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The Importance of International Demographic Research for the United States

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Abstract. International demographic research has generated enormous benefits for the U.S. This paper identifies five major reasons for these benefits. First, cross-national research provides unique policy insights that allow the U.S. to develop more effective programs and policies to address pressing and persistent domestic challenges. Second, it helps the U.S. to understand and address problems and issues in many countries or regions of the world that are of particular relevance to the U.S. because of their strategic or commercial importance to us. Third, it helps the U.S. to address problems and issues that are global in nature and require international policy responses. Fourth, it helps the U.S. to provide humanitarian aid to poor countries more effectively and efficiently. Finally, it contributes to the advancement of science, which in turn stimulates and enriches research focusing on the U.S.

I. INTRODUCTION

Demographic research in the U.S. examines trends and patterns in fertility, mortality, marriage, migration, retirement, and health status, as well as the factors that determine and are affected by these behaviors. Research focusing on the U.S. yields vital information for policymaking and the public. Demographers in the U.S also devote considerable effort to describing and understanding demographic behavior in other parts of the world. International demographic research generates large benefits for the United States by informing public policy choices and by expanding basic scientific knowledge. It also aids citizens of other countries of the world. The benefits of this research take many different forms, which are often not widely recognized. The purpose of this paper is to identify how and why international demographic research serves U.S. interests and to demonstrate the important contributions it provides by drawing on a number of specific examples and illustrations.

The majority of funding for international demographic research comes from public sources. Public funding for international demographic research is channeled through two of the country's main scientific agencies, the National Institutes of Health and the National Science Foundation; through the U.S. Agency for International Development; and through multilateral agencies such as the World Bank and the United Nations.

Policymakers, trying to spread dollars as effectively and efficiently as possible, as well as members of the public, often ask why U.S. funding agencies should spend public dollars to support social science research on other countries. Why, they want to know, should we pay to study other nations' problems and policy issues, when we have so many of our own? How can research in less developed countries—so different culturally and economically from the United States—have any relevance for our concerns? Why study problems in other industrialized nations, many of whom seem to have equal funds and capabilities for research?

International demographic research is essential to the U.S. for at least five distinct reasons:

- It yields insights for U.S. domestic policy development that cannot be gleaned from research and analysis focused on U.S. populations alone. Certain policy insights only emerge from cross-country analyses. Cross-country rankings can also identify areas in which the U.S. is underperforming and spur the country into improving outcomes. Other policy insights are based on foreign countries serving as a social policy laboratory for the U.S. by developing new and distinct policies to address problems and issues that are similar to those faced in the U.S. Finally, findings from international demographic research have on occasion challenged the basic assumptions of U.S. policy debates, leading to new or better policies.
- International demographic research helps the U.S. to understand and address population issues overseas that are related to the strategic or commercial interests of the country. For example, immigration to the U.S. is determined in part by levels of population growth and economic development in sending countries.
- International demographic research helps the U.S. to address problems and issues that are global in nature and require international policy responses. These include, for example, protection of the global environment and addressing public health problems that transcend national boundaries.
- The U.S. has a humanitarian interest in helping other countries—particularly less developed countries—to understand and address population issues. International demographic research improves the effectiveness of foreign aid and is itself a form of aid.
- International demographic research exploits opportunities not available to analysts studying the U.S. in isolation and thereby contributes to the advancement of science. The data collected and the techniques developed for

international demographic research have stimulated and enriched the knowledge base both at home and abroad.

The benefits of international demographic research accrue both to the U.S. and to other countries—especially the countries being studied. For example, U.S. research on international population issues has helped produce a cadre of researchers around the world who contribute to the base of scientific knowledge, including knowledge of policy circumstances around the world. Yet these countries often also ask why the U.S. is interested in studying their demographic issues and problems. Aside from the reasons identified above, two further factors explain this interest. One is that the U.S. maintains a position of global leadership and international research helps the U.S. to exercise this leadership effectively—both for the benefit of the U.S. and other countries. The other is that the U.S. has the capability to conduct this research, which is something lacking in many other countries, particularly those in the developing world. The U.S. is unmatched in its capacity to conduct a comprehensive range of high-quality international demographic research.

Public support for international demographic research is appropriate for three reasons. First, the U.S. government and public are among the main consumers and beneficiaries of this and other basic social science and policy research. Hence, public support allows the right groups to direct research priorities and funding levels. Second, funding from non-public sources alone would be lower than socially desirable, given that the international demographic research is a public good with relatively little commercial significance. Third, stable and long-term support that is a hallmark of public funding is necessary in order to attract, train, and maintain a field of first-rate researchers. Priorities of foundations and the private sector may be altered suddenly to reflect a changing set of needs, which do not necessarily reflect policymakers' or the public's interest. Public funding for international demographic research is thus not only appropriate, but is in fact indispensable.

The next five sections outline each of the main arguments for why international demographic research is essential to the U.S., and illustrate them by drawing on specific examples from studies that have been conducted by researchers in the United States. In most areas significant achievements have been made; however, in other areas where research is on-going or prospects are excellent yet opportunities have not been fully exploited, we discuss the potential for future research contributions. The goal of this paper is not to assemble an exhaustive catalog of international demographic research, nor is it to focus exclusively on research funded through specific channels. Rather, it is to identify representative examples of international demographic research that illustrate the importance of this work to the U.S. Finally, note that this paper does not evaluate the returns to international demographic research. No estimates of its costs or benefits are currently available from the literature and generating these estimates represents a formidable endeavor that we are unable to undertake.

II. INTERNATIONAL DEMOGRAPHIC RESEARCH PROVIDES DOMESTIC POLICY INSIGHTS

International demographic research yields insights that are invaluable for developing domestic policy in the U.S. In this section we review four types of international studies that provide lessons for the development of domestic policies. We begin by describing policy insights that cannot be obtained by studying the U.S. in isolation but emerge only from cross-country analyses. We then discuss how cross-country rankings can identify areas where the U.S. performs comparatively poorly and how research related to these rankings can suggest approaches to improving the country's performance. This is followed by a review of studies that show how other countries can provide a social policy laboratory for the U.S. by addressing similar social and demographic challenges using new or distinct programs and policies. The final subsection identifies several instances where international studies have challenged the assumptions of U.S. policy debates, leading to new solutions for addressing persistent domestic problems.

Cross-Country Demographic Studies Can Provide Unique Policy Insights

A major focus of international demographic research is on comparative analyses of behavior across different countries and regions of the world. Cross-country analyses provide a unique perspective from which to understand the effects of historical, institutional, social, and cultural factors on demographic behavior. The range of variation in these contextual factors is often quite narrow in the United States or in any other single country, making it difficult to identify their influence on phenomena of interest. Thus, international research offers opportunities to understand crucial U.S. policy issues that cannot be studied with U.S. data alone. For example, cultural factors vary more across than within countries and may be more easily examined in the context of a comparative study. Insights into the influences of culture and ethnicity on demographic behavior and outcomes can be especially valuable given the diversity of the U.S. population, which continues to grow through changing patterns of immigration. In addition, comparative studies may be useful for analyzing the consequences of future changes, such as population aging, in which other countries lead the U.S. Ultimately, this research provides an opportunity to identify and understand fundamental aspects of human behavior, which in turn leads to the design of better policies.

International research offers valuable insights into policy implications of the growth of the elderly population in the U.S. The increasing number of elderly in the population is one of the most profound demographic shifts that the U.S. faces in the coming years. By 2025, when most of the Baby Boom population in the U.S. will have reached retirement age, 20 percent of the U.S. population will be over age 65, compared to only 13 percent in 1996. As recent political debates regarding the solvency of Medicare and the Social Security system highlight, the U.S. faces serious challenges associated with the aging of the population. Since the U.S. is considering changes in welfare and support for the elderly that are likely to have far-reaching effects, international studies can offer valuable policy insights and can help ensure that unexpected and undesirable outcomes are avoided (Martin, 1991).

The pressure that demographic trends towards an older population are placing on social security systems is compounded by a dramatically declining average age at retirement. In the U.S. and virtually every other industrialized country, employees are leaving the labor force at younger and younger ages, even as the health status of individuals at retirement age improve markedly and their life expectancy reaches new highs. In some countries, the labor force participation rates of 60-64 year old men have fallen by 75 percent over the past three decades; in the U.S., the rate declined from 82 percent in 1960 to 53 percent in 1996 (Gruber and Wise, 1998a). Two results of this trend are that the proportion of retired persons to those in the labor force has increased substantially and that the productive capacity of older workers who leave the labor force is lost prematurely. A recent cross-national study, directed by Gruber and Wise (1998a and 1998b), sought to understand the role that the social security systems play in providing incentives to leave the labor force early. Based on a parallel descriptive data and analytic calculations conducted for eleven industrialized countries, Gruber and Wise were able to investigate the relationship between social security plan provisions on the one hand and labor force participation rates on the other. Two features of social security plans emerged as having important effects on labor force participation decisions. The first is the age at which benefits become available, with a lower age encouraging earlier retirement. The second is the tax rate on earnings if a person continues to work after this age (which includes an implicit tax due to foregone social security benefits), with a higher effective tax rate inducing earlier retirement. Gruber and Wise found that these two features of national social security systems emerged to provide enormous incentives for workers to leave the labor force early, thus by their very structure exacerbating the financial problems that the social security systems face. The strong relationship that emerged between tax rates and retirement rates suggests, however, that a lowering of tax rates would likely reverse the trend towards early retirement and reduce this important source of pressure on the U.S. social security system.

