DOCUMENT RESUME

ED 290 820 UD 025 996

AUTHOR Espenshade, Thomas J.
TITLE Why the United States Needs Immigrants.
INSTITUTION Urban Inst., Washington, D.C.
SPONS AGENCY Department of Health and Human Services, Washington, D.C.
REPORT NO PDA-86-2
PUB DATE Aug 86
GRANT 1-R01-HD18240-01
NOTE 46p.
PUB TYPE Statistical Data (110) -- Viewpoints (120)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Acculturation; *Birth Rate; *Demography; *Foreign Nationals; Geographic Distribution; *Immigrants; Migrant Problems; Migration; *Population Trends; Social Integration; *Trend Analysis
IDENTIFIERS *California

ABSTRACT

This report aims to improve the quality of the policy-making process by using a broad distribution of research findings on the consequences of immigration to California. All major immigrant groups to California are included. Using the information collected, this report discusses economic and fiscal issues associated with immigration, character and tempo of assimilation processes, and impact on California of proposals for immigrant reform. The report begins with a review of current knowledge about population dynamics in populations subject to immigration and/or emigration. Then, in the context of fertility below replacement and consistent annual immigration, two questions are explored: (1) starting from any arbitrary point, what temporal path does a population follow on its way to a long-run equilibrium stationary population; and (2) how long does it take for that stationary situation to materialize? Finally some of the policy implications surrounding the twin features of non-replacement fertility and immigration are considered, along with a possible solution to the demographic dilemma confronting industrial democracies today. Barriers to more rapid immigrant adjustment must be removed and additional facilitators to immigrant adaptation must be found to speed the process of incorporating immigrants and their children into the mainstream of society. (PS)

Why the United States Needs Immigrants

by

Thomas J. Espenshade

The Urban Institute
2100 M Street, N.W.
Washington, D.C. 20037

August 1986
PDS-86-2

This Policy Discussion Paper draws on research supported by the Center for Population Research, NICHD, U.S. Department of Health and Human Services, under grant number 1 R01-HD18240-01, and was prepared as part of The Urban Institute's larger project, Study of the Impacts of Immigration in California, funded by the Weingart Foundation, the Atlantic Richfield Foundation, the Ahmanson Foundation, and the Times Mirror Foundation. My thanks are extended to Terri Murray, Tracy Ann Goodis, and Francesca Moghari for their capable technical assistance. Conclusions or opinions expressed in Institute publications are those of the authors and do not necessarily reflect the views of other staff members, officers, or trustees of the Institute; advisory groups; or any organizations that provide financial support to the Institute.

FOREWORD

Issues concerning the level and composition of immigration to the United States have assumed prominent positions on the agendas of many policymakers. Perhaps nowhere are immigration's effects more keenly felt than in California, where one-quarter of all foreign-born persons in the United States currently reside.

This Policy Discussion Paper series is aimed at improving the quality of the policy-making process through a broad distribution of research findings on the consequences of immigration to California. These dissemination activities are part of The Urban Institute's larger project, Study of the Impacts of Immigration in California, funded by the Weingart Foundation, the Atlantic Richfield Foundation, the Ahmanson Foundation, and the Times Mirror Foundation. Important policy issues being addressed include (a) economic and fiscal issues associated with immigration, (b) the character and tempo of assimilation processes, and (c) the impact on California of proposals for immigration reform. All major immigrant groups to California--not just Mexicans--are being included, as are the comparative effects in northern as well as in southern California.

The Urban Institute's objective is to make a positive contribution to the policy process. It is committed to getting its work into the hands of people who can use it and rely upon it to make judgments of their own on future policy directions. Related titles are listed at the end of this paper.

Thomas J. Espenshade
Director
Program in Demographic Studies

WHY THE UNITED STATES NEEDS IMMIGRANTS

Executive Summary

Industrial nations of the West, including the United States, are entering a new stage in the demographic transition from high birth and death rates to low birth and death rates. Since 1965 birth rates in many of these countries have fallen substantially below, and not just to, the level needed to replace their populations in the long run. At the same time fertility was declining, international migration--much of it from third world countries--was accelerating, both in terms of absolute numbers and as a proportion of total population growth. These developments pose a dilemma to policy makers in industrial democracies. In the absence of immigration, populations with below-replacement birth rates are headed for long-run declines in population size. But if immigration is encouraged for the sake of demographic stability, it leads to changes in the ethnic, racial, cultural, and linguistic composition of populations that are themselves sources of concern.

Because fertility rates in the United States have fallen to about 1.8 lifetime births per woman--below the level of 2.1 needed to maintain population stability--and there is scant evidence on the social horizon to suggest a sharp upturn in birth rates anytime soon, the United States needs immigrants to prevent long-run population extinction. But to forestall the nativist, and frequently xenophobic, tendencies that have gripped some segments of western European populations, the United States also needs an immigrant policy to go along with its immigration policy. Proposed U.S. immigration reforms should be paying more attention to policies and programs to accelerate the incorporation of immigrants and their descendants into full participation in society's mainstream.

INTRODUCTION

Industrial nations of the West are entering a new stage in the demographic transition from high birth and death rates to low birth and death rates. Since 1965 fertility rates in many of these countries have fallen substantially below, and not just to, the level needed to replace their populations in the long run. Moreover, there seems to be little hope for a sharp reversal anytime soon. In the United States, fertility rates prior to 1970 had never been below replacement, with the exception of a few years in the middle of the Great Depression. And with the recrudescence in native fertility following the Second World War, even this brief episode was quickly forgotten. After the war, U.S. period total fertility rates peaked during the late 1950s, then declined slightly to 3.65 in 1960, fell sharply to 2.48 by 1970, and then slipped quietly below replacement in 1972. In succeeding years fertility rates have remained below replacement, showing little tendency to deviate from an essentially flat trend line of 1.80 lifetime births per woman.

Fertility levels in other industrial democracies have also declined precipitously. A review of these trends can be found in Teitelbaum and Winter (1985) and in Wattenberg and Zinsmeister (1985). By the mid-1980s total fertility rates averaged 1.8 in northern Europe and 1.5 in western Europe, including levels as low as 1.3 in Denmark and West Germany (Population Reference Bureau, 1986).

At the same time fertility was declining, international migration to the West—much of it from third world countries—was accelerating, both in terms of absolute numbers and as a proportion of total population growth. Though not recognized as such at the time, these international movements were to become one of the most impo...nt demographic changes of the period (Teitelbaum and Winter, 1985). Immigration to Great Britain and the Netherlands was spurred by decolonization, to Sweden, France, and West Germany by various guest worker programs designed to alleviate labor shortages in the 1950s and 1960s, and to the United States and Canada by immigration reforms in the 1960s that ended discrimination against entrants from non-European countries. Recent estimates suggest that the United States, for example, is now accepting nearly twice as many immigrants and refugees as all other nations combined (Lamm and Imhoff, 1985), and that legal and illegal immigration together make up about one-third of annual U.S. population growth. In 1970 the foreign-born population in the United States comprised 4.8 percent of total population, but low birth rates coupled with growing levels of immigration in the following decade boosted this figure to 6.2 percent by 1980 (Economic Report of the President, 1986).

When immigration is predominantly from third world countries it contributes to population growth in two ways, through the addition of the immigrants themselves and from the fact that immigrant fertility is often higher than native fertility. West Germany registered natural increase of 366,300 in 1965 when the excess of births over deaths among the native German population was 334,000, and among immigrant workers, 32,300. But by 1975, natural increase had turned negative. Births among the native population lagged deaths by 235,600, whereas the surplus among immigrants rose to 99,000. Thus immigration accounted for all of West Germany's demographic increase. Similarly in France, of total population growth between 1950 and 1975 of eleven million, seven million was due to immigration and four million to natural increase. In contrast , growth in the French population since 1975 is due almost entirely to higher birth rates among immigrant North Africans

(Carlson, 1985). Teitelbaum and Winter (1985) have called attention to the demographic significance of low fertility in the presence of immigration:

> The convergence of the baby bust with the growth of international migration has led to a new demographic phenomenon of great relevance to debates about population decline. Put simply, the combination of record-low fertility and high immigration (especially from countries of higher fertility than the receiving countries) means that immigration must account for a large and increasing proportion of Western population growth (pp. 91-92).

