sino también ofreciendo servicios de salud reproductiva. Además se están llevando a cabo con el apoyo de reglamentos y cambios en los procedimientos internos de reglamentos ya existentes. Estas políticas marcan una nueva ruta cuya implementación se hará efectiva a través de la próxima década.

El fin de la transición de la fecundidad en el mundo desarrollado

JOHN BONGAARTS

A fines de la década de 1990 el promedio de la tasa global de fecundidad de momento en el mundo desarrollado había descendido a 1.6, un nivel considerablemente más bajo de lo proyectado en las décadas de 1970 y 1980. Este artículo examina las tendencias y los patrones recientes de la fecundidad en el mundo desarrollado con un énfasis en especial sobre los efectos y las consecuencias de cambios en el intervalo de procreación. El objetivo principal es demostrar que aunque la fecundidad en estos países es efectivamente baja, los niveles de procreación de las mujeres no son tan bajos como los índices de momento tales como la tasa global de fecundidad sugieren. Para obtener pleno entendimiento de las varias dimensiones del cambio de fecundidad, se examinan acá varios indicadores, incluyendo la fecundidad de momento y de cohorte por orden de nacimiento y preferencia de procreación. Un análisis de estos indicadores demuestra que en muchos países desarrollados las medidas de fecundidad de momento han sido reducidas temporalmente por un aumento de la edad media al procrear. La distorsión de la tasa global de fecundidad es tan alta que alcanza a 0.4 nacimientos por mujer en Italia y España. En muchos países desarrollados se han observado estos efectos desde la década de 1970 y...
Podrían continuar por años en el futuro. Pero los efectos de distribución en el tiempo son transitorios y cuando el postergamiento de la procreación termine—como debe suceder finalmente—el efecto correspondiente de la disminución de la fecundidad cesa ejerciendo así una presión ascendente sobre la fecundidad de momento. Países con muy baja fecundidad y considerables efectos de distribución en el tiempo bien pueden experimentar en el futuro próximo alzas de fecundidad si el calendario de la procreación se estabiliza. Sin embargo, aun si esto sucediera, es poco probable que la fecundidad recobre su nivel de reemplazo.

Producción, reproducción y educación: Mujeres, hijos, y trabajo dentro de una perspectiva británica

HEATHER JOSHI

Este artículo examina los hallazgos de estudios llevados a cabo por el autor y colegas sobre las relaciones entre el trabajo de la mujer y la reproducción de la población británica basados en datos de nacimientos de cohortes femeninas 1922–70. Los estudios se dirigen a tres interrogantes: (1) ¿Cómo afectan los hijos el trabajo remunerado de la mujer y los ingresos de vida? (2) ¿Cómo afecta el empleo de la mujer la cantidad de hijos que nacen? (3) ¿Cómo afecta el empleo de la mujer la “calidad” de los hijos? Las respuestas son influenciadas por el nivel educacional de la mujer. Acerca de la interrogante 1, el cuidado de los hijos frecuentemente puede reducir a la mitad el ingreso durante el curso de vida, pero raramente para la mujer con buena educación. En contraste, cualquier efecto de empleo sobre la procreación es más visible en las maternidades tardías de mujeres con buena educación. La calidad infantil, evaluada por indicadores de desarrollo infantil, se beneficia de la educación materna y sufre poco del empleo maternal. Las ventajas económicas para los hijos de familias de carreras duales son por lo tanto constantes. Una brecha creciente entre las madres tenderá a polarizar las oportunidades de vida de sus hijos, a no ser que se ofrecieran mayores opciones para combinar el empleo y el criar de los hijos, especialmente la oferta de un cuidado de alta calidad para aquellos que no pueden costear el precio del mercado. La educación es una influencia poderosa, pero no resuelve por sí sola todos los problemas de equidad, ya sea entre familias o entre sexos.

El papel económico de los hijos en el ciclo de vida de la familia maya: Cain, Caldwell, y Chayanov revisitados

RONALD D. LEE
KAREN L. KRAMER

Se examina en este artículo la relación entre las presiones demográficas del hogar y las transferencias entre edades para un grupo de cultivadores de subsistencia en Yucatán, México. Los autores usan datos de un estudio de campo llevado a cabo en 1992–93 sobre la asignación de tiempo individual, la productividad relativa por edad y sexo, y el costo calórico de las actividades para estimar índices por edad del consumo promedio y de la producción. Usando éstos, los autores investigan el costo neto de los hijos a sus padres y concluyen que los hijos tienen un valor activo neto negativo hasta el momento que dejan el hogar. Sin embargo, los hijos juegan un papel de importancia crítica en el ciclo de vida económico de la familia. En un promedio, las hijas compensan en un 76 por ciento sus costos de consumo antes de dejar el hogar a la edad de 19, y los hijos varones compensan en un 82 por ciento antes de dejar el hogar a la edad de 22. Sin la contribución de los hijos como un grupo, los padres tendrían que duplicar o triplicar sus esfuerzos de trabajo durante parte del ciclo de vida de la familia si fueran a criar el mismo número de hijos. Al alcanzar el treceavo año del ciclo de vida familiar, los hijos como un grupo producen más de la mitad de lo que consumen en cada año, y después del veinteavo año los hijos producen más del 80 por ciento de lo que consumen como grupo. Los autores estiman también que los ancianos en la muestra, de edad 50 a 65, producen más de lo que consumen. Así, aunque
los hijos tienen un valor activo neto negativo para los padres, la distribución en el tiempo de la contribución económica de los hijos que ocurre a través del ciclo de vida de la familia juega un papel clave en subscribir el costo de familias grandes.