International Rankings Can Spur Domestic Action

Cross-country research allows the U.S. to identify areas in which the country's performance may be lagging. Many countries around the world—including some less developed countries—surpass the U.S. in performance in some areas, such as child survival rates and the level of school performance, which suggests that the U.S. may have something to learn from their experiences. Relative rankings—especially when the U.S. is not on top—often stimulate the search for reasons behind the U.S.'s poor showing and ways in which the country can improve.

Compared to other industrialized countries, infant mortality in the U.S. is high: in 1997, the infant mortality rate of 6.55 deaths per 1,000 live births placed the country in twenty-first position among large industrialized nations (U.S. Census Bureau, 1997). The U.S.'s infant mortality rate was almost 50 per cent higher than the rate of Japan or Sweden. Cross-country research offers insights into the reasons behind the U.S.'s relatively poor ranking in infant survival, and provides suggestions about policies that may be effective in improving new borns' survival chances. In particular, given the comparatively high level of spending on health care in the U.S., the relatively poor performance on infant mortality suggests that there may be problems with access to health care or in applying care appropriately.

Research by Cooper (1992) and by Liu et al. (1992) suggests that many factors other than health care, from how vital events are registered to broad social and economic policies, also affect comparisons of the infant mortality rate between the U.S. and other countries. Liu et al.'s (1992) international comparative study indicates that future declines in infant mortality rates in the U.S. are likely to result from improved access to perinatal interventions and prenatal interventions to improve birthweight. Policies to improve access to care and the design of effective interventions are suggested by examining the experience not only of other industrialized countries, but also that of less developed countries. For instance, research on the control of vaccine-preventable infectious diseases among children in developing countries has examined the

effectiveness of immunization programs as a function of the demographic structure of the population (John, 1990a and 1990b; Tuljapurkar and John, 1991). A main finding was that higher immunization rates are necessary to eradicate a disease in a growing population. This result is relevant for the design of programs to reduce the prevalence of vaccine-preventable childhood diseases in the U.S., which has been a major focus of recent government policies to improve child health and survival.

International Research Can Identify Model Programs for Addressing Domestic Problems

The United States faces major social and demographic challenges relating to population aging, infant and child health, fertility, poverty and inequality, parenting and partnering, population and the environment, migration, and other areas (NICHD, 1997). Sound policymaking to tackle these issues must be based on findings from behavioral research and on evaluations of existing policies. Yet the U.S.—or any other single country—is limited in its ability to experiment with alternative policies and programs. However, other countries' experiences in developing new and distinct policies to address similar issues and problems essentially provide a social laboratory within which to identify and evaluate new policies for the U.S. Of course, international research does not necessarily provide direct policy lessons; it may instead serve to stimulate advances in research focusing on the U.S.

An example of a new U.S. program that has drawn on results of international research concerns poverty alleviation programs. The level of poverty in the U.S., and its persistence across generations of the same family and within certain geographic areas, is a major policy concern, as is the relationship between poverty and demographic behavior. Lack of access to credit is potentially an important factor limiting the ability of the poor to generate self-employment opportunities to lift themselves out of poverty. Group lending programs provide an avenue for extending credit to those without collateral or those who would not otherwise qualify based on traditional screening on credit worthiness. International research on these programs has studied their effectiveness at

reducing poverty and promoting social change (Pitt and Khandker, 1998; Morduch, 1998). Under a group lending scheme, a bank makes a loan to a group of individuals, each of whom is liable for repayment of the loan and will be sanctioned by the borrower if any one individual defaults (Besley, 1995). Research has shown that the group enforcement of repayment, through peer pressure and peer support (such as individuals providing help in repaying each other's loans), leads to substantially lower default rates, as does the fact that individuals in groups that have defaulted are not given access to funds in the future.

Group lending schemes have been implemented successfully in poorer areas of the United States (The Economist, 1997). Examples include the Women's Self-Employment Project, founded in Chicago in 1986, and similar institutions in many poor areas across the country, from a Sioux reservation in South Dakota to South Central Los Angeles (Wessel, 1992). The group-lending scheme provides a promising avenue through which poor individuals can exit poverty and welfare programs while the consciousness-raising and moral support offer a means for promoting changes in behavior and status. Group lending schemes in the U.S. have been based on the model provided by Bangladesh's Grameen Bank. They represent an innovative solution to a persistent problem and an area in which the U.S. has learned from the less developed world.

The Grameen Bank was established in Bangladesh in 1976 to give landless villagers, particularly women, access to credit without collateral. It also has a non-economic objective, which is to promote social development. The Grameen Bank has had remarkable success in stimulating income generation among the poor. Research has shown that Grameen Bank participants have a substantially higher level of income and also a more favorable distribution of income (Hamid, 1986; Hossain, 1986 and 1988; Rahman and Hossain, 1986). In addition, members spend more on food, clothing, housing, health, and education, and their households have higher intake of calories, protein, and other nutrients. Participation in Grameen Bank programs is also associated with improvements in women's status and empowerment and higher levels of contraceptive use (Rahman and DaVanzo, 1993; Schuler and Hashemi, 1994). The

Grameen Bank has been emulated not only in the U.S., but also in many other less developed countries. Research on group lending schemes and other microenterprise initiatives in developing countries can thus have an important payoff for U.S. domestic policy.

International Research Can Challenge Assumptions of U.S. Policy Debates

In several important instances, international research findings have challenged conclusions based on studies focusing exclusively on U.S. data. This has changed the nature of policy debates and the focus of U.S. research and has resulted in the development and adoption of better domestic policies and programs in the U.S. International research that has influenced U.S. policy debates has typically drawn on data from countries that have adopted significantly different policies or have economic, social, and institutional settings that differ from those in the U.S. in important ways. Thus, international research can challenge assumptions of U.S. policy debates in ways that research focused exclusively on the U.S. is simply unable to do.

One example of international research changing an important U.S. policy debate concerns the relationship between non-maternal child care and the development and well-being of children. Research in this area has exploited differences in labor market behavior and in government employment and child care policies that exist between the U.S. and European countries. This topic is important because employment of women with young children in the U.S. has recently reached historical highs and is likely to continue to increase in the future, due to the convergence of several trends. For example, welfare reform will require many women currently receiving public support to begin work. A major result of the prevailing societal trends is that the number of children in day care has increased dramatically in the past, and is likely to continue doing so in the future.

Research in the U.S. from the 1980s indicated that non-maternal child care had negative socio-emotional consequences for children (Belsky, 1988; Belsky and Rovine, 1988). However, international comparisons, especially between the U.S. and Sweden,

suggested that an important reason for the U.S. findings was the poor quality of non-maternal child care in the U.S., rather than because non-maternal child care was always bad. In Sweden, high quality non-maternal child care is subsidized and roughly equally available to all families. Thus, the use of child care services is largely independent of income and other family characteristics in Sweden. Research in this setting uncovered the existence of beneficial effects on child development from participation in child care programs (Andersson, 1992; Prodromidis et al., 1995). The Swedish comparison focused the attention of U.S. researchers on understanding the role of quality of non-maternal child care in accounting for developmental differences among children in custodial care (Howes, 1990; Howes and Stewart, 1987; Stallings and Porter, 1980; Vandell, Henderson, and Wilson, 1988). More recent studies in the U.S. show that high quality non-maternal child care is indeed beneficial for children's development, especially if the child comes from a disadvantaged background (Leibowitz, 1995). The latest findings from the NICHD study of early child care indicate that non-maternal child care makes small but significant contributions to the quality of mother-child interaction and to children's cognitive and language development (NICHD Early Child Care Research Network, 1997). Current research not only considers explicitly the effects of quality of care, but has made important strides in identifying the specific aspects of non-maternal child care that are important for children's developmental outcomes. These research findings provided support for U.S. welfare reform by easing concerns about sending mothers to work.

Another example of international research that has challenged widely held assumptions concerns the relationship between nutritional status and cognitive development in children. In many less developed countries, undernutrition and malnutrition are widespread. These unfortunate conditions permit researchers to study how nutritional changes affect children's health and cognitive development, how long lasting those effects are, and whether the effects of early malnutrition are reversible. This research is important for U.S. domestic policy because milder forms of malnutrition are common in this country, and moderate or even mild malnutrition can result in

impairments to both cognitive and behavioral development (Gorman, 1995). Indeed, in 1992 an estimated 12 million children in the U.S. consumed diets that were significantly below the nutritional requirements recommended by the National Academy of Sciences (Brown and Pollitt, 1996), although few children are as severely malnourished as in less developed countries.

The principal program in the U.S. to improve children's nutrition is the Special Supplemental Food Program for Women, Infants, and Children (WIC). Studies evaluating the impact of WIC on selected outcomes suggest that the program does meet most of its objectives and is cost-effective. However, the national evaluation study of WIC has been marred by shortcomings in design that have prevented it from reaching conclusive findings in several areas (Pollitt, 1994). One important gap concerns whether nutritional supplementation in general, and WIC in particular, prevents or ameliorates the cognitive deficits associated with general undernutrition. Indirect information on this relationship is available from studies that have been conducted in several developing countries.