Assuming that most governments find it easier both administratively and politically to regulate immigration than fertility, and that non-replacement fertility is therefore likely to be a permanent condition of western industrial democracies, brings into clear focus the demographic dilemma facing these countries. In the absence of immigration, populations with below-replacement fertility are in incipient decline. And if immigration is encouraged for the sake of demographic stability, it leads to changes in the ethnic, racial, cultural, and linguistic composition of populations that are themselves sources of concern. In western European countries where these compositional changes are occurring more quickly than in the United States, concern is sometimes magnified to the level of hysteria, especially when traditional white majority populations feel threatened by the prospect of being displaced by other peoples. For this reason, Teitelbaum and Winter (1985) comment: "Recent developments in France and Germany once more highlight the extent to which the matters raised in this book go far deeper than the administrative and technical, touching sensitive and important political issues likely to cloud and complicate present and future policy debates" (p. 120).

Before policy makers can deal intelligently with these issues, it is important to understand what the demographic implications are of continued low fertility and immigration. Most discussions of long-term population dynamics are couched in terms of stable population theory, a theory of the growth and structure of human populations that was developed for populations assumed to be closed to immigration and emigration. When migration is recognized, it is often to note that migration rates can be incorporated into survival rates so that no substantial modifications of the stable model are required (Lopez, 1960; Hyrenius, 1959; Sivamurthy, 1982). Only in the last decade or so have demographers turned their attention to the formal properties of so-called "open" populations, and they have generally proceeded by focusing first on the existence and second on the nature of long-run equilibrium solutions. Important gaps in our knowledge remain, however, with respect both to the paths followed by these open populations on the way to a long-term equilibrium and to the time it takes to achieve an equilibrium outcome.

This paper is concerned with these latter two gaps in our understanding. It begins by reviewing what we already know about population dynamics in populations subject to immigration and/or emigration. Then, in the context of fertility below replacement and constant annual immigration, it addresses two issues: (1) Starting from any arbitrary point, what temporal path does a population follow on its way to a long-run equilibrium stationary population? and (2) How long does it take for such a long-run stationary population to materialize? Finally, some of the policy implications surrounding the twin features of non-replacement fertility and immigration are considered, along with a possible solution to the demographic dilemma confronting industrial democracies today.

BACKGROUND

Mathematical models have treated migration both as rates of migration and as numbers of migrants. We begin our review with those models that have taken the first approach. Keyfitz (1977) has studied the long-run properties of populations subjected to repeated out-migration. Suppose, for example, that a population that is closed to immigration and emigration has an intrinsic growth rate of r and that the objective is to lower that rate to r*. When r* = 0 so that a stationary population is the ultimate aim, Keyfitz produces a simple formula for the fraction of the population at age x that must emigrate each year. Because examples of emigration at just one age are difficult to find in practice, it would be worthwhile to generalize these results to incorporate emigration at several ages simultaneously. Hyrenius (1959) and Espenshade (1984) have made a start by adding emigration into the force of mortality schedule.

Approaches to in-migration and out-migration have been combined in work by Rogers (1975), who extended the classical mathematical demography of single regions to multiregional population systems. Rogers considers a closed multiregional system that experiences internal migration but no emigration or immigration. Long-run equilibrium conditions are then explored if multiregional age-specific rates of fertility, mortality, and internal migration are assumed to be constant. With these postulates, the entire multiregional system and each region separately eventually grow at the same constant rate. Each region has a stable age distribution, though not necessarily the same as the age distributions in other regions.

Sivamurthy (1982) studies the effects of migration on the growth of a population and on its age-sex structure when migration is specified by an overall net migration rate and an age-sex composition of the net migrants at the time of migration. These impacts are compared to those when there is no migration and when migration is specified by age-sex-specific net-migration rates. He concludes that the continuation of a fixed set of fertility, mortality, and migration rates leads eventually to an equilibrium-state population with an unchanging age-sex structure and a constant growth rate. Sivamurthy also examines the time required for convergence to such an equilibrium-state population. If there is net immigration at all ages, then convergence occurs more quickly than in the absence of migration; if there is net emigration at all ages, convergence takes longer than if migration were zero.

For many purposes it is more appropriate to characterize immigration by the number of migrants than by the rate of migration, not only because most countries have policies to limit their annual immigration but also because the population at risk of immigrating is not the population in the host country but the population in the rest of the world.

In a paper prepared for the U.S. Commission on Population Growth and the American Future, Coale (1972) asked how much of a reduction in fertility below the replacement level would be needed in an initially stationary population to maintain a stationary population with the same annual number of births if a steady stream of immigrants were permitted to enter the population. Coale also considered the effect on long-term population growth if immigrants were added to a stationary population where everyone maintained replacement-level fertility. In the latter case, growth would be at a constant arithmetic rate; each year the addition to the population would be the same as in the previous year.

Pollard (1973) has shown that any fixed below-replacement fertility schedule, when coupled with a constant number and age composition of immigrants, leads to a stationary population. Pollard's analysis is somewhat more general than Coale's because Pollard shows that the level of below-replacement fertility that leads to a stationary population is not unique. On the other hand, Coale preserves the distinction between immigrant and native fertility, whereas Pollard assumes the same reproductive behavior for all women.

Espenshade, Bouvier, and Arthur (1982) have shown that if, starting at some arbitrary point, age-specific birth and death rates of a population are fixed, if fertility is below replacement, and if the yearly number of immigrants to the population as well as their age-sex composition are constant, then that population will evolve in the long run to a stationary population with a constant size and an unchanging age-sex distribution. Such characteristics of the long-run stationary population as its size and age composition do not depend on the size or the age-sex structure of the starting population, but only on the underlying assumptions regarding future fertility, mortality, and immigration. Moreover, the qualitative conclusion that a stationary population eventually results under these circumstances is unaffected by how far below replacement fertility is or by the precise level of immigration. For this conclusion to hold, it is not necessary for immigrant women to adopt the fertility patterns of native women. Immigrant women may have fertility rates substantially above replacement, and so may their descendants in the first, second, and later generations. All that is required for an equilibrium stationary population to materialize in the long run is that, at some point in the generational chain—whether beginning with the first generation, the tenth, or the fiftieth—one generation of immigrant descendants must adopt, and subsequent generations must maintain, below-replacement fertility.

Finally, Mitra (1983) has examined the asymptotic properties of populations with a constant annual influx of immigrants and with fertility rates below, at, and above replacement. He reproduces the result that a long-run stationary population is the outcome when fertility rates are constant and below replacement. Like Coale, he finds that a population experiences arithmetic growth if fertility is at replacement; and if fertility rates are above replacement, Mitra shows that the long-run population approaches the same intrinsic growth rate it would have in the absence of immigration.

In sum, the current literature focuses on proving the existence of long-run equilibrium solutions when fertility, mortality, and migration are assumed to be constant, and on deducing the characteristics of the equilibrium population (e.g., its size, growth rate, and age composition) from underlying assumptions about vital rates. Much less is known about population dynamics in the years separating the start of a projection from the attainment of an eventual equilibrium and about how long it takes to reach an equilibrium-state population. We turn next to a consideration of these two issues when fertility is below replacement.

PATH TO CONVERGENCE

Concepts

To study the dynamic path toward a long-run equilibrium stationary population that is followed by any arbitrarily chosen population when its fertility is constant and below replacement and when it receives a constant annual influx of immigrants, it is useful to imagine that the host country is divided into a "western" half and an "eastern" half. Let us assume that the population that is alive at time $t = 0$, the time when underlying fertility, mortality, and immigration conditions become constant, lives entirely in the western half and that there is no migration into or out of this region for values of $t > 0$. The eastern region, which is assumed to be empty at $t = 0$, is reserved for subsequent immigrants and their future descendants.

Under these conditions, the population in the west eventually disappears. Because it is closed to immigration and emigration and has fertility below the replacement level, the western population has a negative intrinsic growth rate, and therefore its size will eventually approach zero. The long-run path taken by the western population depends on the size of the stable equivalent population, Q_0, and on the intrinsic growth rate, r. As time increases beyond $t = 0$, $Q_t = Q_0 e^{rt}$ traces out a declining exponential population trajectory to which the size of the western population converges.[1]

The population-building process in the eastern half of the country is more complex. The first point to recognize is that a constant annual flow of immigrants after $t = 0$ leads to a resident population of foreign-born persons whose size and age composition are eventually constant. This stationary population of immigrants is built up in much the same way that an ordinary life-table stationary population is generated except that, in the former case, people can enter the population at any age and not just age zero. After immigrants have been arriving for t years, the foreign-born population will be stationary at all ages less than or equal to t. For example, the number of

[1]The interested reader may consult Espenshade and Campbell (1977) for details of the stable equivalent population and its relevance to population momentum.

foreign-born women will be constant through the end of the childbearing ages after about 45 or 50 years. The total foreign-born population will be stationary after about 100 years. However, because immigrants enter the population at all ages and not just at age zero, the age distribution of the foreign-born population will not follow the shape of the life-table survival curve, even when the number of foreign-born persons is stationary at all ages.

