NEGATIVE POPULATION GROWTH

THE NPG FORUM

How To Get There From Here:

The Demographic Route To Optimal Population Size

by Leon F. Bouvier

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Our "Love Affair" with Growth

During a recent episode of the popular TV game show, *Jeopardy,* the college-level participants were asked which country will "surpass China in population within the next century." Two of the three contestants properly identified India. The third replied "the United States." Such an answer from a Harvard student is surprising. But even more surprising was the comment of the host, Alex Trevek: "That is a noble thought but unfortunately it is incorrect."

In January 1989 the U.S. Census Bureau published a new set of population projections (U.S. Bureau of the Census, 1989). Its middle scenario projected an eventual decline in population starting fifty years from now. The "neo-doomsdayers," worried about population decline, jumped up in unison to sound the alarm. Journalist Ben Wattenberg, already on record as advocating more births to American women, commented in *US News and World Report* (1989) "The surest way to break the downward momentum of the projections is through more immigration. And only more immigration can provide the stream of 'instant adults' to deal with the looming problems in a timely manner." Economist Julian Simon, another supporter of higher fertility, has argued that immigration levels should be raised to perhaps 2 million annually (Washington Post, 1988). The media generally viewed the prospect of declining population quite gloomily—never mind that the so-called "middle range" scenario of the Census Bureau was in fact a rather low projection given current levels of fertility, mortality, and immigration. (Bouvier, 1989)

These two unrelated incidents point out the built-in bias for growth among many Americans. Texans proudly look forward to passing New York state in population, as Californians did in 1963. Chambers of Commerce hail the latest population estimates showing their metropolitan area to have climbed two places. Suburbanites are gleeful when their city's population surpasses that of the older central city in their metropolitan area. We have forgotten E.P. Schumacher's words that "Small is Beautiful." Rather, we have been convinced, particularly in the Reagan era, that "Growth is Good."

Such a turn of events is quite ironic. Twenty-five years ago most Americans who thought about population were concerned about explosive growth. The population of the United States was increasing at a rate we now associate with the Third World, one that would have yielded over 400 million inhabitants by 2050. Many felt that the United States was growing too fast. Mortality was low and immigration moderate, but fertility was high. Consequently, the goal of zero population growth gained wide acceptance. In the intervening quarter of a century the perceptions of many Americans has turned about. From its baby boom peak of 3.7 in 1957, the U.S. fertility fell below the level needed to replace the population and reached 1.8 in 1972. Baby boom had given way to baby bust. Even though the country has added 54 million people in the last two decades, a new and unfamiliar fear now troubles some Americans: population decline. Yet even the highly publicized "medium" projection of the Census Bureau shows a population of 292 million in 2080—some 40 million more than today's 248 million.

Interestingly, those agonizing about population decline and who advocate increased population growth seldom discuss the consequences of that growth. Alex Trevek is a thoughtful and intelligent individual. His comment on Jeopardy was on the spur of the moment. No doubt he would not advocate a United States population of over one billion people! Yet if our fertility reverted to that during the baby boom and if we did accept 2 million immigrants per year, the resulting 2 percent annual growth rate would yield 1 billion Americans well within the next century.

Even a more conservative set of assumptions yields a disturbing answer. **If life expectancy increased slightly, if fertility rose to a mere 2.2 live births per woman (rather than 1.8 today) and if net immigration was constant at 800,000 annually (close to current levels), the United States population would surpass half a billion in just 90 years—and still be growing fairly rapidly!**

It may be difficult for Americans to accept the fact that not all growth is beneficial. The small world of certain growth-oriented economists is just that—a small world that fails to take into account the dangers to the environment and to the quality of life of all Americans that will result from continued population growth. So, like it or not, and while we may disagree on the eventual ideal number, sooner or later, population growth must come to an end. Those advocating continued rapid growth concede privately that, eventually, growth must come to an end, perhaps at some astronomical number. Those advocating negative growth must also favor eventual stationarity at some level smaller than the current population—otherwise, the society would run out of people!

The Demographic Variables

Given agreement that growth must eventually come to an end, this begs the question: "How do we get from here to there?" We get there by manipulating the three demographic variables that account for all the changes in population size. These are fertility, migration, and mortality.

Slight variations in any single demographic variable can have considerable impact on eventual population size. For example, according to the Census Bureau projections, if immigration is 800,000 per year rather than 500,000 (while holding fertility and mortality constant) there will be 41 million more people by 2080.

