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Producing migration data using household surveys and other sources

Update on the Suitland Working Group Project on Reviewing Methods for Estimating Emigration

Note by United States Census Bureau¹

I. Introduction

The Suitland Working Group is a task force that was organized in 2008 under the framework of the Conference of European Statisticians (CES) Work Plan on Improving International Migration Statistics. In 2009, the Suitland Working Group held a meeting titled *Using Household Surveys to Measure Migration and the Size, Distribution, and Characteristics of Migrant Populations* at the U.S. Census Bureau Headquarters in Suitland, Maryland, outside of Washington D.C. Several projects were proposed during the conference to improve household survey data on migration specifically and international migration statistics in general. One of these projects was to produce a single source, such as a handbook, describing and synthesizing the methods used to estimate emigration. While this project is still ongoing, a draft report titled *A Review of Methods for Estimating Emigration* is forthcoming.

The report was produced by experts in the Population Division of the U.S. Census Bureau working in collaboration with researchers from academic institutions and statistical agencies in Austria, Canada, Italy, Lithuania, Lebanon, Mexico, Spain, and the United States. A major goal of the project was to conduct a thorough search of the published literature on estimating emigration in various languages. Literature searches were conducted in the following languages: Arabic, English, French, German, Italian, Spanish,

¹ Coordinated by Eric Jensen. This paper is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau not necessarily those of the U.S. Census Bureau.

and Russian. Analysts fluent in the specific language reviewed the reference, summarized the methodological approach used in the reference, and provided an analysis of the strengths and limitations of the methodology.

This paper provides a brief summary of the forthcoming report, focusing on the types of data and methodological approaches used to estimate emigration. The specific data sources include population registers, migration surveys, and special household surveys. The methodological approaches include the residual method, panel data attrition methods, indirect estimation, and the multiplicity sampling method. In addition to summarizing the methods for estimating emigration, the strengths and limitations of each method are included. The full reference list from the report is also included in this paper. The project is ongoing and comments or feedback are being solicited. Please send questions or comments to Eric.B.Jensen@Census.Gov.

II. Report Summary

International migration statistics measure the movement of people across national borders and often comprise estimates of immigration (migration into a country) and emigration (migration from a country). Developing high quality estimates of international migration flows is essential for producing accurate population estimates. Emigration is one of the most difficult components of population change to estimate for several reasons. First, because the emigrant population is not resident in the country, it cannot be measured directly using censuses or surveys. In addition, both the native and foreign-born populations are at risk of emigrating. Finally, there are generally few mechanisms for ensuring that administrative data sources are updated when a person moves abroad.

Despite the difficulties with estimating emigration, researchers and national statistical agencies have used a variety of data and techniques in an effort to produce timely and accurate statistics. These include population registers, migration surveys, residual methods, panel data attrition methods, indirect estimation, and the multiplicity sampling method. However, the literature describing the use of these data and techniques for estimating emigration is relatively sparse and difficult to find. In addition, foreign language translations of key research are often unavailable, limiting the access of this information to an international audience.

The forthcoming report presents the results of an extensive literature search of published methods for estimating emigration that was conducted in several languages. It also describes and synthesizes the methods to determine the strengths and limitations of each methodology. Finally, the report provides references for original documents in English, French, German, Italian, and Spanish. The report is divided into sections based on the type of data or common methodological approach. The following sections summarize the methods included in the full report.

Population Registers

Population registers provide data that can be used to estimate native and foreign-born emigration (Cantisani and Greco 2006; Salvisberg and Heininger 2007). Population registers are official lists or databases maintained by governments to record vital events such as births, deaths, and marriages; demographic characteristics such as age, sex, place of birth, and nativity; and in some countries socioeconomic characteristics such as employment status and educational attainment. Migration events, both domestic and international, are recorded as new registrations or de-registrations from the local register. Emigration estimates are produced using periodic reports of individual-level or aggregated data that are submitted to the national statistical office (Poulain et al. 2006).

Population registers are a useful source of data for estimating emigration. Depending on their level of centralization and linkage with other administrative or statistical sources, population registers provide extensive information about the size and characteristics of the emigrant population. Also, registers are much more current than surveys and censuses which allows for estimates to be produced on an annual or even quarterly basis.