The most complete source of knowledge about the relationship between malnutrition and intellectual development of children is a study in Guatemala conducted over a period of two decades (see Martorell, 1995). This study revealed that improved nutrition has beneficial effects for children's cognitive development, with the strongest effects accruing to the poorest children (Pollitt et al., 1995). Thus, policies to improve nutrition—especially among socially disadvantaged segments of society—can serve to equalize educational opportunity and performance. Moreover, findings from the research in Guatemala and other less developed countries have helped to modify the long-held concept that there is a critical period in brain development (Brown and Sherman, 1995). In its place has emerged an understanding that the ability of brain development to adapt to malnutrition is far greater than previously recognized, and that the effects of malnutrition are reversible. While some lasting adverse outcomes are often unavoidable, the important policy implications are that interventions and rehabilitation can play crucial roles in promoting intellectual development among disadvantaged children, although it is

often necessary for these to continue past infancy and childhood into adolescence as well (Brown and Sherman, 1995). Findings from less developed countries are relevant to the U.S. because they have shown that the beneficial effects of supplementary feeding are broad and that they accrue to children displaying a wide range in their level of nutritional risk (Pollitt, 1994).

III. INTERNATIONAL RESEARCH SUPPORTS U.S. INTERESTS

International demographic research helps the U.S. to promote its overseas strategic and commercial interests by improving our understanding of the causes and consequences of worldwide social and economic change. Two particular areas of benefit for the U.S. are promoting a faster pace of economic growth and development overseas and improving the effectiveness of foreign aid programs. However, in many cases the benefits eventually accrue close to home. The best example concerns immigration: social and economic conditions in sending countries are a major factor that leads people to move to U.S. Demographic research provides an understanding of the conditions that influence immigration to the U.S. and the consequences of immigration for this country.

The process of economic growth and development, which is closely linked with patterns of demographic change, has important implications for international trade with the U.S. Rapidly developing countries provide new markets for U.S. exports of goods and services and also become important sources of imports to the U.S., with the rise in trade benefiting both economies and also leading to closer social and cultural ties. The emergence of a large middle class population in even relatively poor countries, such as India, and the large and growing elderly populations in many less developed countries are two examples of key demographic changes that represent important new trade and commercial opportunities for the U.S. Economic growth and development in poor countries also leads to a lessening reliance on assistance from the U.S. and other sources. This represents progress towards the ultimate goal of weaning countries from international assistance programs, which is one yardstick for measuring the success of U.S. foreign aid programs.

A large body of demographic research conducted over the past half century has been concerned with understanding the relationship between population growth and economic development. This work began with Coale and Hoover's (1958) seminal study of India and Mexico and includes influential studies by the World Bank (1984) and the National Academy of Sciences (1986). This research has uncovered the great extent to which government policies and national endowments of natural resources shape the effects of rapid population growth on economic development. Several recent research studies have analyzed the lessons learned from the rapid economic growth experienced by newly industrialized countries in East and Southeast Asia (e.g., World Bank, 1993b). This research continues to be important because, in addition to understanding markets for U.S. products in these countries themselves, the lessons learned may be applicable to less developed countries in other parts of Asia and in Latin America and Africa.

Immigration to the United States is a major national and international policy issue. Research on the social, cultural, and economic factors determining migration to this country—from Mexico and from countries in Central America, the Caribbean, Asia, and elsewhere—is important for predicting the future course of immigration, understanding policy measures that are likely to be effective in altering the level of international migration, and gaining insights into the likely consequences for the U.S. In order to understand the factors that lead people to migrate to the U.S., it is necessary to examine circumstances in the countries from which they come.

A recent study by Massey and Espinosa (1997), drawing on data from Mexico, sought to test the validity of competing theoretical explanations for migration to the U.S. in order to understand why efforts to reduce undocumented migration have largely been unsuccessful. Because each of the theories implies that a different set of policy instruments is likely to be effective in curbing rates of immigration, their research permitted an assessment of the efficacy of recent U.S. policies to curb the flow of undocumented Mexican migrants. U.S. policymakers have drawn exclusively on the neoclassical economic model of migration. Under this model, potential migrants in Mexico weigh the costs and benefits of migrating to the U.S. and attempt to enter this

country if their expected net returns are higher than if they were to remain in Mexico. U.S. policies have sought to deter illegal migration by raising the costs and lowering the benefits of undocumented migration. For example, costs have been raised by reducing the number of visas available to Mexican citizens and by increasing the resources allocated to the U.S. Border Patrol for enforcement. To reduce the benefits, in 1986 Congress designed sanctions on employers who knowingly hire illegal workers and California's Proposition 187, approved by voters in 1994, sought to deny illegal immigrants access to public education, nonemergency medical services, and public assistance.

Massey and Espinosa's analysis suggests that the factors thought to promote or discourage immigration under the neoclassical model do not appear to have played an important role in influencing Mexico-U.S. migration. They find instead that migration from Mexico to the U.S. has been linked more to the forces identified by social capital theory (family and social networks create and sustain migration), the formation of migration-specific human capital (previous personal experience living in the U.S. strengthens likelihood of migrating again and of remaining in the U.S.), and the new economics of migration (growing economic insecurity leads Mexican households to migrate to the U.S. to diversify risk and to accumulate capital). Massey and Espinosa's results suggest that a different set of forces is driving Mexico-U.S. migration and that the theoretical foundations of U.S. immigration policy—and the policies themselves—are flawed.

Demographic trends in Mexico and other countries of strategic importance to U.S. are of interest partly because these trends can directly affect the U.S. Demographic change, economic development, and social behavior in countries in Central America, the former Soviet Union, and the Middle East affect the U.S. through their importance as markets for U.S. products and services; through their direct demographic ties to the U.S. (through immigration, for example); and through the effects of population processes on social and political stability, which can affect U.S. security concerns.

An understanding of how demographic change affects social and political stability helps the U.S. to understand, anticipate, and work to reduce international conflict. Research has pointed to interesting links between population growth and conflict. Relative population sizes and differential growth rates can alter the actual and perceived power of one group versus another, thereby leading to conflict (Homer-Dixon, 1994). For example, demographic factors are an underlying source of conflict in Quebec province in Canada, helped to produce the policy of racial apartheid in South Africa, and have exacerbated conflict between Palestinians and Israelis. Also, there is evidence of connections between high population density and psychological stress and violence (Proshansky, 1984; Kelly and Galle, 1984). There may, in addition, be a relationship between environmental scarcity and civil conflict, where resource depletion and environmental degradation emerge from large population size and rapid population growth rates; however, work in this area is only just beginning. For additional examples of the relationship between demographic factors and national security see Nichiporuk (1999).

IV. INTERNATIONAL RESEARCH HELPS SHAPE U.S. POLICY RESPONSES TO GLOBAL PROBLEMS

International research helps the U.S. to address problems and issues that are global in nature and require international policy responses. Many global problems have current or potential impacts on the U.S. population. For example, a better understanding of the causes of rapid population growth and of the relationship between population and the environment will contribute to the design of more effective policies to preserve the global environment. The combined effects of population growth and economic development in lower-income countries may have dramatic environmental effects, with spillover to the U.S. Understanding the complex issues here is of vital importance for U.S. policymaking.

Over the past 25 years, demographic research has played a key role in providing the scientific basis for U.S. foreign policy regarding population growth and

socioeconomic development. At the 1974 International Population Conference in Bucharest, the U.S. urged developing countries to adopt policies aimed at slowing population growth (Menken, 1986). This position, which was supported by the U.S. through its backing of family planning programs as part of its international development assistance, was based on a number of influential demographic studies—principally the Coale-Hoover study described above. Ten years later, at the 1984 International Population Conference in Mexico City, U.S. population policy shifted dramatically to focus more on promoting economic development and less on controlling population growth. The intellectual support for this position emerged from a number of studies which suggested that, in most cases, rapid population growth would have few effects on the economy but that economic development would result in lower fertility (e.g., Easterlin, 1967; Simon, 1977 and 1981; National Academy of Sciences, 1986). Although there remains scientific disagreement about the relationship between population growth and economic development, a consensus has emerged regarding the effectiveness of family planning programs in lowering fertility and helping to prevent unwanted births (Bulatao, 1998).

The U.S. has shaped global population policy through its intellectual leadership—built in large part through international demographic research—and the country's position as the leading donor for international population programs (McIntosh and Finkle, 1995). For example, the U.S. was instrumental in creating the United Nations Population Fund, in encouraging the World Bank to take a serious interest in population growth, and in prompting the World Health Organization to view rapid population growth as a legitimate health problem (Finkle and Crane, 1976; Symonds and Carder, 1973; McIntosh and Finkle, 1995).

Another major area of concern to the U.S. is public health problems that transcend national boundaries, such as HIV/AIDS, tuberculosis, and malaria. Public health challenges—and especially infectious diseases—have always crossed national borders. It is impossible for the U.S. to isolate itself from the spread of infectious diseases, many of which are extremely easy to transmit and are spread efficiently and effectively by travel,

trade, and commerce—especially since the advent of the jet age. By investing in research on these issues, the U.S. can protect the health and well-being of its own citizens as well as that of other people of the world. This investment will help the U.S. and other countries to avoid possibly staggering costs in the future from the failure to control disease, promote public health, or preserve the global environment. In addition, the improvement of international health is a valuable component of U.S. efforts to promote sustainable economic development and worldwide political stability (National Science and Technology Council, 1995). Self-interest should reinforce our humanitarian concerns to improve these outcomes around the globe (Evans, 1995).