A gradual increase of 7 years in life expectancy (holding immigration and fertility constant) means a difference of 25 million by 2080.

The impact of fertility is particularly powerful. A gradual 20 percent increase in fertility from 1.8 to 2.2 live births (holding immigration and mortality constant) means 128 million more people by 2080!

Furthermore, in 2080, in all instances the population would still be growing. Population momentum must thus be considered when looking at the three demographic variables. If an end to growth is desired, it cannot be achieved overnight. **There is a built-in momentum for growth in any young population.** A drop in the fertility rate does not necessarily mean that the **number** of births has fallen. The number of potential mothers is as important as the number of children each has. In the United States, for example, the **number** of births has climbed from 3.1 million in 1978 to 3.9 million in 1989 although the fertility rate has remained fairly constant at about 1.8 live births per woman. In the 1980s there were proportionately many women in their childbearing years—the baby boom babies had become potential mothers. Interestingly, a momentum for population decline is also possible. If American women were to average 1 child for the next generation, there would be very few women 25 to 30 years hence to have babies. If further population decline was not desirable at that time, these relatively few women would have to average at least 3 births for the population to stop falling. Thus momentum is an important concept to consider when trying to determine "how to get there from here."

Demographic Models

What do we mean by "there?" This can be both a number and a date. There is general consensus that population growth must end. Other writers in this series believe that it should stop at a lower level than present United States population. Demographers are supposed simply to give the facts: what are the results of different sorts of demographic behavior? Demographers are people too, and I confess to a certain sympathy with the view that eventual moderate population decline is desirable. However, my obligation is to demonstrate just how hard such a task will be, and how long it will take. To be realistic, we limit our horizon to the next 60 to 90 years—to the years 2050 and 2080. What combinations of fertility, mortality, and migration behavior patterns will get us from "here to there, whatever 'there' is?"

We begin by examining demographic mathematical models. These are not intended to serve as projections; rather, they illustrate what would occur under certain constant demographic conditions. Perhaps the best known of such models is the stable model developed by Dublin and Lotka early in this century. (Dublin and Lotka, 1925) Essentially, the model states that, in a closed population (that is, where there is no migration), a stable condition evolves if age-specific birth and death rates remain constant over a long period of time. A stable population exhibits a constant rate of growth and has constant birth and death rates. Note that a stable population can be growing, declining, or be stationary. Herein lies the reason why demographers never use the word "stability" to mean "no growth." That is reserved for the term "stationarity."

In 1982, the stable model theory was expanded to include migration: the open, stable model. (Espenshade, Bouvier, and Arthur, 1982) If age-specific birth and death rates are fixed, if fertility is below replacement, and if the yearly number of immigrants as well as their age and sex composition are constant, then that population will evolve in the long run to a stationary state with a constant size. In other words, as long as fertility is below replacement and the level of immigration is constant, zero population growth will eventually occur.

Such models, while not appropriate for real world projections, nevertheless point us in the right direction. This is particularly true for the United States which exhibits both below replacement fertility and net immigration. For example if the current fertility remained at 1.8 live births and if immigration were limited to 400,000 annually, the eventual stationary population of the United States would be about 120 million. However, it would take two or three centuries to approach this goal. We are more concerned with the 21st century. Using the demographic model as a guide, what demographic patterns are needed to attain our stated goal, whatever that may be?

The Projections

We first accept the fact that there is a momentum for growth in the current United States population. We then assume that life expectancy will increase in future years.

Admittedly gains in life expectancy contribute to additional growth and more aging of the population and

admittedly, life expectations could be depressed in the next 90 years by the environmental deterioration presently underway. Be that as it may, all of us, whether advocating massive increase or negative growth, favor extending the longevity of all Americans and we should plan on it. The United States rates near the bottom of the list of all developed nations on such measures as life expectancy and infant mortality. The rate among certain American minorities is particularly disturbing. One Census Bureau projection has life expectancy climbing gradually from 75 years today to 88 years in 2080. This is a mere 1½ years every decade—a reachable and desirable goal. In all further projections, such improvements in life expectancy are assumed.

