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Zero Net International Migration: What Does It Really Mean?

Leon F. Bouvier, Dudley L. Poston Jr., and Nanbin Benjamin Zhai

[*Editor's Note: This piece is adapted from a paper prepared by the authors for the August 1995 meeting of the American Sociological Association.*]

Summary: The idea of “zero net migration” is gaining increasing currency. It has been assumed that if there is balance between the number of immigrants and emigrants, migration will have no impact on a country's population size. However, this article demonstrates that zero net migration is not necessarily the same as zero migration, and can result in a higher population than would have occurred without any migration at all.

Introduction: Along with natural increase (births minus deaths), net international migration determines the actual growth, or decline, in a nation's population. (In this paper, when we refer to “net migration,” we are referring to *international* migration.) Despite its importance, it remains a “step-child” in demography.¹ This is in large part due to the paucity of accurate international migration data — whether immigration or emigration. In addition, sources for calculating net migration rates are not complete — when they exist at all — as those for birth or death rates. An entire literature has emerged discussing the pros and cons of various denominators that should be used to determine migration rates.² For example, what is the population “at risk” of migrating? Technically, one could argue that it is the whole world less the intended area of destination. This is not the case with birth and death where the population “at risk” of giving birth or dying is obvious.

International migration has long been ignored when making country population projections. But with international migration becoming an increasingly important factor in determining population size, it should no longer be overlooked.

However, at the same time, an interesting development is occurring. While not ignoring migration, the term “zero net migration” is gaining increasing currency. It is admitted that migration is sufficiently large to merit notice; however if as many people leave as enter a country, then net migration becomes zero — and once again, it can be ignored.

This approach has been taken by two widely different groups: (1) those statistical organizations interested in simply illustrating the effects of net migration on population growth; and (2) advocacy groups concerned with eliminating migration as a contributor to population growth. It is our contention

in this paper that in both instances the arguments are incorrect. Zero net migration is not to be confused with no migration, something both these groups in fact do.³

The first group includes the U.S. Census Bureau, which in its series of reports on population projections, inevitably prepares at least one scenario that has what the Bureau refers to as “zero net migration.” This is used to demonstrate the impact of migration on population growth. By comparing the projected population of a scenario including migration with one assuming “zero net migration,” one can determine the actual contribution of migration to population growth. In its 1989 report, the Bureau prepared 27 scenarios, each with high, medium, and low assumptions for fertility, mortality, and migration. In addition, it prepared three scenarios with “zero net migration.”⁴ Similarly, the newest projections from the Census Bureau refer to “zero net migration” when they in fact mean no migration in or out of the country.⁵

The second group includes those who, in their efforts to develop demographic scenarios that could lead to an end to population growth, advocate what they refer to as “zero net migration.” For example, according to Washington, D.C.-based Population-Environment Balance (PEB), “the focus of an effective policy [to end population growth] should be enactment of an all-inclusive replacement level, legal immigration ceiling of 200,000, which is approximately the same number of people who voluntarily leave the U.S. every year....Replacement level immigration for the U.S., in conjunction with replacement level fertility, would result in the population stabilization that is essential to solving our worsening environmental, social and economic problems.”⁶

Well-meaning as these goals may be, the assumptions behind them are problematic. For one thing, no one really knows exactly how many people leave the country permanently every year. A few studies have been undertaken by experts at the Census Bureau and INS.⁷ These suggest that the number might be in the vicinity of 160,000 to 250,000 annually. It is also generally accepted that an overwhelming majority of emigrants were immigrants in the first place. Very few native-born Americans leave the country permanently.

These studies point out that only a certain proportion of immigrants eventually leave, presumably to return to their homeland. Some estimate that share to be about one-quarter; others think it may be as high as one-third. Currently, about 800,000 people enter the country legally every year and perhaps one-quarter (or 200,000) eventually leave.

If immigration is limited to 200,000 annually, it is unrealistic to assume that 200,000 will leave. Perhaps that many would depart for the first few decades — the result of previous high levels of immigration. But soon thereafter, it would be necessary for all those who enter the country to eventually depart permanently. Clearly, this is an unrealistic goal, at least for a receiving country such as the United States.

