

POPULATION DIVISION
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**Evaluating Components of International Migration:
Native Emigrants**

James C. Gibbs
Gregory S. Harper
Marc J. Rubin
Hyon B. Shin

Synopsis

On March 1, 2001, the U.S. Census Bureau issued the recommendation of the Executive Steering Committee for A.C.E. Policy (ESCAP) that the Census 2000 Redistricting Data not be adjusted based on the Accuracy and Coverage Evaluation (A.C.E.). By mid-October 2001, the Census Bureau had to recommend whether Census 2000 data should be adjusted for future uses, such as the census long form data products, post-censal population estimates, and demographic survey controls. In order to inform that decision, the ESCAP requested that further research be conducted.

Between March and September 2001, the Demographic Analysis-Population Estimates (DAPE) research project addressed the discrepancy between the demographic analysis data and the A.C.E. adjusted estimates of the population. Specifically, the research examined the historical levels of the components of population change to address the possibility that the 1990 Demographic Analysis understated the national population and assessed whether demographic analysis had not captured the full population growth between 1990 and 2000. Assumptions regarding the components of international migration (specifically, emigration, temporary migration, legal migration, and unauthorized migration) contain the largest uncertainty in the demographic analysis estimates. Therefore, evaluating the components of international migration was a critical activity in the DAPE project.

This report focuses on the evaluation of the assumptions about emigration of the native born used by the Census Bureau. From the 1970s through the 1980s, the Census Bureau estimated annual emigration of the native born at a constant level of 27,000. For the 1990 and 2000 decennial population census, the Census Bureau estimated annual emigration of the native born at a constant level of 48,000. The evaluation attempted -- unsuccessfully -- to replicate the approach taken to arrive at the 48,000 figure.

However, working with published data from population censuses and statistical reports of other countries, we were able to calculate a rough estimate of the net effect of the native born emigrant flow on the 2000 national resident population estimate. We compared the available data for dates as close to 1990 and 2000 as possible for 16 countries for which data were available. These 16 countries represented 58 percent of the American population abroad as measured by 2000 State Department data. We then applied 1990 U.S. survival rates to survive the populations of the 11 countries for which age distribution data were available. For those countries for which we did not have age distributions, we estimated the survived population by assuming a one-percent annual decrease in the Year 1 population. This was based on the experience of the countries for which we did have data.

The limitations on the available data make the estimate of the native born emigrant population questionable, but our research indicates that the magnitude of this population is small and likely to fluctuate over time. Our best estimate of the annual emigration of the native born is 18,000, or 180,000 for the 1990-2000 intercensal decade. Based on this estimate, we believe that the estimate of 480,000 native born emigrants for the 1990-2000 decade that was used in the 2000 national population estimate is too high by 300,000.

Background

Emigration from the United States is one of the most difficult components of migration to measure. There are only minimal identification checks for those leaving the United States, and there is no system - official or unofficial - to identify residents of the United States who emigrate. While demographic techniques have been developed by the Census Bureau and others to estimate the amount of emigration of the foreign born, emigration of the native born has been and remains, at best, a guess. From the 1970s through the 1980s, the Census Bureau estimated annual emigration of the native born at a constant level of 27,000. For the 1990 and 2000 decennial population census, the Census Bureau estimated annual emigration of the native born at a constant level of 48,000.

The methodology and procedures used to arrive at the 48,000 figure are described in *Estimation of the Annual Emigration of U.S. Born Persons by Using Foreign Censuses and Selected Administrative Data: Circa 1980*, Population Division Technical Working Paper 10, prepared by Edward W. Fernandez in January 1995. Fernandez' work, both Technical Working Paper 10 and various background memoranda and other documents prepared by him, were the point of departure for the work completed by Team 7.