Infectious diseases are the largest cause of death in the world today (Lopez, 1993) and, among infectious diseases, tuberculosis is the leading killer (Murray, Styblo, and Rouillon, 1990). In trying to understand and combat these challenges, it would be a mistake not to seize the scientific opportunity to study them in countries that have large affected populations. Moreover, the higher levels of prevalence outside the U.S. may mean that research on these diseases can only be conducted overseas, in collaboration with other countries (Institute of Medicine, 1997). U.S. citizens have much to gain from the results of this research and collaboration since programs that prevent illness save the U.S. money over the long term, in addition to promoting our health. For example, the U.S. contributed a total of $84 million to the global smallpox eradication effort between 1967 and 1977; USAID (1997) estimates that every year since then, the U.S. saves $150 million annually because we no longer have to vaccinate our children against this disease.

As an illustration, the case of tuberculosis reveals various dimensions of the current international public health challenges. The magnitude of the global tuberculosis problem is enormous. One study predicts that between 1990 and 2000, 30 million people are expected to die of this disease worldwide (Dolin, Raviglione, and Kochi, 1994). Tuberculosis accounts for more than 25 percent of avoidable adult deaths in the developing world (Murray, Styblo, and Rouillon, 1990). Following a substantial decrease in tuberculosis cases in the U.S. over much of this century, in the mid-1980s the number of cases began to increase, at an annual rate of about 14 percent (Raviglione, Snider, and

Kochi, 1995). Changes in population composition and demographic processes, such as population growth, immigration, and urbanization, play an important role in explaining the reemergence of tuberculosis and other infectious diseases. Of the 25,000 tuberculosis cases reported in the U.S. in 1993, more than 70 percent occurred in racial and ethnic minorities and 30 percent occurred in persons born overseas (Centers for Disease Control and Prevention, 1994). These are key features to understand in order to develop effective policies to reduce the prevalence of infectious diseases such as tuberculosis. McKenna et al. (1995) show that immigration has had an increasingly important effect on the epidemiology of tuberculosis in the U.S., and that it will be difficult to eliminate tuberculosis without better efforts to prevent and control it among immigrants and greater efforts to control it in sending countries, particularly in Latin America and Asia.

V. INTERNATIONAL RESEARCH IS AN IMPORTANT FORM OF FOREIGN ASSISTANCE

Support for international demographic research represents an important avenue through which the U.S. provides assistance to people in other countries, particularly to people in less developed countries. Subjects of interest to demographers overlap many areas in which the U.S. and other countries provide humanitarian assistance to people in the less developed world. These topics include health and mortality, reproductive behavior, poverty and inequality, the status of women, investment in human capital, and economic growth and development. As a result of this match, international demographic research has the ability to identify particular problem areas as well as geographic locations where problems are most severe and to suggest policies and programs that are likely to be effective not only in improving a narrow set of outcomes, but serving more generally to promote welfare and well-being.

There are a variety of reasons for the U.S.'s interest in helping other countries. Foremost is that the U.S. has a humanitarian interest in improving welfare and the quality of life universally. This represents a fundamental ideal of the U.S. that helps to guide the country's foreign policy, military involvement, economic aid, and research agenda.

International research improves the effectiveness of foreign aid that the U.S. provides and is itself a form of aid. In particular, research on less developed countries can help these countries to understand and address their problems; over time, effective research can indeed lead to more effective aid and to a lessening of dependence on assistance programs. Finally, international research promotes goodwill and closer relations between the U.S. and other nations, which help the U.S. achieve its strategic aims. For example, there are important political benefits that accrue to the U.S. from its child survival programs in less developed countries, because saving children is an unambiguous humanitarian gesture.

International Research Yields Humanitarian Benefits

In many less developed countries, prevailing conditions often represent a state of avoidable suffering and a waste of human potential. With a relatively modest investment in research, the U.S. can help identify pressing problems and suggest effective interventions to ameliorate suffering; improve people's health, well-being, and quality of life; and promote economic, social, and political development. The investment in this research yields returns to the U.S. through the humanitarian rewards it provides.

An important topic of international demographic research and humanitarian concern is the level of mortality among infants and children in less developed countries. The infant mortality rate is an important social indicator that reflects more than simply the chances of survival among a particular age group in the population. Rather, it serves as a sentinel indicator of the health status of the population and may reflect the extent of social inequality and the overall level of well-being. This characterization is strongly supported by demographic research that has closely tied the level of infant mortality to fundamental social and economic characteristics of households, communities, and nations.

In a number of less developed countries today child mortality rates remain high, which is tragic because much of this mortality is avoidable through simple interventions and modest changes in behavior. One in seven children dies before the age of five in a

number of countries in sub-Saharan Africa, such as Mozambique, Sierra Leone, Malawi, and Mali, and over 12 million children under the age of five die in less developed countries in each year (World Bank, 1993a). Nevertheless, there has been a remarkable decline in child mortality over the past 30 years in the majority of less developed countries and the overall level of child mortality in these countries is less than one-half what it was in the 1960s.

Demographic research has made a fundamental contribution to the understanding of factors that are associated with the decline in child mortality. In addition, research has helped to measure and monitor rates of child mortality in less developed countries, even in the presence of missing and incomplete data (e.g., Trussell, 1975; Hill and Trussell, 1977; Feeney, 1980; Palloni, 1980). Studies by demographic researchers in the U.S. over the past two decades have examined the effects on child mortality of demographic and reproductive factors, such as birthweight, birthspacing, breastfeeding, and childbearing at younger and older maternal ages (DaVanzo, Butz, and Habicht, 1983; Pebley and Stupp, 1987; Miller et al., 1992); household and community socioeconomic characteristics, and interactions between these two sets of factors (Rosenzweig and Schultz, 1982; Thomas, Strauss, and Henriques, 1990; Sastry, 1996); and the effects of policies, programs, and interventions (Muhuri, 1995; Pebley and Amin, 1991). These studies have found important effects of birthspacing, breastfeeding, maternal education, and basic infrastructure on child survival. This research has guided the design and implementation of policies that have contributed to an increase in survival chances in childhood and the well-being of children and families. For example, research has pointed to the substantial benefits of longer birth intervals and breastfeeding durations for improving child survival chances. These are robust findings that have emerged from decades of demographic research and a direct consequence of this research is that promoting longer birth intervals and higher levels of breastfeeding are two of the cornerstones of USAID's child survival strategy.

Furthermore, research has pointed out that high levels of child mortality can serve to perpetuate high fertility, since parents choose to have a greater number of births to

compensate for the possibility that some children may die before reaching adulthood. Historically, declining child mortality preceded the fertility transition in Europe, the United States, and East Asia (see, for example, Coale and Watkins, 1986; Feeney, 1994). Therefore, improvements in child survival may lead to lower fertility and slower population growth, as well as a higher level of parental investment in children.

Finally, studies in less developed countries—and often foreign assistance itself—help to build internal research capabilities in these countries. This, in turn, strengthens the local capacity for understanding and addressing their demographic problems and lessens these countries' dependence on foreign aid. U.S. researchers often work collaboratively with researchers from less developed countries in the analysis of policies and programs because of the complementary set of research skills and experience that each posses. Many strong ties exist between U.S. researchers and those in less developed countries because the U.S. is the leading provider of research training in demography. Collaborative research helps these countries to develop better scholars, policymakers, and practitioners, which should lead to the development of more effective policies in the future.

International Research Improves the Effectiveness of International Aid

Concern about problems in developing countries exists not only because aspects such as air pollution, the HIV/AIDS epidemic, rapid population growth, and deforestation affect us, but also because of the misery they inflict on the populations of those countries. For example, 7 million adults in less developed countries die of easily prevented or curable causes, 400,000 women die from pregnancy complications or during childbirth, and reducing child mortality rates to those prevailing in industrialized countries would save the lives of 11 million children each year (World Bank, 1993a). U.S. foreign assistance is our humane response to this misery. Research in developing countries helps ensure that foreign assistance dollars have their maximum beneficial effect. For instance, research is useful for evaluating and improving the effectiveness of policy interventions that are supported by foreign aid.

An example of recent demographic research that has improved the effectiveness of international aid is the Global Burden of Disease Study (see World Bank, 1993a; Murray, 1994; Murray, Lopez, and Jamison, 1994). This study, which was undertaken by two demographers drawing on demographic methods of research, developed a new approach for measuring the impact of disease on populations, based on the total number of years of health life that are lost to disease through disability and death. The basic unit of measurement, a disability adjusted life year (DALY), represents one lost year of healthy life. Estimates of premature mortality and disability in a population are converted to this single metric using a mortality model and disease-specific information on severity and duration of disability. In addition to a global measure of the burden of disease in a population, cause- and disease-specific summaries can also be calculated. Thus, DALYs can be used to identify priority areas for research and policy intervention and in cost-benefit analyses of programs and interventions. Moreover, calculation of the cost-effectiveness of different programs and interventions—i.e., the ratio of costs to DALYs gained—can be used to select those that provide the best value for money.

The World Bank's (1993a) Global Burden of Disease Study provided a broad set of policy recommendations for less developed countries concerning public health interventions and the provision of clinical services that were based on the cost-effectiveness analyses. The most general recommendation was to redirect resources from interventions that have a high cost per DALY gained, such as hospital-based health services and specialty training, to those that cost little and benefit the poor. This shift could dramatically reduce the burden of disease, especially among the poor, without increasing expenditures. The desirability of a limited package of public health measures and essential clinical services was also highlighted by the study. The most cost-effective public health interventions included immunizations, school-based health services, HIV/AIDS prevention, the reduction of tobacco and alcohol consumption, and nutritional supplementation. The essential clinical services recommended by the report focused on the provision of pregnancy-related care, family planning services, the control of sexually transmitted diseases and tuberculosis, and the care of childhood illness. The provision of

essential clinical services alone could reduce the burden of disease by 25 percent worldwide.