Next, assume that the native-born children of immigrant women and all of their subsequent descendants also live in the eastern portion of the country. If we designate the foreign-born population as the "zeroth" generation, their native-born children as the "first" generation, their grandchildren as the "second" generation, and so on, we can see how each of these generations evolves from the preceding one. The annual number of first-generation births to immigrant women at time t, $B_1(t)$, starts off at zero for $t = 0$ and then rises steadily as the number of immigrant women in the childbearing ages increases. Once the value of t surpasses the oldest age of childbearing, β, the number of foreign-born women of childbearing age becomes stationary and $B_1(t)$ levels off at a fixed annual ceiling of B_1.

The number of second-generation births at time t, $B_2(t)$, depends on the number of first-generation women in the childbearing ages. If the age childbearing begins is denoted by α, births in the second generation do not appear until after $t = \alpha$ when women in the first generation reach the childbearing ages. Thereafter, because of the monotonic behavior of $B_1(t)$, $B_2(t)$ increases continuously until it, too, reaches a fixed annual ceiling. This ceiling is attained when $B_1(t)$ has been constant for β years, that is, when $t = 2\beta$. At that point, $B_2(t)$ can be written as

$$B_2(t) = B_2 = B_1 \cdot NRR_1 \quad ,$$

where NRR_1 is the value of the net reproduction rate for first-generation women.

In general, the number of births at time t in the ith generation is $B_i(t)$. Reasoning as before, $B_i(t)$ is zero until women in the parent or (i-1)th generation enter their childbearing years. $B_i(t)$ then increases continuously until it reaches a maximum of $B_i = B_{i-1} \cdot NRR_{i-1}$. The times at which the successive generational birth sequences, $B_i(t)$, first acquire nonzero values and when they finally reach their maximum values are shown in table 1.[2]

Up to this point, in describing the evolution of the population in the eastern half of the country, we have not made use of the assumption that fertility is below replacement. The discussion has been general enough that it applies to any levels of generation-specific fertility. But only if fertility is below replacement will the equilibrium-state population in the east be a stationary population. As t progresses to larger and larger values the annual birth flow in the eastern population, B(t), is the sum of births in all generations, or

$$B(t) = B_1 + B_2 + \ldots + B_i + \ldots \quad .$$

---

[2]Another instance in which the succession of generations arises has been discussed by Keyfitz (1968, pp. 117-126). Keyfitz uses the term "generation" in the context of projections of closed female populations. It refers to how many generations separate the children from the population alive at time zero. Specifically, the zeroth generation denotes births, G(t), to women alive at time zero. The first generation, $B_1(t)$, are births to G(t) women. In this situation there are only a finite number of births in each generation. In contrast to the immigration model developed in the text in which the number of births in each generation is infinite (though the annual number is finite) because the population is continually replenished by immigrants, in the case Keyfitz considers, the limiting value of $B_i(t)$ as t tends to infinity is zero.

Table 1

Time Paths Followed by
Successive Generational Birth Sequences, $B_i(t)$

Generation (1)	Births Begin at t = (2)	Births Become Stationary at t = (3)	Duration of Convergence (4) = (3) - (2)
$B_1(t)$	0	β	β
$B_2(t)$	α	2β	$2\beta - \alpha$
$B_3(t)$	2α	3β	$3\beta - 2\alpha$
⋮	⋮	⋮	⋮
$B_i(t)$	$(i-1)\alpha$	$i\beta$	$i\beta - [(i-1)\alpha]$ $= (\beta - \alpha)i + \alpha$
⋮	⋮	⋮	

If all generations exhibit the same below-replacement fertility so that $NRR_i = NRR < 1$ for every generation, then

$$B(t) = B_1 (1 + NRR + NRR^2 + \ldots) \text{ and, in the limit,}$$

$$B(t) = B = B_1 / (1-NRR) \quad .$$

The total stationary population that arises in the east is made up therefore of many smaller stationary populations. There are H foreign-born persons, and if life expectancy at birth is represented by e_0, there are in addition B_1e_0 first-generation persons, B_2e_0 second-generation persons, and so on. The relative size of successive generations of native-born persons is governed by the value of the net reproduction rate in the parent generation. Lastly, the ages of people in each native-born generation are distributed as the life-table survival curve.

To summarize, if a population with an arbitrarily chosen size and age-sex composition is projected assuming fixed below-replacement fertility and a constant annual number of immigrants whose age-sex composition is held constant, the equilibrium-state outcome is a stationary population. The initial population and its descendants eventually die out because fertility rates are inadequate to replace this population. While that is happening, a new population of recent immigrants and their descendants is forming. This new population consists of a succession of smaller stationary populations--one of immigrants themselves, one of first-generation native-born persons, one of second-generation native-born persons, and so on. The stationary population of foreign-born persons is formed first, followed by the population of first-generation descendants, and so on down the generational chain. Total population size is the sum of the number of people in each generation, and this sum converges to a fixed total provided the number of people in successive generations becomes progressively smaller, that is, provided fertility rates are below replacement.

Application

To illustrate these conclusions we have projected the 1980 U.S. population using constant assumptions about fertility, mortality, and annual immigration. Fertility rates are set at their 1980 levels, or at a total fertility rate of 1.835. Death rates come from 1980 U.S. life tables in which life expectancy at birth is 77.5 years for females and 70.0 years for males. When combined, these fertility and mortality rates determine a net reproduction rate of 0.874. Figures on legal immigration to the United States for 1982 are used because Immigration and Naturalization Service data for 1980 and 1981 were not tabulated by sex. In 1982 there were 559,800 lawful permanent residents admitted to the United States.[3]

The results of this projection are shown in table 2. There were 226.5 million persons enumerated in the 1980 U.S. decennial census. With the assumptions described above, this population would eventually decline by over 50 million people before leveling off at a stationary population size of 169.7 million. In the eventual stationary population, the sum of the annual number of births (1,937,700) and the annual number of immigrants (559,800) is just

[3]Although these projections ignore emigration and undocumented immigration, these two components are roughly offsetting. According to Warren and Kraly (1985), ". . . the estimated number of non-U.S. citizens emigrating and undocumented migrants counted in the census were roughly of the same magnitude during the 1970s, 1.2 and 1.5 million respectively" (p. 7). Making a small adjustment for the emigration of U.S. citizens boosts current total emigration to more than 150,000 people each year (p. 2). Beginning in January 1986, the U.S. Bureau of the Census' postcensal estimates and CPS controls included an annual allowance of 200,000 for undocumented immigration and 160,000 for legal emigration for each year since 1980.

Table 2

U.S. Population, April 1, 1980, and Eventual Stationary Population Achieved with Constant Fertility, Mortality, and 559,800 Annual Immigration (all numbers in thousands)

Age	U.S. Population, April 1, 1980		Immigration Assumptions (1982)		Eventual Stationary Population	
	Females	Males	Females	Males	Females	Males
0-4	7,986.2	8,362.0	17.5	16.5	4,706.1	4,936.0
5-9	8,160.9	8,539.1	19.7	21.4	4,788.9	5,016.5
10-14	8,925.9	9,316.2	22.6	24.8	4,889.4	5,123.9
15-19	10,412.7	10,755.4	27.0	28.7	5,004.1	5,235.2
20-24	10,655.5	10,663.2	39.7	41.1	5,155.9	5,362.2
25-29	9,815.8	9,705.1	42.0	48.8	5,343.2	5,531.7
30-34	8,884.1	8,676.8	30.2	33.9	5,503.3	5,684.8
35-39	7,1[illegible]3.8	6,861.5	19.4	20.7	5,598.9	5,759.4
40-44	5,961.2	5,708.2	13.2	13.2	5,635.4	5,758.0
45-49	5,701.5	5,388.3	10.0	9.2	5,620.9	5,680.7
50-54	6,089.4	5,620.7	9.0	6.9	5,555.2	5,510.9
55-59	6,133.4	5,481.9	8.7	5.7	5,429.6	5,223.3
60-64	5,417.7	4,669.9	7.0	5.0	5,220.3	4,792.0
65-69	4,879.5	3,903.0	4.8	3.7	4,893.3	4,188.8
70-74	3,944.6	2,853.5	2.9	2.3	4,410.2	3,410.2
75+	6,420.4	3,548.4	2.5	1.7	9,470.9	5,255.3
Total	116,492.6	110,053.2	276.2	283.6	87,225.7	82,469.1
Both sexes	226,545.8		559.8		169,694.8	