Fernandez' opinion was that the analytical demography used to estimate emigration of the foreign born was not adequate to estimate emigration of the native born. Instead, he used analytical methods applied to information derived from administrative records. To briefly summarize the technique used by Fernandez,

“I applied the Intercensal cohort survival techniques to the two latest censuses of a selected number of foreign countries which had enumerated U.S. residents by birth. In addition, I used State Department information on U.S. citizens registering at U.S. posts abroad (e.g., Consulates, Embassies, etc.). By combining these two methods and making some basic assumptions, I was able to estimate the net annual emigration of U.S. born persons by age, sex, and race.”

Fernandez noted that Technical Working Paper 10 was exploratory in nature, and the document is replete with caveats concerning the quality of the data with which he was working and the limits of his analysis. Still, in the absence of any more detailed analysis, his figure of 48,000 U.S. born emigrants annually was used as the component of native emigration for the population estimates during the 1990s and in the preliminary demographic analysis estimate produced in March.

The objectives of Team 7 were to answer the following questions:

- Could the results of the 1990 demographic analysis be replicated?
- Could the methodology utilized by Fernandez be replicated?
- Does the 1990 - 2000 estimate of emigration of the native born (480,000) appear reasonable?
- How does the 1990 - 2000 estimate change based upon current demographic analysis and current data?
- Are there changes in procedures and methodologies that we would suggest for

the future, that is, to be implemented for the period 2000 - 2010?

These questions are addressed in the following sections of the report, dealing respectively with methods, limits of the data and analysis, results, and suggestions for future estimates.

Methods

Fernandez' methodology started with Department of State records concerning the number of U.S. persons living abroad. Unfortunately, his documentation doesn't make clear with whom he spoke, or what precise data he obtained from the State Department. Team 7 met with officials from both the Consular Section and the Operations Center at the Department of State. The Consular Section personnel, while not providing any raw data, were extremely helpful in explaining the voluntary registration system employed by the 166 U.S. Consulates worldwide.

Operations Center personnel provided information from 1999 and 2000 on the number of persons registering as Americans at the 166 Consulates. This information, which is contained in the body of an annual reporting cable - called the F-77 - from the Consulate to the State Department in Washington, is interesting, but can hardly be considered definitive.

The second phase of Fernandez' work involved consulting the published census volumes of selected countries that report on U.S. emigrants (taken by Team 7 to mean published data on the U.S.-born population). Fernandez used the University of Texas library in this phase. Team 7 used the resource collection of foreign censuses and other statistical materials maintained by the International Programs Center. Fernandez' only specific reference to his census sources is "*Censuses of Foreign Countries: 1965 to 1985*" and presumably Team 7 consulted many of the same sources.

However, when Team 7 turned to the IPC resource collection, there was not a single instance in which we could validate a country figure reported by Fernandez. This was due principally to the vague nature of his bibliographic references. We therefore were forced to improvise by using whatever sources we could find, and hope that the dates and definitions contained therein were compatible. Table 1 lists all of the direct comparisons that could be made. While "Germany 1980" and "Japan 1980" produce nearly identical figures for the US State-DAPE Team 7 comparison, only "Argentina 1980" (9,785 vs. 11,667) is close when the relevant Fernandez estimate is measured against the estimate of DAPE Team 7.

Table 1. Estimates of U.S. Born Persons in Selected Countries at Specified Dates Based on Registrations of U.S. Residents at U.S. Posts Abroad, by Sex: 1970 & 1980

Country	U.S. State Department	Fernandez I	Fernandez II	DAPE Team 7
Argentina				
1970	5,825	9,708	4,854	
1980	7,000	11,667	5,833	9,785
Austria				
1970	5,235	8,725	4,363	(1/1/71) 4,422
1980	10,168	16,947	8,473	
Germany				
1970	59,927	99,878	49,939	56,393
1980	75,956	126,593	63,297	77,436
Greece				
1970	28,532	47,553	23,777	(1/1/71) 20,756
1980	46,000	76,664	38,333	
Italy				
1970	60,886	101,477	50,738	
1980	69,161	115,268	57,634	(10/25/81) 18,546
Japan				
1970	20,680	34,467	17,233	19,045
1980	22,532	37,553	18,777	22,401
Norway				
1970	7,596	12,660	6,330	(1/1/71) 7,010
1980	15,500	25,833	12,917	(1/1/81) 10,680
Philippines				
1970	25,195	41,992	20,996	(1971) 9,951
1980	55,500	92,500	46,250	(1978) 8,353
Spain				
1970	23,708	39,513	19,757	
1980	34,754	57,923	28,962	(1981) 5,883
Thailand				
1970	9,039	15,065	7,533	
1980	5,732	9,553	4,777	2,250