Results from the World Bank study also provided guidance on research priorities that would provide the largest health benefits for less developed countries. The study suggested, for example, that new anti-malarial drugs and new or improved vaccines would have a very high payoff and would build on the comparative advantage of industrialized countries in conducting scientific research.

Information about the burden of disease has helped to change priorities and policies of governments in less developed countries, leading them to focus on neglected health areas such as maternal mortality (Nowak, 1995). These changes have allowed international donors to more effectively leverage their aid. The Global Burden of Disease Study revealed, for example, that pregnancy-related complications were the largest single cause of death and disability for women aged 15 to 44. Although promoting safe motherhood has been a priority for WHO, UNICEF, UNFPA, and the World Bank since the mid-1980s, few countries channeled program resources to this area. However, the combination of new information on the substantial societal and economic losses that were revealed by the Global Burden of Disease Study and the emergence in the early 1990s of new policies for promoting maternal health and survival—focusing on the provision of emergency obstetric care—have together begun to shift government attitudes and policies. Furthermore, cost-effectiveness analysis based on this research shows that in terms of economically productive lives saved, emergency obstetric care is not only relatively inexpensive, but is among the handful of cost-effective interventions.

VI. INTERNATIONAL RESEARCH ADVANCES SCIENCE

International demographic research yields considerable scientific benefits to the U.S. These benefits emerge from several unique features of international studies, which complement research focused on the U.S. alone. International research that exploits these features not only contributes to the advancement of science but also stimulates and enriches research focusing solely on the U.S.

The scientific contributions of international research emerge because these studies are able to exploit opportunities not available in the U.S., often because relevant data are not available. However, cross-national comparisons are able to uncover the role of factors that emerge only when looking at differences across countries. Research on countries outside the U.S. is able to validate U.S.-based studies by replicating them in different settings. Finally, new theories of demographic behavior and methods of research that are developed in international studies are often applicable to the U.S. In this section we review representative examples of these types of international studies, while at the same time highlighting some of the general scientific contributions of international research.

International Studies Provide Unique Scientific Research Opportunities

Research in international settings allows analysts in the U.S. to undertake studies that cannot be performed in this country, often because relevant data are not available. International data may expand the range of observed behaviors and outcomes and may cover events of interest that are rare or non-existent in the U.S. For example, levels of fertility, mortality, and co-residence are much higher in most less developed countries, which allows researchers to develop and test models and methods in these settings that could not be easily done in the U.S. There are also several examples of "natural experiments" in foreign countries, and analysis of these situations can provide valuable insights into behavior that in other circumstances could only be obtained from carefully designed social experiments that are usually unfeasible due to cost or ethical reasons. In addition, there are quite a few cases in which foreign data are of substantially higher quality or more complete than equivalent data in the U.S., and these data permit investigators to undertake substantially better research. For example, Scandinavian countries maintain population registers that are of tremendous value for conducting studies of topics such as migration and mortality. Finally, research conducted overseas may be able to study concentrations of populations with certain behavior or characteristics that may be costly, difficult, or even impossible to locate in the U.S.

The range of demographic behaviors and outcomes that is observed in any one country is often limited, due to a wide variety of factors that include the population's racial and ethnic composition, cultural background, physical environment, the level of economic growth and development, and government policies. However, researchers' ability to study particular outcomes—as well as the effects of certain policies and behaviors—depends critically on the level of variation in the data. For example, virtually all of the elderly in the U.S. are covered by Medicare, so understanding the relationship among the elderly between the cost of medical care and its use must generally rely on data from other settings. In addition, research studies require there to be a certain prevalence of a behavior or outcome in a population in order to conduct statistical analyses. Although some rare behaviors or outcomes are not of policy or scientific interest, others clearly are. For instance, infant mortality in the U.S. is a rare event, which makes it a difficult topic to study; yet understanding and reducing child deaths is an important scientific and policy priority.

Studies of mortality at advanced ages benefit tremendously from the use of accurate, complete, and reliable data available outside the U.S. These data have been used to study the biological limits to the human life span, understand the sources of these limits, and predict the likely gains in life expectancy over the coming decades. Population registers in Scandinavian countries provide exceptionally reliable data on mortality and population counts at advanced ages. Analysis of U.S. data has been constrained by inaccurate data on age-specific mortality; also, age misreporting and other errors in census data lead to inaccurate estimates of the size of the elderly population (Coale and Kisker, 1990; Condran, Himes, and Preston, 1991). Studies based on high quality data from Scandinavia and other countries in Europe (see, for example, Kannisto et al., 1994; Vaupel and Lundstrom, 1993) show that death rates have been declining, even at the highest ages, and that the pace of this decline has proceeded at an accelerated rate over the last 50 years. These findings suggest that life expectancy is likely to continue increasing in the foreseeable future, a result that has important scientific and policy implications for the U.S.

Research based on data collected overseas can provide a more cost-effective way for analysts to achieve study aims for topics of interest internationally and in the U.S. For example, it can be considerably less expensive to conduct clinical trials and demographic/epidemiological surveys in foreign countries. Less developed countries, in particular, can provide experimental or quasi-experimental situations that would be impossible or prohibitively expensive to set up in the U.S. An example of experimental research in developing countries is the well-documented policy and programmatic interventions implemented in Matlab, Bangladesh (Fauveau, 1994). More than 20 years ago, the International Center for Diarrheal Disease Research, Bangladesh (ICDDR,B) grouped contiguous villages in Matlab into treatment and comparison areas that were roughly equal in size and closely comparable according to demographic and socioeconomic characteristics. The comparison area received standard government health and family planning services, while the treatment area was the target of a more extensive family planning program, introduced in 1978, and an enhanced maternal and child health program—emphasizing immunization—that was begun in 1982 and later expanded. Excellent records are kept in both areas on the introduction of services at the community level and on their use by individual women, as well as on the health and use of services for young children. Thus there is unusual opportunity to measure externally-induced variation between the two areas. This situation has allowed researchers to study the effectiveness of programs and interventions without relying on observational data, which make it difficult to identify causal effects. For instance, it has allowed researchers to study the effects of family planning on fertility (Phillips et al., 1982) and maternal mortality (Koenig et al., 1988a) and the effects of measles vaccination on child mortality (Clemens et al., 1988; Koenig et al., 1990b). This type of experiment would have been virtually impossible to implement in the U.S. Moreover, the Matlab study area in Bangladesh has developed local Bangladeshi capacity and has promoted cooperation with other less developed countries. ICDDR,B has also developed new vaccines against diarrheal disease and oral rehydration therapy that saves the lives of more than a million

children each year and also yields direct benefits to the U.S. through their use in this country.

Important Scientific Findings Can Emerge from Cross-Country Studies

A number of valuable scientific insights emerge from international demographic studies in which the principal sources of variation are cross-country differences in the social, economic, and cultural environment. These environmental factors vary greatly across countries and, to a more limited extent, so do biology and behavior. Different combinations of behavior, biology, and environment allow researchers to conduct studies that provide a better understanding about the fundamental nature of the relationships among these factors. For example, researchers can test certain hypotheses about mortality and morbidity to see whether it is culturally or socially grounded rather than biologically-based.

A classic study that sought to separate the effects of biological factors from social and cultural factors is that of coronary heart disease, stroke, and mortality among Japanese men in Japan, Hawaii, and California (Marmot et al., 1975; Worth et al., 1975). Japanese men in these three settings are differentiated by their degree of exposure to Western lifestyle influences concerning diet, occupation, living arrangements, and patterns of social interaction. For example, Japanese men living in California had a higher fat diet and higher mean serum cholesterol than men in Japan, while the men in Hawaii fell in between. Paralleling this, the U.S. had a high rate of coronary heart disease while Japan's rate was low. However, even after controlling for levels of blood pressure, cholesterol, and other risk factors (such as smoking), there was a significant increase in the prevalence of coronary heart disease from Japan to Hawaii to California, with smaller differences between the first two settings compared to the last two settings.

Further investigation of the data revealed that certain features of Japanese culture might provide a buffer against stress. When Marmot and Syme (1976) classified individuals according to the closeness of their connection to Japanese culture—based on whether they were raised according to traditional cultural practices and the extent to

which their personal and social contacts with other Japanese, for example—they found that men who scored higher on the traditional culture scale had lower prevalence of coronary heart disease. This differential persisted after controlling for diet and other known risk factors.

These results suggest that lifestyle and cultural factors do indeed play an important role in explaining differences in morbidity. This study is notable because it was among the first to point out the strong relationship between lifestyle and cultural factors on one hand, and disease, disability, and death on the other. Moreover, this research—and many subsequent studies that have built upon it—demonstrated the relative importance of environmental factors compared to genetic factors and the potential for lifestyle and public health interventions to improve health and mortality.

International Studies Allow Testing of U.S. Research Findings

Addressing the same research questions in different settings allows researchers to investigate whether theories developed to explain behavior and outcomes in one setting are applicable in other settings. Results from testing the same theory in different setting reveal whether the theory has general validity. This leads to the development of more general and robust theories, which provide an appropriate basis upon which to develop policies and interventions.