Nevertheless, true zero net migration is theoretically possible. Indeed, that has always been the intent behind temporary worker programs — whether in Europe or in the Middle East. Workers are allowed to enter the country for a specified period of time and then expected to return to their homelands.

Let us then assume that zero net migration can become reality even in a country like the United States. Does that mean that immigration will no longer contribute to our population growth? Unfortunately, for those whose goal it is to end such growth, the answer is “no.” Even with zero net migration, immigration can result in considerable population increases.

The Direct Impact of Zero Net Migration: First, we must bear in mind that immigrants are younger than emigrants, at least in receiving countries. Typically, these newcomers arrive in their twenties and early thirties; those who leave do so either fairly soon after their arrival or much later, when they reach

retirement. To simplify our illustration, let's assume they all enter at age 15-19 and leave at age 65-69. Thus they spend most of their lives in the U.S. — on average about 50 years. Yet, net migration is zero.

This brings up a problem that is endemic in demography — differentiating between period and cohort measures. Earlier we pointed out that while 200,000 people might leave the country as 200,000 entered, those departing represented an earlier much larger cohort of immigrants. As a period measure, which indicates the demographic behavior of a specific year, net migration is zero. But, in reality, a cohort measure would indicate that, in this example, perhaps 2 million immigrants entered the country over the past decade (that is, 200,000 annually).

This period-cohort dilemma is best exemplified when trying to measure fertility. This is perhaps the most frustrating challenge in demography. Technically, it is impossible to answer the question: “How many children are women having nowadays?” A period measure would look at the births in a given year and the number of women of reproductive age. But many of those women will have more offspring in the future. A cohort measure would look at the number of children born to women who have completed their reproductive years. But this would reflect the fertility of a decade or two in the past, not “nowadays.” Demographers compromise and rely on the total fertility rate — which is part period and part cohort.

The age-specific fertility rates for a stated year (period) are used and it is then assumed that women will have children at those rates as they go through their reproductive years (cohort). It is the best measure of fertility available, but it can be misleading. For example, it was widely claimed that during the baby boom, fertility (as measured by the total fertility rate) reached a peak of 3.7 births per woman in 1957. However, a look at the completed fertility of baby boom mothers indicates that the average was never higher than 3.2 births per woman.

Unfortunately no analogous measure exists that would allow us to calculate the cohort impact of immigration. However, the life table does serve as a surrogate.

To most people the life table indicates how many more years a person can expect to live, on average, given the age-specific death rates of a stated year. The life table thus has the same characteristics as the total fertility rate. It relies on the age-specific rates of a given year and assumes that people will go through their life cycle dying according to those rates. This is called a “current” life table. A so-called “generation” life table can also be constructed, but has little practical value except for historical purposes. In such life tables, the 100,000 births are actually followed through their true life cycle, dying at the appropriate age-specific rates.

The current life table has another, more abstract, purpose than determining how many more years an individual can expect to live. It tells us what a closed (that is, no migration) stationary (zero population growth) population would look like; its size, its age composition, its sex ratio. A life table stationary population assumes that 100,000 births as well 100,000 deaths occur every year. While the births all take place at the beginning of each year, the deaths occur at various times in the life cycle depending on the age-specific death rates. Using the death rates for the U.S., such a stationary population (with 100,000 births and deaths) would number about 7.5 million people. That stationary population has an equal number of births and deaths (as many people “enter” as “leave”), yet its population is not zero; it is 7.5 million.

Demographically speaking, immigration and births are the same. In both cases a new person

enters the social system, albeit at different ages. Likewise, emigration and deaths are the same. In both cases, a person leaves the social system, again at different ages.

If 200,000 people enter the United States at, say, age 15-19 and leave at 65-69, the total number of person-years spent in the country is 10 million minus the approximately 5 percent who die before reaching age 65. All “births” occur at age 15-19 and the population declines through deaths and eventually through the emigration (“deaths”) of the balance of the population that reaches 65-69.

We can turn to the generation life table to better illustrate the impact of zero net migration. Assume an uninhabited island. In year one, 200,000 individuals age 15-19 all of the same sex settle there. Another 200,000 come the following year, and so on. In year 50, when the earliest settlers reach age 65-69, they leave — 200,000, less those who died in the interim. By then the island population has reached 9,500,000 and will remain stationary from then on, because by then it will have reached true zero net migration. That is to say, 200,000 enter and 200,000 leave.