Summary Demographic Measures

	1980-1985	Stationary Population
Total fertility rate	1.835	1.835
Gross reproduction rate	0.894	0.894
Net reproduction rate (NRR)	0.874	0.874
Male births per 100 female births	105.3	105.3
Female life expectancy at birth (in years)	77.50	77.50
Male life expectancy at birth (in years)	70.00	70.00
Population size	231,774.7	169,694.8
Yearly births	3,671.7	1,937.7
Yearly deaths	2,140.0	2,497.5
Yearly net immigrants	559.8	559.8
Annual rates per 1,000 population		
Birth rate	15.8	11.4
Death rate	9.2	14.7
Natural increase	6.6	-3.3
Net migration	2.4	3.3
Population increase	9.0	0.0

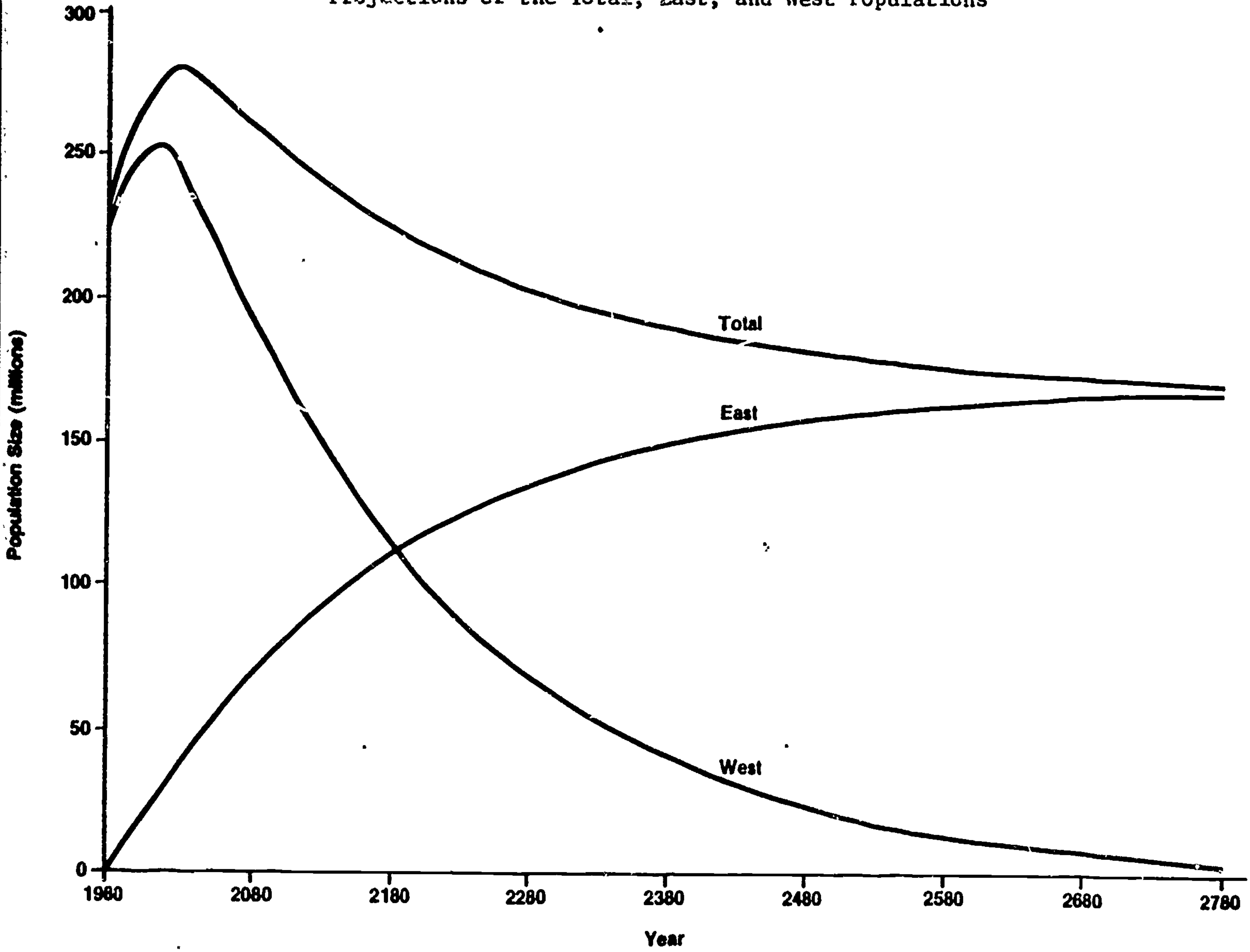
enough to offset the annual number of deaths (2,497,500). In addition to being smaller, the stationary population is also older than the 1980 population. The median age for females is 42.3 years in the stationary population compared with 31.3 years in 1980. For males the corresponding ages are 38.8 and 28.8 years, respectively.

The time path followed by the projected 1980 population as it proceeds to an equilibrium-state stationary population is shown in figure 1 by the line labeled "Total". Total population size increases to a maximum of 280.8 million in the year 2025 and then begins a long and gradual decline toward an eventual 169.7 million. Figure 1 also shows the individual projections for what we have termed the western and eastern portions of the population. The closed population in the west continues to increase for a time after 1980 due to the effects of population momentum, but it soon reaches a maximum of 252.3 million in 2015 and then begins to decline toward zero. Soon after the population in the west begins to shrink, its "growth" rate settles down to a constant rate of -0.0052 per annum. Readers can note that the "West" line in figure 1 may be interpreted as a projection of U.S. population size if there were no immigration or emigration after 1980.

The population in the east rises from zero in 1980 to an eventual total of 169.7 million. It is appropriate to think of the eastern population as a "layered" population, much like sedimentary rock, where the successive generations of immigrants and their descendants constitute the layers. The bottom stratum in figure 1 would be the immigrant generation. First-generation native-born persons constitute the layer above that, and so on. The reason that the rate of growth in the eastern population decreases over time is that progressively smaller generations are being added to the total because the underlying net reproduction rate is less than one.

Figure 1

Projections of the Total, East, and West Populations



It is clear from figure 1 that the eastern population comprises a rising share of the total population. These fractions are tabulated in terms of the western population's share of the total in table 3. The western population falls to three-fourths of the total within 100 years of the start of the projection and to one-half in just over 200 years.

The concepts developed earlier paid special attention to the generational components of population growth. The behavior of the eastern population's generational birth flows, $B_i(t)$, are shown in figure 2. Only births in the first six generations are included. Births in subsequent generations would appear lower and to the right in the diagram. Each generation's birth path is characterized by the same general pattern; it begins at zero, increases to a fixed annual ceiling, and then remains constant. As the order of the generation increases, it takes longer for births to appear and also longer for births to attain their maximum value. Once births have become constant at an upper ceiling, the number of births in one generation is related to the number of births in the previous generation by the value of the net reproduction rate. In our example, because all women are assumed to have the same fertility, the final number of births in one generation is 0.874 times the final number in the parent generation.