For example, European countries, such as Sweden, provide a useful comparison to the U.S. for testing theories about the effects of family and society on fertility behavior. Research in the U.S. (e.g., Thomson, McDonald, and Bumpass, 1990; Thomson, 1997) has found that married men's views regarding childbearing intentions are important and that men have roughly the same degree of influence over fertility decisions as their wives. However, social context may alter the influence of men's childbearing intentions. Potentially important factors include gender arrangements and ideals, contraceptive practices, union stability, and societal support for childrearing. If these were in fact crucial factors and they changed in the future, then men's roles regarding childbearing decisions could change. In a recent study, Thomson and Hoem (1998) examined the

relationship between a couple's childbearing plans and their subsequent fertility in Sweden. The analysis of Swedish data (and its comparison with results for the U.S.) allowed these researchers to examine the extent to which contextual factors matter. In particular, Sweden has a substantially higher gender equality score than the U.S., couples there use reversible contraceptive methods more widely and more effectively than in the U.S., rates of union dissolution are similar (although divorce is less common and premarital cohabitation is ubiquitous in Sweden), and Sweden provides far more generous social and economic support for childrearing. Thomson and Hoem (1998) found gender equality in childbearing decisions in Sweden, similar to results for the U.S., and that generous parental benefits do not appear to make disagreeing couples more likely to have a child; they also found no effects of union type (married versus cohabiting). The results of this study provide strong support for Thomson's hypothesis—developed from analyzing U.S. data—that men's childbearing plans have an important influence on couples' childbearing and show that this influence is not strongly affected by social context.

As this example illustrates, international research provides a laboratory for testing scientific theory. Empirical research in several different countries leads to the acceptance (or refutation and modification) of theories and to scientific progress. Without international research, in industrialized and less developed countries alike, researchers do not have the laboratory in which science can be confirmed or rejected.

International Research Advances Theory and Methods in Demographic Research

International research stimulates and enriches scientific progress by developing and testing new theories and new analytical methods that have later been found to be applicable to the U.S. For example, research on the relationship between marital status and mortality in other settings, such as Japan, highlighted the potential importance of the mate selection process in accounting for the excess mortality of the unmarried (Hu and Goldman, 1990; Goldman and Hu, 1992); this work has stimulated further research in the U.S. that has sought to understand the relative importance of mate selection effects versus

the protective effects of marriage (e.g., Lillard and Panis, 1997). In general, demographic research conducted in an international context must develop theories and methods to accommodate a wider range of variation in institutional structure and demographic/social behavior. Furthermore, new theories that are developed for international research are generally applicable to the U.S., to the extent that they aim to explain fundamental aspects of human behavior and biology and basic features of social and economic organization.

Research on the determinants of fertility in less developed countries has been a central topic of interest within international demographic research. Recent theoretical advances in the study of fertility and contraceptive use in high-fertility settings have focused on the role of social learning and social influence, which operate to diffuse new ideas and behaviors through society. These models have been widely applied in less developed countries (e.g., Montgomery and Casterline, 1993; Rosero-Bixby and Casterline, 1993 and 1994; Entwisle et al., 1996) and hold significant promise for analyzing U.S. fertility. Montgomery and Casterline (1996) describe how these new models of fertility can provide insights into how social effects influence U.S. adolescent fertility, contraceptive method choice, use of family planning and reproductive health services, and the relationship between childcare and fertility. Several new data collection efforts in the U.S., such as the National Longitudinal Study of Adolescent Health, will provide researchers with the necessary data to estimate these models.

Methods developed for research in international settings have also proved useful for studies focusing on the U.S. For example, indirect estimation techniques for estimating population parameters from incomplete data, originally developed because of poor vital registration systems in less developed countries, have been used to estimate the size of the homeless population in the U.S. An important innovation in statistical methods that has had major benefits for U.S. research is the development of multilevel or hierarchical statistical models (Mason, Wong, and Entwisle, 1983; Wong and Mason, 1985 and 1991). These were initially developed by researchers to study the effects of family planning programs on contraceptive use and fertility in the developing world

(Entwisle and Mason, 1985; Entwisle, Mason, and Hermalin, 1986). These statistical models allowed researchers to estimate correctly the effects of both individual and contextual characteristics on demographic outcomes. Following their development, these models have been extremely widely used by U.S. researchers to study a wide variety of topics in this country, such as educational attainment (Garner and Raudenbush, 1991), domestic violence (O'Campo et al., 1995), violent crime (Sampson, Raudenbush, and Earls, 1997), and fertility (Billy and Moore, 1992).

VII. SUMMARY AND CONCLUSIONS

International demographic research has generated important benefits for the U.S. population, as well as for citizens of other countries of the world. This paper has identified five major reasons why the U.S. benefits from international demographic research. First, cross-national research provides unique policy insights that allow the U.S. to develop more effective programs and policies to address pressing and persistent domestic challenges. Second, it helps the U.S. to understand and address problems and issues in many countries or regions of the world that are of particular relevance to the U.S. because of their strategic or commercial importance to us. Third, it helps the U.S. to address problems and issues that are global in nature and require international policy responses. Fourth, it helps the U.S. to provide humanitarian aid to poor countries more effectively and efficiently. Finally, it contributes to the advancement of science, which in turn stimulates and enriches research focusing on the U.S.

Despite the existence of these benefits, policymakers and the public in the U.S. often question the value and appropriateness of government support for international demographic research. This suggests that researchers are not disseminating their results as regularly and as effectively as they could. Improved dissemination may help policymakers and the public better understand the value of international demographic research. At the same time, it would give researchers the opportunity to document the value of their studies, to continue influencing policy, and to educate the public. Future studies will provide even greater opportunities to demonstrate the value of international

demographic research for the public good. Some topics for future research have been identified in this paper, including the relationship between population and the environment, the effects of demographic factors on the emergence of new threats to public health, and the relationship between population and conflict.

Better dissemination requires efforts by researchers, institutions, and the field as a whole. Several possible strategies are available. One is for researchers to publish more papers in journals that have a wider readership than mainstream demography journals. Publications such as *Science* and top-tier medical journals have both stellar reputations and high levels of readership. Papers appearing in these journals are more visible to the media and to policymakers. At the institutional level, new programs for disseminating research, such as the *Population Matters* project currently underway at RAND, should continue to disseminate research findings broadly, in forms more easily understood by policymakers and the public. This is a task in which professional organizations, such as the Population Association of America, and funding organizations, especially the National Institutes of Health, can play a role. Coordinated efforts, at leading institutions and across the field as a whole, are needed because of the specialized skills required for effective communication.

Investment in better communication with policymakers and the public is essential because of the primary role that the government has in supporting international demographic research. This reliance on government funding is unlikely to change. Although foundations in the U.S. provide funding for international demographic research, their support can only complement, but not replace, public funding. There is, in addition, essentially no private sector support for international demographic research. This is not surprising, given that few commercial opportunities emerge from this research. Although the private sector is certainly interested in understanding demographic trends in countries around the world—for example, to plan investments or to identify new markets—the benefits to any particular company or industry are unlikely to justify the costs. Combined with the major benefits that accrue to policymakers and the public, this means that international demographic research constitutes a public good. Consequently, government

support is not only highly appropriate, but is needed in order to achieve an optimum level of funding.

Government support for international demographic research provides other benefits to policymakers, researchers, and the public. Because the government and the public are the main consumers of this research, public funding provides an appropriate control and an opportunity for productive dialog with researchers. It focuses research on topics of greatest public interest and ensures responsiveness to the needs of policymakers and the public. Researchers also benefit from government funding because it provides stable, long-term support for their work. This allows the field to attract and retain talented researchers, which is essential for producing high quality research.

Although we have identified the benefits of international demographic research in this paper, we have not undertaken the challenging task of assessing the returns to the dollars spent. There are no estimates of these returns available from the literature either. It would be fairly straightforward to estimate the total level of funding for international demographic research, especially for that supported by U.S. government agencies. It is more difficult, however, to assign a total dollar value to the benefits of this research. Perhaps the best approach for assessing the overall contribution of the field would be to identify a small set of projects or research topics for which the most significant impacts have occurred, and assess their returns. Although this may overstate the returns associated with the average project or research topic, there is a good chance that the total returns from the most important projects have yielded large returns greatly exceeding the total amount spent on all demographic research. For example, even if the contribution of international demographic research to the enormous global decline in infant and child mortality over the past several decades is relatively minor, the decline has been so large, the benefits so great, and the cost of research so modest, that the returns to this research are, most likely, substantial.

In coming decades the benefits of international demographic research are likely to grow. This is because international trade and commerce is likely to increase, populations

will age and fertility rates fall, new threats to public health will emerge, the retreat from marriage will continue, the volume and patterns of immigration will change, and other new demographic trends will emerge. It would indeed be shortsighted of the U.S. not to exploit the considerable opportunities for international research that exist, now and in the future.

REFERENCES

Andersson, B.E. 1992. "Effects of day care on cognitive and socioemotional competence of thirteen year old Swedish schoolchildren," *Child Development* 63: 20-36.

Belsky, J. 1988. " The effects of infant day care reconsidered," *Early Childhood Research Quarterly* 3: 235-272.

Belsky, J., and M.J. Rovine. 1988. "Nonmaternal care in the first year of life and the security of infant-parent attachment," *Child Development* 59: 157-167.

Besley, T. 1995. "Savings, credit, and insurance," Chapter 36 in J. Behrman and T.N. Srinivasan (eds.), *Handbook of development economics, Volume III.* Amsterdam: Elsevier.