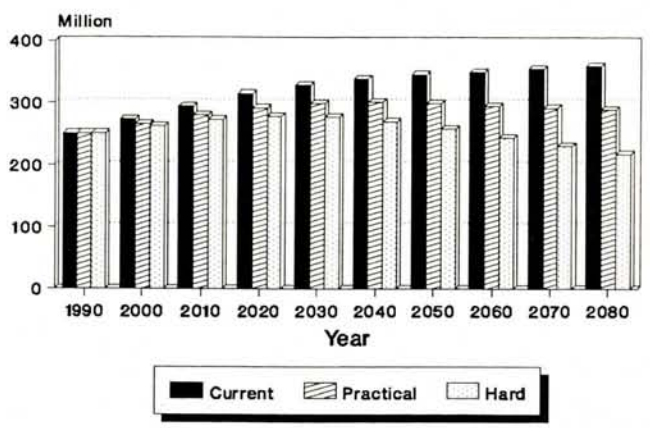
It remains for us to balance fertility and immigration. Fertility has been remarkably stable over the past 18 years. It fell to 1.8 live births per woman in 1972 and has remained at approximately that level ever since. Preliminary 1988 data indicate that the rate rose to 1.94. Similar increases have been observed in Sweden and West Germany. The fertility rate could rise in the future because of an increasing proportion of minorities in the population. Hispanics, in particular, have substantially higher fertility (about 2.8) than other groups. Gains in their share of the population could result in some increases in the nation's fertility.

Given these conditions, I feel it is unrealistic to project lower fertility in the United States for the immediate future. Americans could be encouraged to lower their fertility through more and better jobs for women, better and easier access to abortions, and wider availability of effective contraceptives. Much more could be done, through sex education, to lower the disturbingly high level of adolescent fertility. In a democratic society, specific fertility levels can never, nor should they, be enforced. However, a population policy encouraging lower fertility could prove effective.

Contrary to fertility, much can be done to determine the extent of immigration. Federal legislation limiting international movements, in one way or another, has been in effect in some form for over a century. Currently, about 650,000 legal immigrants enter the country annually. Additional hundreds of thousands enter illegally. We do not know the exact number, but conservative estimates put it at between 200,000 and 400,000. Nor do we know how many people leave the country in any given year. It could well be as high as 200,000. In balance, these figures suggest that annual net migration may be in the vicinity of 750,000 to 800,000.

ALTERNATIVE PROJECTION SCENARIOS

U.S. Population, 1990-2080



A continuation of such current demographic trends (that is, fertility of 1.8 and net immigration of 800,000) would yield a population of 346 million by 2050 and 360 million by 2080 according to the Census Bureau projections. At that time the population would still be growing by about 1 million per year (see graph). Growth would eventually come to an end, as indicated by the demographic model, but only in the very distant future. This is an example of how to get from "here to there" following current trends of demographic behavior. One hundred million more people in a mere 60 years is far too many for the nation to handle, if its quality of life and its infrastructure are to remain at least at current levels, much less improve. It is not an "optimal population."

The "Practical" Scenario: I think that a maximum population of 300 million with decline beginning well before 2080 is a practical and attainable goal. One of the Census Bureau's projections meets these requirements. Recall that life expectancy is assumed to increase to 88 years by 2080. When that mortality is combined **with fertility at about 1.8 and net migration of 300,000 per year, the population peaks at 300 million in 2040 and falls to 289 million by 2080.** Beyond that year, the population declines slowly, reaching stationarity at about 120 million some three centuries later. But let us not concern ourselves with the 22nd century any more than Americans of 1890 concerned themselves with our demographic problems!

The "Hard" Scenario: To those less patient with population growth, such a model may appear too high. Admittedly, adding 50 million Americans poses serious environmental problems.

Lowering fertility to 1.5 live births per woman, for example, is a possibility. Austria, West Germany, and Italy all exhibit rates below 1.5. Affluent Americans show similar fertility. It is the poor and the minorities who drive U.S. fertility up. Reductions in their fertility rates could result in an overall total fertility rate of 1.5 if government population policy encouraged such a change. With net migration reduced to 300,000, **the nation's population would still grow to 278 million in 2020 before falling to 218 million in 2080.** (See Graph) However, a majority of immigrants come from societies where fertility is high. With the resident American birth rate below replacement, the proportion of the nation's population who are minorities will increase. We have projected elsewhere that by 2060, it is likely that no racial/ethnic group will comprise a majority of the United States population. (Bouvier, forthcoming) Thus, for overall fertility to fall to 1.5, some substantial reductions in the fertility of native-born Americans will have to occur to compensate for the growing proportion of minorities in the population.