As a last illustration, figure 3 charts the evolving sizes of successive generations in the total population as it proceeds from 1980 to its ultimate stationary form. The orders of the generations are shown along the horizontal axis, starting with "-1" for the population in the western region. Other generational indicators refer to the eastern population. A "0" denotes the foreign-born population, a "1" first-generation native-born persons, and so on. The heights of the histograms correspond to the number of people in each

Table 3

West Population as a Percent
of Total Population, Selected Dates

Percent	Year	West Population (thousands)	Total Population (thousands)
100	1980	226,545.8	226,545.8
95	2000	248,237.0	261,122.8
90	2020	251,874.5	279,307.5
75	2080	192,162.8	257,654.5
50	2190	108,861.5	219,541.0
25	2350	47,614.0	191,496.6
10	2540	17,834.3	177,860.8
5	2680	8,649.8	173,655.4

Figure 2

Annual Births by Generational Status in the East Population

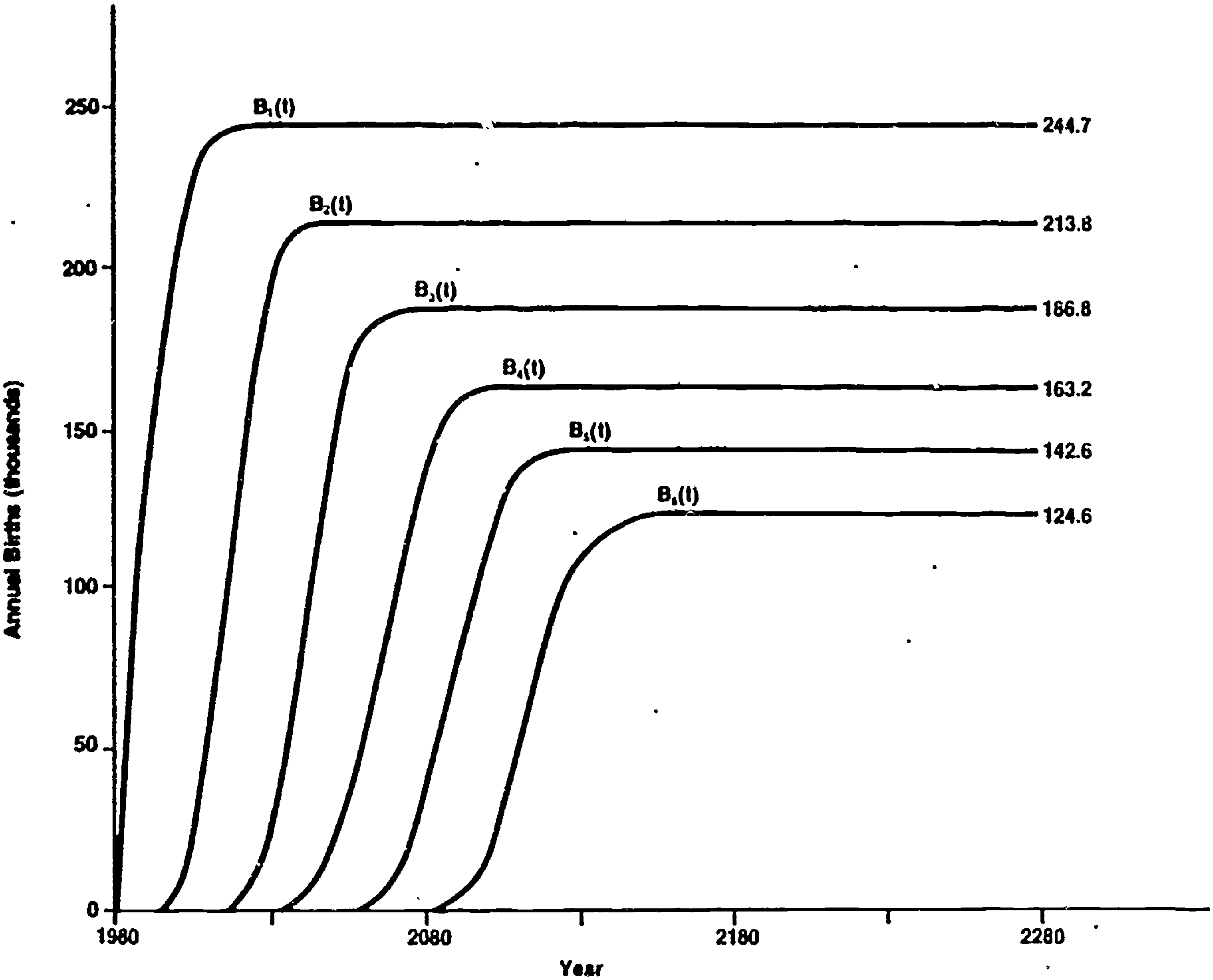
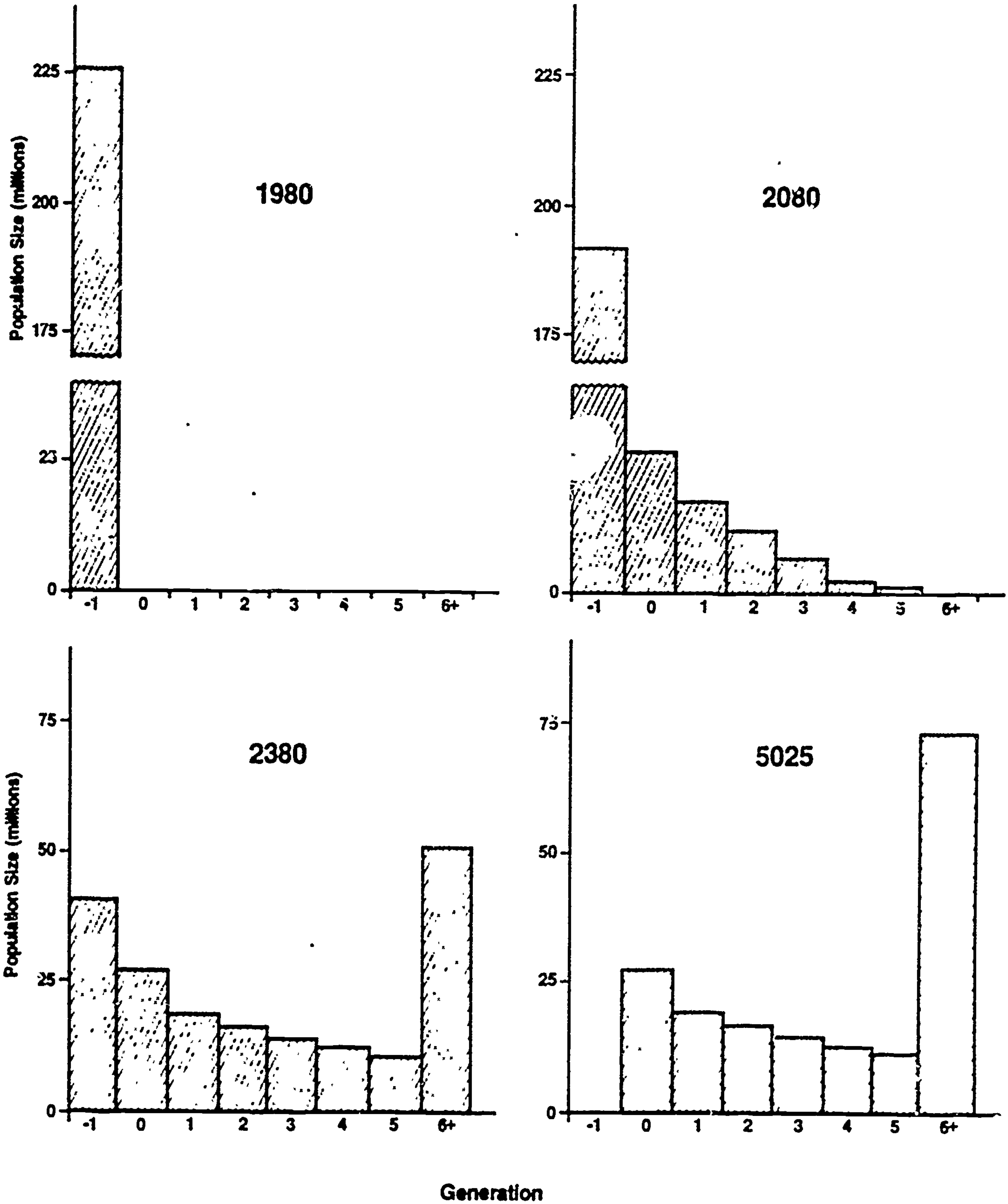


Figure 3

Generational Components of Population Size, Selected Years



generation. Beginning in 1980, all 226.5 million people live in the western region and there are no persons in the zeroth and higher-order generations. But as we move ahead in time, the number of people in the "-1" generation gradually declines until by the year 5025 there are no people left. As the western population is shrinking, the one in the east is building up. In our particular example, the foreign-born population is ultimately the largest single generation. As with births, the sizes of successive native-born generations are related to each other by the net reproduction rate.

DURATION OF CONVERGENCE

This section of the paper deals with the problem of how long it takes for an equilibrium-state stationary population to materialize with immigration and non-replacement fertility. This question involves two separate issues: (1) How long does it take for the closed population in the west to disappear when fertility is below replacement? and (2) How much time is needed to establish a stationary population in the east? Each of these issues is examined in turn.