There are also challenges to using data from population registers to estimate emigration. In countries without centralized population registers, there can often be considerable variation in the quality of data that central offices receive from individual municipalities. Coverage of the population register and differential coverage for certain groups, such as migrants leaving without their family and undocumented migrants, can bias estimates produced using registers. It is especially important for data from population registers to be up to date. If there is a significant time lag between changes in residence and when the register is updated, emigration will be underestimated. The most significant limitations to using population registers for estimating emigration is that emigrants often fail to have themselves de-registered from the population register in the origin municipality. This will also produce an underestimate of emigration.

Migration Surveys

Estimates of emigration can be made using special surveys of migrants (Silvestrini and Cariani 2005). These include both household surveys that ask retrospectively about changes in the country of residence of respondents and household members and port surveys that ask travelers about their intentions to change their country of residence (Rendall, Tomassini and Elliot 2003). In the report, the International Passenger Survey (IPS)—a port survey conducted in the United Kingdom—and the Survey of Migration at the North Border of Mexico (EMIF-North)—a migration-specific household survey conducted in Mexico—are reviewed as examples of migration surveys used to estimate emigration.

The overall strength of migration surveys is that they provide much more specific data on international migration than general household surveys or censuses. Migration surveys have the potential to be more current than censuses and, therefore, may capture new or emerging trends. Because migration surveys often sample respondents throughout the year, they can measure seasonal variations in emigration.

There are limitations to using migration surveys to measure emigration. Migration surveys can be very expensive and time consuming. National statistical agencies may not have the available resources to regularly conduct migration surveys. Emigration is a rare event, and even within the sample of passenger surveys, the number of people moving abroad is quite small and these estimates are often prone to error (Zaba 1985). Migration surveys are also limited by coverage error, or the under-representation of the full population in the sample.

Residual Method

The residual method is a commonly used technique for estimating emigration (Ahmed and Robinson 1994; Warren and Peck 1980). The method is based on the interrelationships between the demographic processes that cause population change, or the population balancing equation. The basic approach of this method is to survive estimates of the population from the first census (along with estimates of immigration during the intercensal time period) forward to the next census and then subtract the enumerated or actual population from the survived or expected population to produce a residual estimate of emigration. Because emigration of the native population is usually a rare event, this approach is mainly used to estimate the emigration of the foreign-born population.

However, the residual method can also be used to estimate native emigration using data from other countries—the foreign-census method—which is also presented in the report.

In general, the residual method is fairly straightforward and easy to apply. Emigration is often calculated using data from censuses, household surveys, or vital registration systems, which are readily available for most countries. Also, the methodology can be used to produce emigration rates by selected demographic characteristics including sex and broad age groups. In addition, residual methods can be adapted to measure specific period of entry cohorts that entered before the first observation, which eliminates the need to estimate new immigration during the interval, thus reducing the data requirements and complexity of the model (Ahmed and Robinson 1994).

There are limitations inherent in the residual method. The first is that the method is especially prone to errors in the residual term, and if these errors are not accounted for, then the method produces inaccurate estimates of emigration. Also, if the life tables or survival rates are not available by nativity, the emigration estimates could be biased if there are significant mortality differentials between the native and foreign-born populations. A second limitation of the residual method is that the estimates are not current and do not include estimates of the emigration of temporary migrants who might immigrate and emigrate between censuses. Censuses are normally conducted every five to ten years; therefore, the time span for estimating emigration with this method can be relatively long. The residual method produces a cumulative emigration rate for the time interval; therefore, the year-to-year variations in emigration rates are not detected. Another limitation is that the residual method does not capture the emigration of recently arrived immigrants whose migration is temporary or short in duration.

Panel Data Attrition Methods

Panel data attrition methods may also be used to estimate emigration. These methods use the attrition of the foreign-born population from administrative data or household surveys as an indicator of return migration. The basic approach of these methods is to decompose the missing data, or attrition of the foreign-born population, from longitudinal panel data into its component parts, including emigration. Two panel data attrition methods are reviewed in the report. The first uses linked administrative data from the former Immigration and Naturalization Service, now part of the U.S. Department of Homeland Security (DHS), on a cohort of legal immigrants to the United States to estimate cumulative emigration rates for that cohort (Jasso and Rosenzweig 1982).² The second attrition method uses data from matched Current Population Survey (CPS) files to estimate emigration rates for the total foreign-born population residing in the United States (Van Hook et al. 2006).