Sources: US State: US State Department estimate (Technical Working Paper 10)
 Fernandez I: State Department estimate inflated by 60 percent to reflect fact that perhaps 40 percent of all Americans abroad fail to register. (Technical Working Paper 10, p.4.)
 Fernandez II: Fernandez I estimate deflated by half to capture US born among all U.S. citizen registrants (Technical Working Paper 10, p.4)
 DAPE: various census volumes and statistical abstracts in IPC resource collection

Note: For our purposes, the most relevant comparison is Fernandez I to DAPE Team 7, since most of our European data are by country of citizenship not birth. Nevertheless, the Fernandez I figure is still a flawed comparator since it probably includes businessmen on temporary travel, while DAPE Team 7 does not.

As mentioned earlier, the State Department provided us with an electronic version of its worldwide internal tracking report (the F-77) for 1999 and 2000. From this, we were able to extract a table that summarized a plausible estimate of the number of registered Americans living abroad by Consulate. In many case, Consulates also provided information on the likely numbers of unregistered Americans and Americans of dual citizenship. In 1999 and 2000, the only two years for which data are available, there were approximately 3.4 million Americans overseas, excluding tourists and federally affiliated personnel (See Appendix 1). With only two data points, this data set had too few

observations to support a robust statistical trend analysis of stocks or flows. However, it was useful to estimate the comparative level of U.S. citizens living in other countries. That is, the countries containing the majority of U.S. citizens in the State Department count can reasonably be expected to contain the majority of U.S. emigrants. The 26 countries that contained approximately 85 percent of the total population of Americans living abroad, according to State Department data, were the countries for which we attempted to locate information from the IPC resource collection as well as other sources.

Since we were unable to replicate Fernandez' baseline data, we abandoned any effort to reproduce the results of his initial model. Nevertheless, we felt it was premature to abandon his methodology altogether at this point since we were still compiling our own database for the years after 1980. We could not determine in advance what type of modeling activity it would ultimately support. This data effort is now complete, and we are in a position to make a determination on methodology.

Although we used the cohort survival method to create an estimate of native born emigration, the lack of timely data including age distributions for many countries makes this estimate problematic. We had recent data (past 1995) for only 16 countries and age distribution data for only 11. We assumed that the proportion of the native born emigrant population was proportionate to the American population living abroad as identified in the State Department F-77 data. A review of the available data shows that the native born emigrant population is fluid. What we are attempting to measure is not simply the gross outflow of native born Americans to other countries but the net effect of native born Americans leaving the United States versus those returning to the United States from abroad. The flow of this population is likely influenced by a variety of unpredictable economic and political factors and for some countries there will be a net negative flow of U.S. native born (that is, more people departing than arriving).

Limits of the Data and Analysis

The data compiled by the Consulates, which are designed to be useful to identify citizens in the case of an emergency evacuation, are severely limited for our purposes. Not only is the registration system completely voluntary, but also:

1. There is no independent confirmation that the people who register are, in fact, U.S. citizens,
2. The registration system apparently is conducted independently with only minimal documentation and oversight in the 166 Consulates (that is, no guarantee of comparability of data),
3. The registration system most likely obtains information on short-term U.S. visitors to a country as well as long-term residents,
4. The registration system includes people of dual citizenship, meaning many people who have never lived permanently in the United States and may have no intention of returning to or ever living in the United States

A more serious concern from our standpoint was the apparent absence of historical records and institutional memory on the part of the State Department. It wasn't clear how long the annual reporting system had been in place, what the specific source of Fernandez'

information was, or if historical records were maintained in any form or for any period of time (1999 and 2000 were the only years available from the Operations Center at the time of our discussions with State). There was simply no way to retrieve the registration numbers for 1970-1980 used in Technical Working Paper 10.