To be precise, the western population never does disappear completely; it keeps getting closer and closer to zero without actually ever reaching it. Therefore, a more relevant question is how much time must elapse so that, for all practical purposes, the western population has vanished. To answer this question we need criteria to determine when P_t, the size of the western population at time t, is sufficiently small. Three separate criteria are relevant. Because P_t behaves as $Q_t = Q_0 e^{rt}$ as t increases indefinitely, each criterion is expressed in terms of Q_t, Q_0, and r. First, P_t may be said to have disappeared when Q_t falls below a predetermined threshold, ε. Second, P_t may be said to be sufficiently small when Q_t falls below a predetermined fraction, ρ, of Q_0. Third, P_t may be assumed to be sufficiently small when the annual change in Q_t falls below a predetermined level, δ. Choosing among these three criteria and selecting a particular value for the parameter in question (ε, ρ, or δ) inevitably involves a certain amount of arbitrariness.

Empirical results presented in this section are based on the projection of the 1980 U.S. population described in table 2 and illustrated in figure 1. Calculated times to convergence are given only for females.[4] The top half of table 4 shows the first year that the projected female population in the west would meet the specified criterion for convergence under each of three criteria and for selected values of the three parameters. The bottom row of the panel for west females includes what may be thought to be fairly generous conditions for convergence. The projected population must be less than one million persons, or be less than one percent of the size of the stable equivalent population (that is, less than 1.67 million persons), or be declining by fewer than 5,000 persons per year. Even with these liberal criteria, however, it takes the western population nearly one thousand years beyond 1980 to "disappear." Choosing more stringent criteria prolongs the duration of convergence.

Results on the duration of convergence for east females are given in the bottom half of table 4. The three criteria for convergence are inspired by those used in the western region. The first criterion suggests that the size of the eastern population at time t, N(t), may be said to have converged to its ultimate stationary population size, N, when N(t) approaches N within an arbitrarily small amount. The second criterion establishes convergence

---

[4]In the projection of the 1980 U.S. female population, Q_0 = 166,736,300 and r = −0.0051685.

Table 4

Duration of Convergence in the West and East Female Populations, for Selected Criteria and Parameter Values

West Females

$Q_t < \varepsilon$		$Q_t < \rho \cdot Q_0$		$\frac{dQ_t}{dt} > \delta$	
ε	Year	ρ	Year	δ	Year
50,000	3550	.0001	3762	- 100	3734
100,000	3416	.0005	3451	- 400	3465
250,000	3239	.001	3317	-1,000	3288
500,000	3104	.005	3006	-2,000	3154
1,000,000	2970	.01	2871	-5,000	2977

East Females

$N_t > N - \varepsilon$		$N_t > (1 - \rho) \cdot N$		$\frac{dN_t}{dt} < \delta$	
ε	Year	ρ	Year	δ	Year
50,000	3431	.0001	3767	100	3635
100,000	3297	.0005	3458	400	3350
250,000	3120	.001	3324	1,000	3175
500,000	2986	.005	3012	2,000	3035
1,000,000	2852	.01	2878	5,000	2860

Note: Years in this table represent the calendar years when each criterion is first met. The duration of convergence is the calendar year minus 1980.

according to the percentage of N that N(t) has achieved. Convergence under the third criterion is based on the rate of change in N(t) suggesting that N(t) can be said to be sufficiently close to N when the annual additions to N(t) fall below a predetermined amount.[5] The results indicate that, when similar criteria and identical parameter values are used, it takes just about as long for the eastern population to converge to a stationary population as it does for the western population to die out.

The final question to address is how long it takes for the total 1980 U.S. female population to become stationary when the western and eastern halves of the population are combined. Answers are contained in table 5. The results suggest that the total population converges to a stationary population somewhat more quickly than either the western or eastern halves converge to their respective limits, but the differences are not large. A faster convergence for the total might be expected because the western population is declining and the eastern one is increasing. Therefore, changes in the separate regions are to some extent offsetting. Nevertheless, with the parameter values we have chosen, it will still take at least 800 or 900 years beyond 1980 for the equilibrium-state stationary population to materialize fully.

SUMMARY

Prior research has shown that if an arbitrary population is projected forward on the basis of constant below-replacement fertility, constant mortality, and a constant number and age-sex composition of immigrants, this population will converge in the long run to an equilibrium-state stationary

[5]In our projection of the female population, N = 87,225,600.

Table 5

Duration of Convergence for the Total Female Population, for Selected Criteria and Parameter Values

$P_t < N + \varepsilon$		$P_t < (1 + \rho) \cdot N$		$\frac{dP_t}{dt} > \delta$	
ε	Year	ρ	Year	δ	Year
50,000	3399	.0001	3741	- 100	3600
100,000	3265	.0005	3426	- 400	3320
250,000	3088	.001	3292	-1,000	3140
500,000	2953	.005	2980	-2,000	3005
1,000,000	2819	.01	2846	-5,000	2825

Note: Years represent the calendar years when each criterion is first met. The duration of convergence is the calendar year minus 1980.

population with a constant size and a fixed age-sex composition. This paper extends these findings by concentrating, first, on the temporal path the population follows during the projection period and, second, on how long it takes to achieve an equilibrium stationary population.

To analyze the path to convergence we have adopted the convenient device of separating the population into two parts. Those persons alive at the start of the projection process and their subsequent descendants are assumed to live in the western portion of the country, and immigrant arrivals after the projection begins and all their subsequent descendants are assumed to live in the eastern portion. Our analysis has shown that the population alive at the beginning, together with its descendants, eventually becomes extinct because fertility rates are not high enough to replace the population in the long run. Taking its place in the east is a population consisting of recent immigrants and their descendants. Because fertility rates are assumed to be below replacement for this population, too, each generation of immigrant descendants is smaller than the preceding one. But the eastern population converges to a stationary population, rather than dying out, because it is being replenished annually by immigrants.

In the particular example used in this paper, the western population falls to about 75 percent of the total population after 100 years. In another 100 years or so the western and eastern populations are equal in size. Because the western population approaches zero but never actually reaches it, we adopted several criteria to judge when, for all practical purposes, the western population has disappeared. Similar procedures were used for the eastern population, which converges gradually to a stationary population. Nearly 1,000 years are required for the western and eastern halves of the population to converge to their respective limits, even when fairly liberal criteria for convergence are adopted.

DISCUSSION

This paper assumes that low fertility in industrial democracies is here to stay. Not all writers agree with this postulate. Teitelbaum and Winter (1985), for example, caution against projecting a continuation of non-replacement fertility on the basis of low period fertility rates. When childbearing is being delayed, as it is now, period rates are often below cohort rates, and fertility may not be below replacement on a cohort basis. Easterlin (1980) goes farther and argues that fertility will rise in the 1990s when the small baby bust cohorts of the late 1960s and 1970s enter adulthood. Using the Easterlin model, Ahlburg (1983) predicts a climb from 3.3 million U.S. births in 1978 to 4.6 million in 1997.

Nevertheless, these are minority views, and to the extent that a consensus exists, most demographers expect that fertility in developed countries will probably remain low (Westoff, 1983). McIntosh (1983) attributes these trends to "the convergence of a number of social revolutions, each of which exerts an antinatalist effect" (p. 229). Huber (1980) and Folbre (1983) point specifically to the increasing costs and declining rewards for childbearing, many of which are economic in nature, and argue that fertility is likely to go even lower.

It is also worth noting that, in western democracies, government efforts to reverse undesirable fertility trends have been notably unsuccessful. Many of these countries have progressive systems of child allowances, designed partly with a pronatalist intent. In West Germany, for example, the monthly child allowance in 1982 was DM 50 for the first child, DM 100 for the second child, DM 220 for the third, and DM 240 for the fourth or higher-order child (Teitelbaum and Winter, 1985). Despite this program, fertility in West Germany is the lowest in the world. Nor are western nations likely to do much more in the future. With reference to France, Sweden, and West Germany, McIntosh (1983) observes that "the evidence suggests that the 1980s are unlikely to see the adoption of strong, broadly based and coordinated policies intended to stimulate fertility" (p. 224). Part of her reasoning is that an effective program would be prohibitively expensive. In addition, a "muted sense of nationalism" has prevented any strong feeling of urgency over the need to stimulate the birth rate.