In general, these methods are useful because they use administrative or existing survey data, which reduces the time and resources needed to create estimates of emigration. Also, panel data attrition methods can provide estimates of migration for relatively short durations, which would not be measured by the census-to-census residual method. Similarly, these methods produce timely estimates, which can be used to estimate annual flows of emigration.

² The Department of Homeland Security (DHS) of the U.S. Government was created in 2003 by merging several government agencies including the Immigration and Naturalization Service (INS). The data collection and dissemination duties of INS were relocated to the Office of Immigration Statistics (OIS) at that time.

There are limitations to panel data attrition methods for estimating emigration. Administrative data systems and panel surveys are typically not designed for measuring migration, therefore, the data sources might not contain all the information necessary to estimate emigration without making substantial assumptions about the data. Both of the studies reviewed in the report rely on assumptions that could affect the validity of the emigration estimates.

Indirect Estimation and Multiplicity Sampling Methods

Indirect estimation and multiplicity methods use data on the residence of relatives living abroad from household surveys to estimate emigration. Indirect estimation methods for measuring emigration were largely adapted from the literature on indirect techniques for estimating mortality in developing countries using household surveys (Zaba 1985). Special survey questions about the residence of household members or relatives are used to identify the population of interest. There are two main approaches to the indirect estimation methods that have been used in the literature—the residence of children and the residence of siblings—which are discussed in more detail in the report. Multiplicity sampling methods use similar survey questions as the indirect estimation methods to estimate emigration but also adjust for multiplicity, the probability that more than one household may identify the same emigrant between the sample and population (Woodrow-Lafield 1996).

The indirect estimation and multiplicity sampling methods have clear advantages over other approaches to estimating emigration. First, these methods can be used to estimate the recently emigrated population. Second, the special questions needed for these methods can be added to existing household surveys, therefore, data collection is much less expensive than migration surveys. Finally, these methods can be used to estimate emigration of both the native and foreign-born populations; however, estimating emigration of the foreign-born population can be problematic because the likelihood of a whole family move is greater than for the native population.

Indirect estimation and multiplicity sampling methods also have limitations that may bias the estimates. Given that both the indirect estimation and multiplicity sampling methods rely on data from household surveys, which sample the relatives of emigrants who are resident in the United States, the estimates do not include whole family migrations or emigrants who do not have relatives in the resident population. Another limitation of the methods is that unless the period of departure is included in the survey instrument, the emigration rates effectively cover long periods of time and are therefore difficult to use in estimating annual or recent emigration. Survey errors including coverage and recall bias could potentially bias the estimates of emigration.

III. Conclusions

Emigration is one of the most difficult components of population change to estimate because of both data and methodological challenges. Despite significant development of methodologies over the past three decades, estimating emigration remains a challenge. When released, the report, *A Review of Methods for Estimating Emigration*, will provide a review of the methods and techniques used by researchers and national statistical agencies to estimate emigration. The review also will provide an assessment of the strengths and limitations of each approach. In the extract presented in this paper, we summarized the challenges that are commonly shared by the methods for estimating emigration focusing specifically on data and methodological issues. The overall goal of the project is to prepare a document that will aid researchers and national statistical agencies in not only producing

estimates of emigration but also developing new methodologies for estimating emigration that can overcome the challenges presented above.