Una interpretación biodemográfica de longevidad

S. Jay Olshansky
Bruce A. Carnes
Jacob Brody

La longevidad de los individuos y la esperanza de vida de las poblaciones que estos comprenden siempre han sido tópicos de interés para el científico y para la población civil. En tiempos modernos, los pronósticos de longevidad y de la esperanza de vida se han convertido en asuntos de política pública de suma importancia debido a su influencia sobre la futura solvencia de los programas a que se tiene derecho por edad. Los autores presentan un breve análisis de los orígenes de la noción de longevidad, examinan su relevancia e importancia con respecto a desarrollos recientes en el campo emergente de la biodemografía del envejecimiento, y exploran las fuerzas teóricas y biológicas que influyen la duración de la vida de las especies que se reproducen sexualmente.

Diferencias en autonomía femenina y fecundidad musulmana y no musulmana: Evidencia de cuatro países asiáticos

S. Philip Morgan
Sharon Stash
Herbert L. Smith
Karen Oppenheim Mason

Basado en investigaciones sobre comunidades pareadas musulmanas y no musulmanas seleccionadas en India, Malasia, Tailandia y las Filipinas, los autores examinan la hipótesis que el mayor pronatalismo musulmán observado puede ser explicable por un menor poder o una menor autonomía entre las mujeres musulmanas. En efecto, las esposas en las comunidades musulmanas compara-

do a las no musulmanas: (1) tenían más hijos, (2) demostraban una mayor tendencia a desear hijos adicionales, y (3) si deseaban no tener más hijos, su probabilidad de usar anticoncepción era menor. Sin embargo, los autores no encontraron que con respecto a las dimensiones de poder/autonomía de la mujer las comunidades musulmanas se calificaban consistentemente más bajas. Por lo tanto, las comparaciones a nivel agregado proveen poca evidencia de una relación entre autonomía más baja y fecundidad más alta. Un análisis multivariado a nivel individual de las mujeres casadas en estos contextos pareados sugiere igualmente que el nivel de autonomía de la mujer no explica la fecundidad más alta, la demanda por más hijos, y el menor uso de anticoncepción entre esposas musulmanas. Estos resultados sugieren que las explicaciones de las diferencias de fecundidad musulmana/no musulmana yacen en otro sitio.

Incertezas en la composición de la población mundial en el siglo veintiuno

Max Singer

El interés previo en las proyecciones de largo alcance de la población global se ha centrado casi exclusivamente en el tamaño futuro de la población y, hasta cierto punto, en los cambios de estructura por edad. Las incertidumbres con respecto al futuro de la dinámica demográfica se resuelven típicamente preparando proyecciones múltiples que se distinguen por trayectorias de fecundidad diferenciadas que fluctúan de altas a bajas. La suposición usual, que las unidades constituyentes de la población global—países y regiones—siguen todas la misma proyección variante tales como alta y baja, ocultan otra incertezas potencial de la futura dinámica de la población: la incertezas en la composición del total global debido a los tamaños relativos de sus unidades constituyentes. Usando un conjunto de proyecciones de población de largo alcance cubriendo el periodo 2000–2100, esta nota examina la fluctuación plausible de esta incertidumbre con referencia a seis unidades constituyentes de la población global.
AUTHORS FOR THIS ISSUE

JOHN BONGAARTS is Vice President, Policy Research Division, Population Council.

JACOB BRODY is Professor, School of Public Health, University of Illinois at Chicago.

BRUCE A. CARNES is Senior Scientist, Center on Aging, National Opinion Research Center.

HEATHER JOSHI is Professor of Economic and Developmental Demography in Education, Bedford Group for Lifecourse and Statistical Studies, Institute of Education, London University.

KAREN L. KRAMER is Assistant Professor, Department of Anthropology, State University of New York at Stony Brook.

RONALD D. LEE is Professor in the Departments of Demography and Economics, University of California at Berkeley.

KAREN OPPENHEIM MASON is Director, Gender and Development, The World Bank, Washington, DC.

S. PHILIP MORGAN is Professor of Sociology, Duke University, Durham, North Carolina.

S. JAY OLSHANSKY is Professor, School of Public Health, University of Illinois at Chicago.

MAX SINGER is Senior Fellow, Hudson Institute, Washington, DC.

HERBERT L. SMITH is Associate Dean for the Social Sciences and Professor of Sociology, Population Studies Center, University of Pennsylvania, Philadelphia.

SHARON STASH is Program Officer, Bill & Melinda Gates Foundation, Seattle, Washington.

EDWIN A. WINCKLER is Research Associate, East Asian Institute, Columbia University.