In short, the majority opinion is best summed up by Westoff (1983):

> I do not see any social changes on the horizon that would lead to the expectation that the fertility rate will increase substantially (to a total fertility rate greater than 2.5, for example). More likely is the continuation of rates at or below replacement, and in some instances these rates may indeed fall closer to the one- than to the two-child average. Scattered evidence suggests the proportion of childless women and the proportion with only one child will increase significantly (p. 102).[6]

If the assessment that fertility in western industrial democracies will remain low is correct, then three broad conclusions may be drawn from the analysis in this paper. First, developed nations with non-replacement fertility need immigrants. While it may be true that immigrants are needed because, in the words of Jeane Kirkpatrick, former U.S. Ambassador to the United Nations, they "bring to us a special personal sense of the importance of freedom" (Kirkpatrick, 1986, p. A11), they are needed most because the

---

[6]In an ironic twist, Wattenberg and Zinsmeister (1985) comment, "There may be an enormous paradox of human development in all this. Is it possible that one of the inevitable results of making people rich and free is that they find better things to do than reproduce themselves? Is it history's cruel joke that a culture's success brings about its own erosion?" (p. 35).

demographic survival of western nations depends on them. Without immigrants, many populations in the West would soon stop growing and then begin to shrink into eventual oblivion. With immigrants, these countries can maintain demographic stability for an indefinite period.

This point is not well understood. With reference to the United States, Lamm and Imhoff (1985) have commented: "At current levels of legal and illegal immigration, we will be doomed to expand our population continuously" (p. 16). This assertion simply is not true because it ignores the fact that U.S. fertility levels are below replacement. On the other hand, focusing on below-replacement fertility in the western community, Wattenberg and Zinsmeister (1985) argue: "Today every major nation that is modern and free is also on a demographic track that, if not changed, will ultimately decimate it" (p. 13). This observation is not correct either, because it ignores the contribution of immigration to demographic increase.

Second, despite the fact that in our numerical projection it takes nearly 900 years beyond 1980 for a fully stationary U.S. population to materialize, important compositional changes in the population occur well before then. In just 100 years, 25 percent of the total population consists of post-1980 immigrants and their descendants. If we had been more realistic and assumed higher fertility among immigrants and their near-term descendants than among the "native" population in the western region, these compositional changes would have occurred sooner. In addition, it is important to recognize that significant changes in the ethnic and racial balances of the U.S. and western European populations are already underway and that these changes were evident well before 1980. Finally, in the short run at least, the potential for change in the ethnic, racial, linguistic, religious, and other compositional aspects of national populations is perhaps greater in Europe than in the United States because Europe did not experience a baby boom after the Second World War that matched that in the United States, either in terms of magnitude or duration. As a result, European populations do not have age distributions with the same degree of built-in momentum for future growth as the age distribution of the U.S. population, and therefore they lack a "protective mantle of natural increase" that softens and to some extent obscures immigration-related recompositional trends.[7]

Third, when a population has both immigration and low fertility, we have seen that a kind of demographic transfusion occurs as it proceeds to a long-run stationary population. The initial population and its descendants eventually die out under the pressures of below-replacement fertility, and this original population is replaced by a new population of recent immigrants and their descendants. Whether these findings trigger policy concerns depends on the particular context in which immigration arises and on how much like the original population immigrants and their descendants either are or ultimately become.

At least three immigration scenarios can be imagined. The first, and most hypothetical, is a situation in which below-replacement fertility, mortality, and the annual volume of immigration have been constant for a sufficiently long time that an equilibrium stationary population has been in existence for at least a lifetime. Let us denote this time by $t = t^*$. If immigration continues, the population alive at t^* and its later descendants will eventually disappear and be replaced by a new population of recent

[7]To my knowledge, Peter Morrison (1978) was the first to coin this delightful "protective mantle of natural increase" metaphor.

immigrants and their descendants. But if the level and composition of the immigrant streams do not change, there will be no apparent change in either the size or the composition of the stationary population. The fact that one population is being replaced by another will hardly be noticeable, and it is therefore unlikely to arouse policy concerns.

A second circumstance is one in which a population, having had relatively little recent experience with migration, suddenly begins to experience immigration in substantial amounts. This situation approximates that of several western European countries today. A third case is one where a population has experienced immigration over a long period and then the source of the immigration suddenly changes. The United States provides an example because, following U.S. immigration reforms in 1965 that did away with country quotas, the countries sending immigrants to the United States shifted from Europe to Asia and Latin America.

In the second and third contexts, the fact of population replacement can be, and indeed is, a source of growing concern. Carlson (1986) believes there exists the potential for a backlash against immigrants in the United States. He cautions, "If [immigration and low fertility] continue over the next several decades, it is folly to assume that there will not be major political and cultural consequences. Among other things, conditions would be ripe for a latter-day wave of passionate, possibly ugly nativist and xenophobic reaction" (p. C2). An example from California lends support to Carlson's prediction. In a recent city council election in Monterey Park, a small Los Angeles suburb, three incumbent ethnic Americans—the nation's first female Chinese-American mayor and her two Latino colleagues—lost to three Anglos. According to news accounts, an immigrant backlash seems to have been a dominant factor. Two of the winners championed English as the official city and state language, and one of the victors was quoted as saying, "The American people, as friendly and as generous and as flexible as they are, have come to a point in the road where they want proof that their rights and their dreams are not all going to be replaced" (Mathews, 198 , p. A3).

Most of the reaction in West Germany has been muted. But in an exceptionally blunt document, referred to as the Heidelberg Manifesto, a group of fifteen prominent German professors in 1982 called for the repatriation of immigrants in West Germany:

> It is with grave concern that we observe the infiltration of the German nation by millionfold waves of foreigners and their families, the infiltration of our language, our culture, and our national characteristics by foreign influences . . . . The integration of large masses of non-German foreigners and the preservation of our nation thus cannot be achieved simultaneously; it will lead to the well-known ethnic catastrophes of multicultural societies . . . . For the Federal Republic of Germany, which is one of the most heavily populated countries of the world, the return of the foreigners to their native lands will provide ecological as well as social relief (Teitelbaum and Winter, 1985, pp. 176-178).

Reaction against immigrants has perhaps been most widespread in France where it became a political issue in the Parliamentary elections held in March 1986. Jean-Marie Le Pen, an outspoken candidate for the far-right National Front, blamed immigrants for taking away jobs and causing crime, and campaigned on the slogan "2 million immigrants equals 2 million unemployed" (Echikson, 1986, p. 13). Having scored only about 1 percent in public opinion polls a few years ago, the National Front received 9.7 percent of the vote in the Parliamentary elections and succeeded in moving the immigrant question to the top of the national agenda. In an interview, Le Pen was quoted as saying, "The problem for Europe is a question of survival as a civilization. If we do not reverse the current of immigration, we will be swept away" (Markham, 1986).

Similar accounts could be cited from other countries. But whether these stories refer to Asians in Canada, Caribbean blacks in Great Britain, or Surinamese in Holland, the theme is almost always the same. Increasingly, immigrants are the focus of tension and often the targets of abuse and violence. Many whites, fearful of becoming a minority in their own country, share Prime Minister Margaret Thatcher's concern about being "swamped" by outsiders (Markham, 1986). Fears arise not only because of the large volume of immigration and its contributio to population growth, but also because immigrants and their offspring often have fertility rates higher than those of the indigenous population. The fact that many of these newer immigrants are culturally and ethnically distinct from the native population also complicates policy alternatives (Teitelbaum and Winter, 1985).

The dilemma facing policy makers in developed countries with immigration and low fertility is clear. Because fertility rates are now at levels that are insufficient to replace these populations in the long run and because there is little hope that they will rise above replacement anytime soon, immigrants are needed for their contribution to demographic stability. At the same time, the public's dissatisfaction over the presence of a large and growing immigrant community swells as the proportion of total population growth attributable to immigration rises. It is for this reason that many writers appear reluctant to recommend an "immigration solution" to fears of population decline. Teitelbaum and Winter (1985), for example, conclude: "It seems doubtful, therefore, whether large-scale immigration can ever serve as a politically viable response to declining population over a considerable period of years, unless the immigrant streams are considered similar in character to the indigenous population" (p. 150).

If industrial democracies of the West want a solution to the demographic dilemma they face, then more attention must be paid to the character and tempo of immigrant adaptation and adjustment processes. It cannot be acceptable for minority immigrant populations to comprise an underclass existing "at the margins of white tolerance" (Markham, 1986). Barriers to more rapid immigrant adjustment must be removed and additional facilitators to immigrant adaptation must be found to speed the process of incorporating immigrants and their children into the mainstream of society.