IV. References

- Ahmed, Bashir and J. Gregory Robinson. 1994. "Estimates of Emigration of the Foreign-Born Population: 1980-1990." *Population Division Working Paper # 9*. U.S. Census Bureau. (English)
- Bonaguidi, Alberto. 1990. "Measurement of Emigration Using Indirect Techniques." *European Journal of Population-Revue Europeenne De Demographie* 6:113-116. (French)
- Borjas, George J. 1985. "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants." *Journal of Labor Economics* 3:463-489. (English)
- Cantisani, Giambattista and Valeria Greco. 2006. "Country Report: Italy." Pp. 477-489 in *THESIM: Towards Harmonised European Statistics on International Migration*, edited by M. Poulain, N. Perrin, and A. Singleton. Louvain-la-Neuve: Presses universitaires de Louvain. (English)
- Gibbs, James C. , Gregory S. Harper, Marc J. Rubin, and Hyon B. Shin. 2001. "Evaluating Components of International Migration: Native Emigrants." *Population Division Working Paper #63*. U.S. Census Bureau. (English)
- Hill, Kenneth. 1979. "The Use of Information on Residence of Siblings to Estimate Emigration by Age." *Notas Poblacion* 7:71-89. (Spanish)
- . 1981. "A Note of Estimating the Age Distribution of Surviving Emigrant Children." *Notas Poblacion* 27.(Spanish)
- . 1983. "A Note on the Use of Information Concerning the Residence of Surviving Siblings to Estimate Emigration." *Notas Poblacion* 11:33-58. (Spanish)
- Jasso, Guillermina and Mark R. Rosenzweig. 1982. "Estimating the Emigration Rates of Legal Immigrants Using Administrative and Survey Data: The 1971 Cohort of Immigrants to the United States." *Demography* 19:279-290. (English)
- Poulain, Michel, Nicolas Perrin, Ann Singleton, and THESIM Project. 2006. *THESIM : Towards Harmonised European Statistics on International Migration*. Louvain-la-Neuve: Presses universitaires de Louvain. (English)
- Rendall, Michael, Cecilia Tomassini, and David J Elliot. 2003. "Estimation of Annual International Migration from the Labor Force Surveys of the United Kingdom and the Continental European Union." *Statistical Journal of the United Nations ECE* 20:219-234. (English)
- Salvisberg, Esther and Marcel Heininger. 2007. "Im- and Emigration of the Permanent Foreign Population: From Register Counts to Statistics." Federal Statistical Office of Switzerland. (German)
- Schachter, Jason. 2008. "Estimating Native Emigration from the United States." Memorandum dated December 24, delivered to the U.S. Census Bureau. (English)
- Silvestrini, Angela and Giovanni Cariani. 2005. "Survey on the Italians Abroad on 21st March 2003: Demographic Characteristics." General bureau of Italians Abroad and Policy Migration and Italian National Institute for Statistics. (Italian)
- Sirken, Monroe G. 1970. "Household Surveys with Multiplicity." *Journal Of The American Statistical Association* 65:257-266. (English)
- Somoza, Jorge L. 1980. "Indirect Estimates of Emigration: Two Methods Based on Information on Place of Residence of Children and Siblings." *Notas Poblacion* 8:93-122. (Spanish)

- . 1981. "Indirect Estimates of Emigration: Applications of Two Procedures Using Information on Residence of Children and Siblings." *International Union for the Scientific Study of population (IUSSP) Papers* 5:35-60. (English)
- Sudman, Seymour, Monroe G. Sirken, and Charles D. Cowan. 1988. "Sampling Rare and Elusive Populations." *Science* 240:991-996. (English)
- U.S. Department of Labor. 2012. "Labor Force Statistics from the Current Population Survey: Technical Documentation." September 9, 2012. <http://www.bls.gov/cps/documentation.htm>. (English)
- United Kingdom Office for National Statistics. 2012. "International Passenger Survey (IPS) Methodology." September 8, 2012. <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/travel-and-transport-methodology/international-passenger-survey/index.html>. (English)
- Van Hook, Jennifer, Weiwei Zhang, Frank D. Bean, and Jeffrey S. Passel. 2006. "Foreign-Born Emigration: A New Approach and Estimates Based on Matched CPS Files." *Demography* 43:361-382. (English)
- Warren, Robert and Jennifer Marks Peck. 1980. "Foreign-Born Emigration from the United States: 1960 to 1970." *Demography* 17:71-84. (English)
- Woodrow-Lafield, Karen. 1996. "Emigration from the USA: Multiplicity survey evidence." *Population Research and Policy Review* 15:171-199. (English)
- Zaba, Basia. 1985. *Measurement of Emigration using Indirect Techniques: Manual for the Collection and Analysis of Data on Residence of Relatives*. Liege, Belgium: Ordina Editions. (French / English)
- . 1987. "The Indirect Estimation of Migration: A Critical Review." *International Migration Review* 21:1395-445. (English)
- Zlotnik, Hania. 1987. "The Use of Information on Residence of Relatives to Measure International Migration." *Notas Poblacion* 15:25-65. (Spanish)
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