Billy, John O.G., and David E. Moore. 1992. "A multilevel analysis of marital and nonmarital fertility in the United States," *Social Forces* 70: 977-1011.

Brown, J. Larry, and Ernesto Pollitt. 1996. "Malnutrition, poverty and intellectual development," *Scientific American* February: 38-43.

Brown, J. Larry, and Laura P. Sherman. 1995. "Policy implications of new scientific knowledge," *Journal of Nutrition* 125: 2281S-2284S.

Bulatao, R.A. 1998. *The value of family planning programs in developing countries.* Santa Monica: RAND.

Centers for Disease Control and Prevention. 1994. "Expanded tuberculosis surveillance and tuberculosis morbidity—United States, 1993," *Morbidity and Mortality Weekly Report* 43: 361-66.

Clemens, J.D., B.F. Stanton, J. Chakraborty, S. Chowdhury, M.R. Rao, M. Ali, et al. 1988. "Measles vaccination and childhood mortality in rural Bangladesh," *American Journal of Epidemiology* 128: 1330-1339.

Coale, Ansley J., and M. Edgar Hoover. 1958. *Population growth and economic development in low-income countries: A case study of India's prospects.* Princeton: Princeton University Press.

Coale, Ansley J., and Ellen E. Kisker. 1990. "Defects in data on old age mortality in the United States: New procedures for calculating mortality schedules and life tables at the highest ages," *Asian and Pacific Population Forum* 4: 1-36.

Coale, Ansley J., and Susan C. Watkins (eds.). 1986. *The decline of fertility in Europe.* Princeton: Princeton University Press.

Condran, Gretchen A., Christine L. Himes, and Samuel H. Preston. 1991. "Old-age mortality patterns in low-mortality countries: An evaluation of population and death data at advanced ages, 1950 to the present," *Population Bulletin of the United Nations* 30: 23-60.

Cooper, M. 1992. "Infant mortality: Why is the U.S. death rate high compared with other nations?" *CQ Researcher* 2: 641-664.

DaVanzo, Julie, William P. Butz, and Jean-Pierre Habicht. 1983. "How biological and behavioral influences on mortality in Malaysia vary during the first year of life," *Population Studies* 37: 381-402.

Dolin, P.J., M.C. Raviglione, and A. Kochi. 1994. "Global tuberculosis incidence and mortality during 1990-2000," *Bulletin of the World Health Organization* 72: 213-20.

Easterlin, Richard A. 1967. "Effects of population growth on the economic development of developing countries," *Annals of the American Academy of Political and Social Science* 369: 98-108.

The Economist. 1997. "Microlending: From sandals to suits." February 1, 1992, p. 75.

Entwisle, B., and W.M. Mason. 1985. "Multilevel effects of socioeconomic development and family planning programs on children ever born," *American Journal of Sociology* 91: 616-649.

Enwisle, B., W.M. Mason, and A.I. Hermalin. 1986. "The multilevel dependence of contraceptive use on socioeconomic development and family planning program strength," *Demography* 23: 199-216.

Entwisle, Barbara, Ronald R. Rindfuss, Divid K. Guilkey, Apichat Chamratrithirong, Sara R. Curran, and Yothin Sawang-dee. 1996. "Community and contraceptive choice in rural Thailand: A case study of Nang Rong district," *Demography* 33:1-11.

Evans, J. 1995. "Sounding board: Essential national health research," *New England Journal of Medicine* 323: 913-915.

Fauveau, Vincent (ed.). 1994. *Matlab: Women, children and health.* Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh.

Feeney, Griffith. 1980. "Estimating infant mortality trends from child survivorship data," *Population Studies* 34: 109-128.

Feeney, Griffith. 1994. "Fertility decline in East Asia," *Science* 266: 1518-1523.

Finkle, Jason L., and Barbara B. Crane. 1976. "The World Health Organization and the population issue: Organizational values in the United Nations," *Population and Development Review* 11: 1-28.

Garner, C., and S. Raudenbush. 1991. "Neighborhood effects on educational attainment: A multilevel analysis," *Sociology of Education* 64: 251-262.

Goldman, Noreen, and Yuanreng Hu. 1992. "Excess mortality among the unmarried: A case study of Japan," *Social Science and Medicine* 36: 533-546.

Gorman, Kathleen S. 1995. "Malnutrition and cognitive development: Evidence from experimental/quasi-experimental studies among the mild-to-moderately malnourished," *Journal of Nutrition* 124: 2239S-2244S.

Gruber, Jonathan, and David Wise. 1998a. *Social security programs and retirement around the world.* Chicago: University of Chicago Press.

Gruber, Jonathan, and David Wise. 1998b. "Social security and retirement: An international comparison," *American Economic Review* 88: 158-164.

Hamid, M.A. 1986. "Grameen bank in Bangladesh: Is it a viable anti-poverty programme?" *Commerce* (New Delhi), November 15-21, pp. 942-945.

Hill, K., and T. J. Trussell. 1977. "Further developments in indirect mortality estimation," *Population Studies* 31: 313-334.

Homer-Dixon, Thomas. 1994. *Population and conflict.* Liege: IUSSP.

Hossain, M. 1986. *Credit for alleviation of rural poverty: The experience of the Grameen Bank in Bangladesh.* Dhaka: Bangladesh Institute of Development Studies.

Hossain, M. 1988. "Credit for alleviation of rural poverty: The Grameen Bank in Bangladesh," International Food Policy Research Institute, Washington DC.

Howes, C. 1990. "Can the age of entry into child care and the quality of child care predict adjustment in kindergarten?" *Developmental Psychology* 26: 292-303.

Howes, C., and P. Stewart. 1987. "Child's play with adults, toys, and peers: An examination of family and child care influences," *Developmental Psychology* 23: 423-430.

Hu, Yuanreng, and Noreen Goldman. 1990. "Mortality differentials by marital status: An international comparison," *Demography* 27: 233-250.

Institute of Medicine, Board on International Health. 1997. *America's vital interest in global health: Protecting our people, enhancing our economy, and advancing our international interests.* Washington: National Academy Press.

John, A. Meredith. 1990a. "Endemic disease in host populations with fully specified demography," *Theoretical Population Biology* 37: 455-471.

John, A. Meredith. 1990b. "Transmission and control of childhood infectious diseases: Does demography matter?" *Population Studies* 44: 195-215.

Kannisto, Vaino, Jens Lauritsen, Roger A. Thatcher, and James W. Vaupel. 1994. "Reductions in mortality at advanced ages: Several decades of evidence from 27 countries," *Population and Development Review* 20: 793-810.

Kelly, William, and Omar Galle. 1984. "Sociological perspectives and evidence on the links between population and conflict," in Nazli Choucri (ed.) *Multidisciplinary perspectives on population and conflict.* Syracuse: Syracuse University Press.

Koenig, M.A., V. Faveau, A.I. Chowdhury, J. Chakraborty, and M.A. Khan. 1988. "Maternal mortality in Matlab, Bangladesh," *Studies in Family Planning* 18: 117-127.

Koenig, M.A., M.A. Khan, B. Wojtyniak, J.D. Clemens, J. Chakraborty, V. Fauveau, et al. 1990b. "Impact of measles vaccination on childhood mortality in rural Bangladesh" *Bulletin of the World Health Organization* 68: 441-447.

Leibowitz, A. 1995. "Child care: Private cost or public responsibility?" in V.R. Fuchs (ed.) *Individual and social responsibility: Child care, education, medical care, and long-term care in America.* Chicago: Chicago University Press.

Lillard, Lee A., and Constantijn W.A. Panis. 1997. "Marital status and mortality: The role of health," *Demography* 33: 313-327.

Liu, Korbin, Marilyn Moon, Margaret Sulvetta, and Juhi Chawla. 1992. "International infant mortality rankings: A look behind the numbers," *Health Care Financing Review* 13: 105-118.

Lopez, A.D. 1993. "Cause of death in industrial and developing countries: Estimates for 1985-1990," in D.T. Jamison, W.H. Mosley, A.R. Measham, and J.L. Bobadilla (eds.) *Disease control priorities in developing countries.* New York: Oxford University Press, 35-50.

McIntosh, C. Alison, and Jason L. Finkle. 1995. "The Cairo conference on population and development: A new paradigm?" *Population and Development Review* 21(2): 223-260.

McKenna, Matthew T., Eugene McCray, and Ida Onorato. 1995. "The epidemiology of tuberculosis among foreign-born persons in the United States, 1986 to 1993," *The New England Journal of Medicine* 332: 1071-1076.

Marmot, M.G., and S.L. Syme. 1976. "Acculturation and coronary heart disease in Japanese-Americans," *American Journal of Epidemiology* 104: 225-247.

Marmot, M.G., S.L. Syme, A. Kagan, H. Kato, J.B. Cohen, and J. Belsky. 1975. "Epidemologic studies of coronary heart disease and stroke in Japanese men living in

Japan, Hawaii, and California: Prevalence of coronary and hypertensive heart disease and associated risk factors," *American Journal of Epidemiology* 102: 514-525.

Martin, Linda G. 1991. "Population aging policies in East Asia and the United States," *Science* 251: 527-531.

Martorell, Reynaldo. 1995. "Results and implications of the INCAP follow-up study," *Journal of Nutrition* 125: 1127S-1138S.