Some countries are farther along than others in recognizing the importance of immigrant adjustment processes once immigrants have arrived in the host population, the impacts that immigrants have on host communities, and the actions that host communities can take to be more accommodating toward immigrants. In Sweden, for example, a new immigrant and minority policy enacted in the mid-1970s provides for equality between immigrants and the native population, cultural freedom of choice for immigrants and minorities, and a partnership between all communities. The 1972 Swedish Lessons Act requires employers to give every foreign national who does not know Swedish 240 hours of paid leave of absence to attend Swedish lessons, and employers are obligated to pay wages for the duration of these studies even if lessons take place outside normal working hours (Swedish Ministry of Labor, 1984). Finally, the fact that Sweden has a cabinet minister for Migration Affairs illustrates the importance Swedes attach to issues surrounding international migration.

By contrast, the United States has an immigration policy, but it lacks an immigrant policy. U.S. immigration policy consists in large measure of a simple gate-keeping function of determining who is and who is not eligible for entry. Once immigrants have been admitted, the federal government acts as though its responsibility to them has ended. Policies and programs to ease the adjustment of immigrants to their new surroundings are a missing component in the current debate over U.S. immigration reform.

References

Ahlburg, Dennis. 1983. "Good Times, Bad Times: A Study of the Future Path of U.S. Fertility." Social Biology 30:17-23.

Carlson, Allan C. 1985. "The 'Population' Question Returns." Persuasion at Work 8 (12, December):1-10.

_________. 1986. "Depopulation Bomb: The Withering of the Western World." Washington Post (April 13):C1-C2.

Coale, Ansley J. 1972. "Alternative Paths to a Stationary Population." In Charles F. Westoff and Robert Parke, Jr. (eds.), Demographic and Social Aspects of Population Growth, U.S. Commission on Population Growth and the American Future, Vol. I of Commission Research Reports. Washington, D.C.: U.S. Government Printing Office, pp. 589-603.

Easterlin, Richard A. 1980. Birth and Fortune: The Impact of Numbers on Personal Welfare. New York: Basic Books.

Echikson, William. 1986. "Gains for French Rightists: National Front's Campaign Blames Immigrants for Unemployment and Crime." Christian Science Monitor (March 12):13.

Economic Report of the President. 1986. Washington, D.C.: Government Printing Office.

Espenshade, Thomas J. 1984. "Comment on Mitra's Generalization." Demography 21:431-432.

Espenshade, Thomas J., Leon F. Bouvier, and W. Brian Arthur. 1982. "Immigration and the Stable Population Model." Demography 19:125-133.

Espenshade, Thomas J., and Gregory Campbell. 1977. "The Stable Equivalent Population, Age Composition, and Fisher's Reproductive Value Function." Demography 14:77-86.

Folbre, Nancy. 1983. "Of Patriarchy Born: The Political Economy of Fertility Decisions." Feminist Studies 9 (Summer):261-284.

Huber, Joan. 1980. "Will U.S. Fertility Decline Toward Zero?" Sociological Quarterly 21 (4, Autumn) 481-492.

Hyrenius, Hannes. 1959. "Population Growth and Replacement." In Philip M. Hauser and Otis Dudley Duncan (eds.), The Study of Population: An Inventory and Appraisal. Chicago, Illinois: The University of Chicago Press, pp. 472-485.

Keyfitz, Nathan. 1968. Introduction to the Mathematics of Population. Reading, Massachusetts: Addison-Wesley Publishing Company.

____________. 1977. Applied Mathematical Demography. New York, New York: John Wiley.

Kirkpatrick, Jeane. 1986. "We Need the Immigrants." Washington Post (June 30): All.

Lamm, Richard D., and Gary Imhoff. 1985. The Immigration Time Bomb. New York, New York: Truman Talley Books.

Lopez, Alvaro. 1960. Problems in Stable Population Theory, unpublished Ph.D. dissertation, Department of Mathematics, Princeton University, Princeton, New Jersey.

Markham, James M. 1986. "Minorities in Western Europe: Hearing 'Not Welcome' in Several Languages." New York Times (August 5).

Mathews, Jay. 1986. "Immigrant Dominance Spurring a Backlash." Washington Post (May 10):A3.

McIntosh, C. Alison. 1983. Population Policy in Western Europe: Responses to Low Fertility in France, Sweden, and West Germany. Armonk, New York: M. E. Sharpe.

Mitra, S. 1983. "Generalizations of the Immigration and the Stable Population Model." Demography 20:111-115.

Morrison, Peter A. 1978. "Emerging Public Concerns Over U.S. Population Movements in an Era of Slowing Growth." In Thomas J. Espenshade and William J. Serow (eds.), The Economic Consequences of Slowing Population Growth. New York, New York: Academic Press, pp. 225-246.

Pollard, John H. 1973. Mathematical Models for the Growth of Human Populations. New York, New York: Cambridge University Press.

Population Reference Bureau. 1986. World Population Data Sheet. Washington, D.C.

Rogers, Andrei. 1975. Introduction to Multiregional Mathematical Demography. New York, New York: John Wiley.

Sivamurthy, M. 1982. Growth and Structure of Human Population in the Presence of Migration. London: Academic Press.

Swedish Ministry of Labor. 1984. Swedish Immigration Policy. Stockholm.

Teitelbaum, Michael S., and Jay M. Winter. 1985. The Fear of Population Decline. Orlando, Florida: Academic Press.

Warren, Robert, and Ellen Percy Kraly. 1985. "The Elusive Exodus: Emigration From the United States." Population Trends and Public Policy (8, March). Washington, D. C.: Population Reference Bureau.

Wattenberg, Ben J., and Karl Zinsmeister. 1985. "A Speculation on the Geopolitical Implications of Below-replacement Fertility in the Western Democracies." Paper presented during the American Enterprise Institute Public Policy Week (December), Washington, D.C.

Westoff, Charles F. 1983. "Fertility Decline in the West: Causes and Prospects." Population and Development Review 9 (1, March):99-104.

July 1986

The Urban Institute

IMPACTS OF IMMIGRATION IN CALIFORNIA

Related Titles

de la Puente, Manuel, and Marc Bendick, Jr., "Employment and Training Programs for Migrant and Refugee Youth: Lessons from the United States Experience." The Urban Institute, August 1983.

Muller, Thomas, The Fourth Wave: California's Newest Immigrants, A Summary. Washington, D. C.: The Urban Institute Press, 1984.

Espenshade, Thomas J., and Tracy Ann Goodis, "Recent Immigrants to Los Angeles: Characteristics and Labor Market Impacts." Urban Institute Policy Discussion Paper PDS-85-1, May 1985.

Koss, Margo, and Harry Hatry, "Human Services Needs and Resources in Long Beach." Urban Institute report to the City of Long Beach, May 1985. Also available from City Manager's Office, City of Long Beach, California.

Manson, Donald M., Thomas J. Espenshade, and Thomas Muller, "Mexican Immigration to Southern California: Issues of Job Competition and Worker Mobility." Urban Institute Policy Discussion Paper PDS-85-2, August 1985.

Connor, Walker (ed.), Mexican-Americans in Comparative Perspective. Washington, D. C.: The Urban Institute Press, 1985.

Muller, Thomas, and Thomas J. Espenshade, The Fourth Wave: California's Newest Immigrants. Washington, D. C.: The Urban Institute Press, 1985.

de Leeuw, Frank, "The Economic Effects of Immigration: Specification of a Model." Urban Institute Policy Discussion Paper PDS-85-3, December 1985.

Taylor, J. Edward, "Selectivity of Undocumented Mexico-U.S. Migrants and Implications for U.S. Immigration Reform." Urban Institute Policy Discussion Paper PDS-85-4, December 1985.

Goodis, Tracy Ann, and Thomas J. Espenshade, "Immigration to Southern California: Fact and Fiction." Urban Institute Policy Discussion Paper PDS-86-1, May 1986.

Espenshade, Thomas J., "Why the United States Needs Immigrants." Urban Institute Policy Discussion Paper PDS-86-2, August 1986.

How To Inquire about Papers and Publications

For information about obtaining copies of Policy Discussion Papers and other Urban Institute papers, contact the Library/Information Clearinghouse,

The Urban Institute, 2100 M Street, N.W., Washington, D. C. 20037; telephone (202) 857-8688 or (202) 857-8687.

For information about obtaining copies of Urban Institute Press publications, contact The Urban Institute Press, P.O. Box 19958, Hampden Station, Baltimore, Maryland 21211; telephone (301) 338-6951.