Very few Americans advocate ending immigration entirely. As a 'nation of immigrants,' it is doubtful if such a policy would be accepted by the American public. One possibility would be to take in only as many as leave the country in any given year. In other words, net migration of zero.* However, this would work only for as long as there was a residue of emigrants from earlier in- movements. At most, one immigrant in three leaves the United States. (The number of native-born Americans who emigrate is negligible.) Eventually, the number admitted would be extremely small if based on the number leaving. This would in effect end immigration.

If 100,000 are accepted, for example, 30,000 may leave. Thus, it seems to us that zero net immigration is not a viable option. However, lower levels than 300,000 might be considered.

*The Census Bureau has prepared selected projections of U.S. population asuming net migration of zero. With low fertility (TFR = 1.5) and life expectancy of 77.9 years, the population peaks at 255 million in 2010 and falls to 147 million by 2080. With moderate fertility (TFR = 1.8) and life expectancy of 81.2 years, the population peaks at 270 million in 2020 and falls to 220 million by 2080

The Demographic Quandary

For those of us who would prefer that eventual zero growth be either at current population levels or lower, certain problems present themselves. First, while increases in life expectancy are favored by all, they contribute to additional numbers as well as aging the society. Second, the built-in momentum for growth inherited from the baby boom means that some increases will occur. It would take drastic and unrealistic reductions in fertility to end growth immediately. Third, immigration could be ended but most Americans, being either immigrants or descendants thereof, would undoubtedly disapprove of such governmental policies.

Together these problem areas limit the range of possibilities to a narrow band of fertility and immigration options. Recalling the open stable model, if fertility remains below replacement, that is, below 2.1, and if some constant level of immigration is maintained, an eventual stationary population will emerge. However, the lower the fertility, the greater and more rapid the ethnic shift in the composition of the population. As long as the resident American fertility is below replacement, the residents and their descendants will eventually be replaced by the immigrants and their descendants.

That is the quandary facing Americans who desire an end to population growth in the near future. The other alternative is cultural amalgation where widespread intermarriage occurs between groups. How long it will take before a 'no majority' situation obtains depends on how low the fertility, how high the immigration, and the extent of intermarriage.

Demographic Behavior Reconsidered: The "population acts" of millions of Americans and immigrants to this nation have given us today's United States population. By population acts, we mean the fertility, mortality, and migration behavior of these millions of individuals. Today's and tomorrow's population acts will give us the population of 2000; of 2050; of 2080—not only the numbers of people but their age and ethnic composition. Advocating a specific ideal size necessarily means also considering the age and ethnic composition of that ideal. The "practical" scenario sees the population size reach 300 million before levelling off and then declining. The "hard" scenario sees population peaking at 278 million before falling.

Equally important is the fact that that population will be aging and be increasingly heterogenous. Aging and diversity are not problems to be avoided. Aging and diversity challenge the society to better adapt to these changing situations. **If the desire is to limit the size of the nation's population, then the demographic dynamics assure us both, increased age and diversity.** It is up to us to adapt to these shifts as we enter the 21st century.

Conclusion

There is little agreement as to what "optimal population" means and what numbers best reflect the optimum. We must be realistic in our efforts to determine what population size is achievable as opposed to optimal. Three, and only three, factors determine population size. One, mortality, is untouchable in that we all advocate increased longevity. A second, fertility, is in the hands of millions of American population actors. While fertility declines should be encouraged, nothing can be done in a democratic society to enforce those suggestions. That leaves immigration as the most maneuverable variable. Yet even here, there is doubt as to whether Americans would allow a total end to immigration. Thus, when trying to define what is an "optimal population," we are limited by these factors. We must also consider age and diversity almost as much as size. Finally, we should not get carried away with long-term models and projections. The next 50 to 90 years are sufficiently long-term, bearing in mind, of course, the potential for possible further exponential growth, to allow the development of specific demographic routes that will show us "how to get there from here."

Ending population growth and beginning population decline will be rough and it will be a slow process. If the problems described elsewhere in this series are as real and as serious as their authors believe, I suggest that we begin to concentrate on the demographic dimension of the problem. From the evidence described in this piece, it is clear that time is not on our side.

NOTES

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