Questions on place of birth (that is, native or foreign born) in the census should yield approximations of the direct impact of zero net migration. For example, those who argue for zero net migration assume that it will not affect future population size. It follows that, according to their logic, the number of foreign born in the population in 2050, for example, would be very small, representing only those who came to the country prior to 2000 and survived to 2050. But a census in 2050 would, in fact, show that the number and share of foreign born would be surprisingly large. Indeed, the number should be the number from the life table reflecting the fact that these people who enter at age 15-19 and leave at age 65-69 spend fifty years in the United States (except of course for those who die in the interim).

From these examples, we conclude that zero net migration is far different from zero migration. We must not confuse the two, as the direct impact of zero net migration can be quite substantial.

The Indirect Impact of Zero Net Migration: Thus far we have assumed that 200,000 males 15-19 are the immigrants. Now let us assume that half the immigrants are female. Most women between 15-19 and 65-69 have children. Thus, even if these immigrants all emigrate in their old age, they still bequeath offspring to their temporary country of residence.

Special projections of the population of Germany have been prepared to illustrate this demographic phenomenon (see Table 1). First, we projected the population from 2000 to 2075 without any international migration whatsoever; no one enters and no one leaves. This is what demographers call

Year	No Migration	Zero Net Migra
2000	83,505	83,505
2010	83,540	83,679
2020	80,921	82,149
2030	76,448	79,765
2040	70,056	75,969
2050	62,640	71,644
2060	56,236	68,625
2070	50,326	66,196
2075	47,514	65,024

a “closed population.” We further assume that the current total fertility rate of 1.5 live births per woman remains constant for the entire 75-year period. From 83.5 million in 2000, the population would fall to 62.6 million in 2050 and 47.5 million in 2075. At that point in time, the rate of population growth would be -1.11 percent.

Now let us assume that each year 100,000 women aged 15-19 enter the country as immigrants and a similar number aged 65-69 leave — zero net migration. We further assume that they too have a total fertility rate of 1.5 births per woman. By 2050, the German population has fallen to 71.6 million (9 million higher than without the zero net migration), and by 2075, it totals 65 million (17.5 million higher).

Thus, the indirect impact of zero net migration on population growth is clear. In 2075, the population size is 17.5 million larger because of immigration — despite the fact that immigrant women are only having 1.5 live births on average!

Let us now speculate on what the impact would be on the United States population over the twenty-first century (see Table 2). We begin with the population for the year 2000, which we estimate will be about 279 million, and assume no migration whatsoever in the next century (Scenario A). Our next scenario (B) includes 200,000 people immigrating at ages 15-19 every year and 200,000 emigrating at ages 65-69 every year. Half of the immigrants and emigrants are females. Finally, we include a scenario (C) in which all emigration ends before the year 2000 but the immigration of those 15-19 begins in that year and remains constant thereafter. Only when these immigrants reach age 65 (beginning in 2050) does emigration begin. In all instances, the total fertility rate is kept constant at 1.8 births per woman — native born and foreign born. In all instances, life expectancy is 79.3 years — slightly higher for women and lower for men.

In scenario A, where there is no migration whatsoever, the population peaks at 306 million in 2025 and falls to 290 million by 2050. In passing, it is interesting to note that even with such low fertility and no migration, the United States' projected population in 2050 would be considerably larger than it is today. The return to current levels (255 million) is reached only in 2080 and by 2100 the population has fallen to 234 million.

In scenario B, the model espoused by some groups concerned about over-population, the population peaks at 312 million in 2030 and falls to 305 million by 2050, some 15 million more than if all migration — in or out — had ended before 2000. By 2100, the population has reached 272 million, 39

Year	Scenario A	Scenario B	Scenario C
2000	279,146	279,146	279,146
2010	293,237	293,833	295,637
2020	303,918	306,827	309,609
2030	306,000	312,326	315,462
2040	299,454	309,899	313,168
2050	289,713	304,844	308,167
2060	279,566	299,616	301,156
2070	267,981	292,720	293,291
2080	256,320	285,560	285,781
2090	245,531	279,162	279,250
2100	234,794	272,586	272,622

million more than Scenario A.