The data set that we produced from the various home country statistical offices, which covers roughly 85 percent of the likely emigrant population, is likewise deficient from a modeling perspective. Comparability is an overriding issue since different countries employ different definitions and methods for purposes of determining their foreign born population. The census figures are based on actual enumeration at known locations at given points in time. Other official data are derived from registrations with the relevant civil authorities as required by local law, or estimates. Neither of these country-based estimates is likely to coincide with the State Department figures since the former are apt to be mandated legally at some date shortly after the beginning of residency or at the time the census is taken. The latter are a voluntary action with no time limitation. Inspecting the figures in Appendix 2 reveals that, despite its breadth of coverage, much of the data matrix is empty. Of the 2632 cells, only 673 had observations.¹ Again, a thorough statistical trend analysis of stocks is impeded by a lack of information. Over the 30 year period covered by the table, 40 of the 94 variable record entries (covering country totals, males and females) had fewer than 5 yearly observations, while thirty-two had fewer than 3.

The implication is that for over one-third of the variable records, the data are insufficient to do statistical testing, and such testing was not done by Team 7. More specifically, for 32 individual countries, simple trend line analysis (with slope and intercept parameters) is not feasible since one needs at least three data points to get the first degree of freedom for conducting tests of statistical significance. The problem of too few observations can be avoided to some extent if data are pooled across countries. But to get these additional data points, one has to sacrifice constancy in the composition of the sample at each point in time. This, in turn, confounds the interpretation of the growth rate. The problems are even more daunting if one is interested in capturing the data patterns with ARIMA (Auto Regressive Integrated Moving Average) models. Our impression of the existing data suggests that the series move erratically. Without more pattern stability, we doubt that Fernandez' method of calculating the growth rate of the stock between the 1970 and 1980 data points can adequately represent the annual rate of increase in emigration in the post 1980 period.

Results

There are two major problems with using the current method to measure native born emigration. First, it is unlikely that the data on U.S. citizens living abroad accurately represents the native born emigrant population. The second problem is that there is little

¹ Figures reported are limited to totals, with breakouts by gender where available. Additional data on the distribution of emigrants by age are also available for many of the included countries, but are not reproduced here.

reason to believe that past trends are reliable indicators of present emigration levels. The severity of these problems suggests that the use of this method for estimating native born emigration is not well supported.

Table 2 illustrates the problem of using the current method to estimate native born emigration. Canada is used as an example because it is home to a relatively large population of Americans, and it has available historical data. These data indicate that the American-born Canadian resident population fluctuates over time and suggest that many of those who immigrate to Canada later return to the United States. The change in these counts for any given ten-year period cannot be used as an accurate indicator of the change for the following ten-year period.

Table 2. Number of American-born Canadian Residents: 1921-1996

Year	Number
1921	374,022
1931	344,574
1941	312,473
1951	282,010
1961	283,908
1971	309,640
1981	312,015
1986	282,025
1991	249,075
1996	244,690

Source: 1961: Dominion Bureau of Statistics. *1961 Census of Canada*. For years 1921-1961.
 1971: Statistics Canada. *1971 Census of Canada*.
 1981: _____. *Population: Place of birth, citizenship, period of immigration*.
 1986: _____. *Population and Dwelling Characteristics, Ethnicity, Immigration and Citizenship, The Nation*.
 1991: _____. *Immigration and Citizenship: The Nation*.
 1996: _____. *Immigration population by place of birth, 1996 Census*.

Table 3 shows similar data for the countries that we identified as having relatively large American citizen populations and for which data were available.