Mason, W.M., G.W. Wong, and B. Entwisle. 1983. "Contextual analysis through the multilevel linear model," in S. Leinhardt (ed.) *Sociological Methodology 1983-84.* San Francisco: Jossey-Bass, 1983: 72-103.

Massey, Douglas S., and Kristin E. Espinosa. 1997. "What's driving Mexico-U.S. migration? A theoretical, empirical, and policy analysis," *American Journal of Sociology* 102: 939-99.

Menken, Jane. 1986. *World population and U.S. policy: The choices ahead.* New York: W.W. Norton.

Miller, Jane E., James Trussell, Anne R. Pebley, and Barbara Vaughan. 1992. "Birth spacing and child mortality in Bangladesh and the Philippines: How much is explained by gestation?" *Demography* 29: 305-318.

Montgomery, Mark R., and John B. Casterline. 1993. "The diffusion of fertility control in Taiwan: Evidence from pooled cross-section, time-series models," *Population Studies* 47(3): 457-479.

Montgomery, Mark R., and John B. Casterline. 1996. "Social learning, social influence, and new models of fertility," *Population and Development Review* 22(Suppl.): 151-175.

Morduch, Jonathan. 1998. "Does microfinance really help the poor? New evidence from flagship programs in Bangladesh." Working paper, Department of Economics, Harvard University.

Muhuri, Pradip K. 1995. "Health programs, maternal education, and differential child mortality in Matlab, Bangladesh," *Population and Development Review* 21: 813-834.

Murray, C.J.L. 1994. "Quantifying the burden of disease: The technical basis for disability-adjusted life years," *Bulletin of the World Health Organization* 72: 429-445.

Murray, C.J.L., A.D. Lopez, and D.T. Jamison. 1994. "The global burden of disease in 1990: Summary results, sensitivity analysis, and future directions," *Bulletin of the World Health Organization* 72: 495-509.

Murray, C.J.L., K. Styblo, and A. Rouillon. 1990. "Tuberculosis in developing countries: Burden, intervention, and cost," *Bulletin of the International Union Against Tuberculosis and Lung Disease* 65: 6-24.

National Academy of Sciences, Committee on Population. 1986. *Population growth and economic development: Policy questions.* Washington: National Academy Press.

NICHD Demographic and Behavioral Sciences Branch. 1997. *Goals and opportunities: DBSB report on program planning 1997-2001*. September, 1996.

NICHD Early Child Care Research Network. 1997. "Mother-child interaction and cognitive outcomes associated with early child care: Results of the NICHD study," paper presented at the biennial meeting of the Society for Research in Child Development, Washington, DC, April 1997.

National Science and Technology Council. 1995. *Infectious diseases: A global health threat.* September, 1995.

Nichiporuk, Brian. 1999. "The security dynamics of demographic factors," MR-1088. RAND, Santa Monica, CA. In press.

Nowak, Rachel. 1995. "Obstetric care: New push to reduce maternal morality in poor countries," *Science* 269: 780-782.

O'Campo, P., A.C. Gielen, R.R. Faden, X. Xue, N. Kass, and M. Wang. 1995. "Violence by male partners against women during the childbearing year: A contextual analysis," *American Journal of Public Health* 85: 1092-1097.

Palloni, Alberto. 1980. "Estimating infant and childhood mortality under conditions of changing mortality," *Population Studies* 34: 129-142.

Pebley, Anne R., and Sajeda Amin. 1991. "The impact of a public health intervention on sex differentials in childhood mortality in rural Punjab, India," *Health Transition Review* 1: 143-170.

Pebley, Anne R., and Paul W. Stupp. 1987. "Reproductive patterns and child mortality in Guatemala," *Demography* 24: 43-60.

Phillips, J.F., W.S. Stinson, S. Bhatia, M. Rahman, and J. Chakraborty. 1982. "The demographic impact of the Family Planning Health Services Project in Matlab, Bangladesh," *Studies in Family Planning* 13: 131-140.

Pitt, Mark M., and Shahidur R. Khandker. 1998. "The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy* 106: 958-996.

Pollitt, Ernesto. 1994. "Poverty and child development: Relevance of research in developing countries to the United States," *Child Development* 65: 283-295.

Pollitt, Ernesto, Kathleen S. Gorman, Patrice L. Engle, Juan A. Rivera, and Reynaldo Martorell. 1995. "Nutrition in early life and the fulfillment of intellectual potential," *Journal of Nutrition* 125: 1111S-1118S.

Prodromidis, M., et al. 1995. "Aggression and noncompliance among Swedish children in centre-based care, family child care, and home care," *International Journal of Behavior Development* 18: 43-62.

Proshansky, Harold. 1984. "Population change and human conflict: The individual level of analysis," in Nazli Choucri (ed.) *Multidisciplinary perspectives on population and conflict.* Syracuse: Syracuse University Press.

Rahman, A., and S.M. Hossain. 1986. *Impact of Grameen Bank operation on the level, composition, and distribution of income and expenditure of the rural poor.* Dhaka: Bangladesh Institute of Development Studies.

Rahman, M., and J. DaVanzo. 1993. "Assessing the impact of the Grameen Bank on women's status and fertility in Bangladesh." Working Paper 93-28, Labor and Population Program, RAND, Santa Monica, CA.

Raviglione, Mario C., Dixie E. Snider, and Arata Kochi. 1995. "Global epidemiology of tuberculosis: Morbidity and mortality of a worldwide epidemic," *Journal of the American Medical Association* 273: 220-226.

Rosenzweig, M.R., and T.P. Schultz. 1982. "Child mortality in Colombia: Individual and community effects," *Health Policy and Education* 2: 305-348.

Rosero-Bixby, Luis, and John Casterline. 1993. "Modeling diffusion effects in fertility transition," *Population Studies* 47(1): 147-167.

Rosero-Bixby, Luis, and John Casterline. 1994. "Interaction diffusion and fertility transition in Costa Rica," *Social Forces* 73(2): 435-462.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and violent crime: A multilevel study of collective efficacy," *Science* 277: 918-924.

Sastry, Narayan. 1996. "Community characteristics, individual and household attributes, and child survival in Brazil," *Demography* 33: 211-229.

Schuler, Sidney R., and Syed M. Hashemi. 1994. "Credit programs, women's empowerment, and contraceptive use in rural Bangladesh," *Studies in Family Planning* 25: 65-76.

Simon, Julian. 1977. *The economics of population growth.* Princeton: Princeton University Press.

Simon, Julian. 1981. *The ultimate resource.* Princeton: Princeton University Press.

Singer, Margaret A., and Richard M. Glass. 1996. "The aging global population," *Journal of the American Medical Association* 276: 1758.

Stallings, J., and A. Porter. 1980. *National daycare home study.* Palo Alto: SRI International.

Symonds, Richard, and Michael Carder. 1973. *The United Nations and the population question, 1945-1970.* New York: McGraw-Hill.

Thomas, D., J. Strauss, and M.H. Henriques. 1990. "How does mother's education affect child height?" *Journal of Human Resources* 26: 183-211.

Thomson, Elizabeth. 1997. "Couple childbearing desires, intentions, and births," *Demography* 34: 343-354.

Thomson, Elizabeth, and Jan M. Hoem. 1998. "Couple childbearing plans and births in Sweden," *Demography* 35: 315-322.

Thomson, Elizabeth, E. McDonald, and L.L. Bumpass. 1990. "Fertility desires and fertility: Hers, his, and theirs," *Demography* 27: 579-588.

Trussell, T. James. 1975. "A re-estimation of the multiplying factors for the Brass technique for determining survivorship rates," *Population Studies* 29: 97-108.

Tuljapurkar, Shripad, and A. Meredith John. 1991. "Disease in changing populations: Growth and disequalibrium," *Theoretical Population Biology* 40: 322-353.

USAID. 1997. "Why should the United States invest in Child Survival programs for the developing world." Available at http://www.info.gov/pop_health/child_sur/invest.htm.

U.S. Census Bureau. 1997. *International Data Base.* Available at http://www.census.gov/ipc/www/idbnew.html.

Vandell, D., V.K. Henderson, and K.S. Wilson. 1988. "A longitudinal study of children with varying quality day care experiences," *Child Development* 59: 1286-1292.

Vaupel, James W., and Hans Lundstrom. 1994. "Longer life expectancy? Evidence from Sweden of reductions in mortality rates at advanced ages," in David A. Wise (ed.) *Studies in the economics of aging.* Chicago: University of Chicago Press, pp. 79-94.

Wessel, David. 1992. "Two unusual lenders show how 'bad risks' can be good business," *Wall Street Journal* June 23, 1992, p. A1.

Wong, G.Y., and W.M. Mason. 1985. "The hierarchical logistic regression model for multilevel analysis," *Journal of the American Statistical Association* 80: 513-524.

Wong, G.Y., and W.M. Mason. 1991. "Contextually specific effects and other generalizations of the hierarchical linear model for comparative analysis," *Journal of the American Statistical Association* 86: 487-503.

World Bank. 1984. *World development report 1984.* New York: Oxford University Press.

World Bank. 1993a. *World development report 1993: Investing in health.* New York: Oxford University Press.

World Bank. 1993b. *The East Asian miracle: Economic growth and public policy.* New York: Oxford University Press.

Worth, R.M., H. Kato, G.G. Rhoads, K. Kagan, and S.L. Syme. 1975. "Epidemiologic studies of coronary heart disease and stroke in Japanese men living in Japan, Hawaii, and California: Mortality," *American Journal of Epidemiology* 102: 481-490.