Scenario C is unrealistic, but is designed to offer a clear-cut demonstration of the real impact of zero net migration. It assumes that all emigration from earlier newcomers ends prior to 2000. Then a new surge of immigrants begins with the 200,000 individuals 15-19 who remain in the country until they reach 65-69 and then they all leave. The fertility rate remains the same as in Scenario B. Thus, after 2050, emigration of 200,000 every year for persons 65-69 begins to occur; that is to say, zero net migration after mid-century. By 2050, according to this scenario, the United States population would be 308 million. In 2100, it would be down to 273 million.

Somewhat surprisingly the difference in total numbers between Scenarios B and C is relatively small. By 2050, it amounts to about 4 million people. Bear in mind that those leaving the country under Scenario B are all 65 or over. While in Scenario C, no one emigrates at that age until after 2050, they “leave” quite rapidly through mortality.

Scenario C does not adequately reflect the cohort impact of immigration. Projections are period measures. Their purpose is to “count” all the people at a specified point in time. A better way to estimate the true direct impact of long-term immigration would be to count the number of foreign born in the projected population. While this cannot be done with current methods to develop projections, the data in our “life table” gives us some idea of the number of foreign born there would be in this hypothetical Scenario C population.

From these examples, whether Germany or the United States, whether indirect or direct, it is clear that zero net migration does not mean that immigration ceases to be a factor in population growth. To be sure, our assumptions about the age of the migrants is unreal and exaggerates the impact of zero net migration. On the other hand, it is unrealistic to assume that the fertility of the immigrants will be as low as that of the native-born women. This was done (as well as keeping mortality levels equal) to assure a pure comparison among the various scenarios.

When introducing the concept of zero net migration, the level of gross migration (that is, the number immigrating plus the number emigrating) must also be discussed. The extent of gross migration that results in zero net migration can affect the actual size of the future population of the country. If, indeed, the Census Bureau and others were actually discussing zero net immigration, then based on our observations in this report, the extent of gross migration is very important in determining the contribution of immigrants to the population of the receiving country. One million people entering even a large population like that of the United States at age 20 and leaving at age 65 will have a far greater impact on population size than 100,000.

Conclusion: We hope that this brief discussion of the peculiarities associated with zero net migration will contribute to a better understanding of its impact on population growth. We cannot assume that zero net migration results in a zero impact on population size. On the contrary, and depending on the fertility of the immigrants and the extent of gross migration, zero net migration has a rather strong upward impact on population size.

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Leon F. Bouvier is senior fellow and director of the Program on Immigration and Population Change in America at the Center for Immigration Studies in Washington, D.C., and adjunct professor of demography at Tulane University School of Public Health.

Dudley L. Poston Jr. is head of the Department of Sociology, and Samuel Rhea Gammon Professor of Liberal Arts, at Texas A&M University.

Nanbin Benjamin Zhai is a doctoral student in the Department of Sociology at Texas A&M University.

Notes

¹ Goldstein, Sidney, "Facets of Re-distribution: Research Challenges and Opportunities," *Demography*, vol. 13, no. 1 (February 1976), pp. 423-443.

² Shryock, Henry S., and Jacob S. Siegel, and Associates (condensed edition by Edward G. Stockwell), *The Methods and Materials of Demography* (New York: Academic Press Inc., 1976).

³ It could, of course, be argued that zero immigration and zero emigration result in zero net migration. However, it is generally understood that whenever the word "net" is used, it implies both pluses and minuses.

⁴ U.S. Bureau of the Census, Current Population reports, Series P-25, No. 1018, *Projections of the Population of the United States, by Age, Sex, and Race: 1988 to 2080*, by Gregory Spencer (Washington: Government Printing Office, 1989), p. 13.

⁵ U.S. Bureau of the Census, Current Population Reports, P-25, No. 1092, *Population Projections of the United States by Age, Sex, and Hispanic Origin: 1992 to 2050*, by Jennifer Cheeseman (Washington: Government Printing Office, 1993), p. xxiii.

⁶ *Balance Data*, Population-Environment Balance, Washington, D.C., August 1992, 3.

⁷ See, for example, Robert Warren and Jennifer Marks Peck, "Foreign-born Emigration from the United States: 1960 to 1970," *Demography*, vol. 17, no. 1 (February 1980).

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