Table 3. Native-born Emigrants to Selected Countries

Country	(Year1 Year2)	Year 1 (1)	Year 2 (2)	Difference (1) - (2) = (3)	Yearly Difference* (4)
Argentina ¹	(1981 1991)	9,767	9,755	-12	-1
Australia²	(1994 1999)	50,200	59,700	9,500	1,900
Austria ³	(1981 1991)	4,171	5,770	1,599	160
Belgium^{3,4,**}	(1991 1999)	11,704	12,394	690	86
Brazil ⁵	(1982 1991)	13,803	11,363	-2,440	-244
Canada^{1,6}	(1986 1996)	282,025	244,690	-37,335	-3,734
France ^{1,3,4}	(1982 1990)	18,800	24,200	5,400	675
Germany^{1,3,4,**}	(1991 1998)	92,700	110,105	17,405	2,486
Great Britain^{1,3,4,**}	(1991 1997)	143,484	110,000	-33,484	-5,581
Greece^{3,4,**}	(1991 1998)	15,070	15,245	1,318	188
Guatemala ⁵	(1981 1994)	3,764	5,658	1,894	146
Ireland^{3,4}	(1992 1998)	9,200	10,000	800	133
Israel¹	(1990 1997)	NA	NA	12,925	1,846
Italy^{3,4}	(1991 1998)	18,604	18,113	-491	-70
Japan⁷	(1990 1995)	33,317	38,954	5,637	1,127
Mexico ¹	(1980 1990)	157,117	194,619	37,502	3,750
Netherlands^{3,4,**}	(1991 1999)	11,418	13,389	1,971	246
Norway^{3,4,**}	(1991 1999)	9,537	8,596	-360	-120
Peru ⁵	(1981 1993)	6,783	5,595	-1,188	-99
Philippines ^{1,8}	(1978 1990)	8,353	19,529	11,176	931
Portugal^{3,4,**}	(1992 1999)	7,210	8,065	855	122
Spain^{1,3,4}	(1991 1999)	14,776	15,563	787	98
Sweden^{3,4,**}	(1991 1999)	7,970	9,515	1,545	193
Switzerland^{3,4,**}	(1993 1999)	11,864	13,213	1,349	225
Thailand ⁹	(1981 1990)	2,454	2,282	-172	-19
Venezuela ¹	(1980 1990)	13,027	10,716	-2,311	-231

Source: 1 Individual censuses from each country
2 Australia Bureau Staff
3 COE: Council of Europe
4 Eurostat
5 Boletin Demografico No. 65, January 2000.
6 Stat Canada
7 Japan Statistics Bureau
8 National Economic and Development Authority
9 Thailand National Statistics Office

* Due to the different years available for each country, the yearly difference is the total in Column (3) divided by the change in the number of years (Year2 - Year1)

** Data for this country include estimates of the population of American citizens not native born Americans

The sources for Table 3 are numerous. They range from foreign census counts to estimates from statistical agencies. Although we attempted to obtain data for 1990 and 2000 for all countries, our choices for the Year 1 and Year 2 were limited by the available data.

Because the data in Table 3 cover inconsistent time periods (with no data at all available for 2000 and data after 1995 available only for 16 of the 26 countries listed), it is not possible to use these data to produce a reliable estimate of the U.S. native born emigrant population. The number in the "Yearly Difference" column offers only an indication of the magnitude of native born emigration.

To arrive at an annual estimate of the native born emigrant population, we confined our analysis to the 16 countries for which we have data after 1995 (Table 4.). We applied 1991 U.S. survival rates to survive the populations of the 11 countries for which age distribution data were available. For those countries for which we did not have age distributions, we estimated the survived population by assuming a 1 percent annual decrease in the Year 1 population. The total estimated emigration for the 16 countries for which we had data past 1995 is 9,851. The 16 countries in Table 4 contained 58 percent of the American population abroad as measured by the 2000 State Department data. If we assume the same proportion for the native born emigrant population, we would arrive at an annual native born emigration estimate of 16,984.

Table 4. Calculation of Native Born Emigration

Country	(Year1 Year2)	Estimated Survived Year 1 Population	Year 2 Population	Difference	Annual Emigration Estimate
Australia	(1994 1999)	47,690	59,700	12,010	2,402
Belgium *	(1991 1999)	10,874	12,394	1,520	190
Canada *	(1986 1996)	217,794	244,690	26,896	2,690
Germany *	(1991 1998)	84,467	110,105	25,638	3,663
Great Britain *	(1991 1997)	135,702	110,000	-25,702	-4,284
Greece *	(1994 1998)	14,549	15,245	696	174
Ireland	(1992 1998)	8,648	10,000	1,352	225
Israel	(1990 1997)	NA	NA	12,925	1,846
Italy	(1991 1998)	17,302	18,113	811	116
Japan *	(1990 1995)	32,160	38,954	6,794	1,359
Netherlands *	(1991 1999)	10,652	13,389	2,737	342
Norway *	(1991 1999)	8,274	8,596	322	40
Portugal *	(1992 1999)	6,631	8,065	1,434	205
Spain	(1991 1999)	13,594	15,563	1,969	246
Sweden *	(1991 1999)	7,352	9,515	2,163	270
Switzerland *	(1991 1999)	11,009	13,213	2,204	367
Total					9,851

* Indicates countries with age data

However, the limitations on the available data make our estimate of the native born emigrant population questionable. The estimates used for many countries are not of American born residents but of American citizens. The quality of both the estimates of the total population and the age distribution data are inconsistent. The 1997 estimate for Great Britain, in particular, seems unreasonable when compared to data from other countries and a more consistent number for Great Britain would tend to increase the total estimate. The age and sex distributions for countries such as Japan and Germany seem to indicate that these populations may be comprised largely of workers who may be in the country for only a few years, thus making an estimate derived using the cohort survival technique of dubious value. The lack of recent data from Mexico and Central and South American countries is troubling because of the possibility that trends for these countries could be substantially different than trends for the countries for which data are available (predominantly European). Given these questions it is not possible to produce a reliable estimate of the native born emigrant population from the available data. However, given these caveats, we believe that the annual number of native born emigrants is probably between 10,000 and 25,000. Our best estimate of the annual native born emigrant

population is 18,000 (approximately the mid point of the range 10,000 to 25,000), making the estimate of 48,000 for the annual native born emigrant population used to produce the 2000 national population estimate too high by 30,000 (or 300,000 for the 1990-2000 intercensal decade).

Suggestions for the Future

We have several suggestions on how to more accurately measure emigrants:

Use survey methodology, namely the American Community Survey (ACS).

This suggestion stems from an article written by Karen Woodrow-Lafield (1996) which used the Current Population Survey (CPS) in July 1987, June 1988, and November 1989 to ask questions on emigration. The survey asked immediate relatives if they had parents, siblings or children living in a foreign country who had previously lived in the United States. Our suggestion to use the ACS instead of the CPS is due to the larger sample size available on the ACS. Since the Census Bureau had previously asked questions regarding emigration, it is not unreasonable to think that this can be used as a valuable tool for future estimates.

Arrange to receive annual updates of the U.S. State Department's F-77s.

As we have learned through working with the State Department, they do not archive their data of Americans who register with Consular Offices. Therefore, if we wish to use the State Department records, we will need to receive the F-77s on a yearly basis. The State Department was forthcoming in sharing their data, so this is a viable option. The limitations of using the State Department numbers, however, make it an unreliable source. This is mainly due to the State Department numbers being unable to distinguish between native- and foreign-born emigrants. They can be utilized, however, as a valuable tool for comparisons with other data that are obtained.

Maintain and enhance contacts with the statistical agencies of foreign countries and receive their annual updates of Americans living in their country.

A significant amount of our data came from publications from statistical agencies throughout the world. Through close communication with those agencies, we would be able to obtain whatever data they produce, not merely the data they choose to publish.

These suggestions are not mutually exclusive and can be used in conjunction with each other.

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**APPENDIX 3: DAPE WORKING PAPER SERIES
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