

## DISCUSSION

Morris H. Hansen, Westat, Inc.  
1650 Research Boulevard, Rockville, Maryland 20850

### According to their Respective Numbers: 200 Years of Census Taking

I found both the paper by Margo Anderson and the book behind it fascinating reading. It was especially interesting to see a historian's perspective on the role of the census over 200 years—a different perspective in many respects than I had as a participant during an important although small part of that period. I will make some supplemental comments and raise a question.

I came to the Census Bureau in 1935, in the depth of the Great Depression. Those were exciting days full with New Deal enthusiasm in major efforts to battle the depression in numerous related initiatives—relief and work programs, social security, deposit insurance, and others—along with the evolution of a new social and political philosophy. I was a youngster with much to learn. A major goal of the Census Bureau at that time was to awaken and modernize. This created an excellent opportunity for innovation. I will mention a few developments that I believe were especially influential.

The special 1937 unemployment registration and the needs for statistics to support World War II, both of which Margo Anderson discusses in the book, provided many opportunities for innovative contributions, and also to learn.

**The 1937 Unemployment Registration.** Unemployment was the great problem for the country. Although it was not known then, and the facts were in great debate, about 20 percent of the labor force was unemployed. Major relief and work programs were underway. Unemployment estimates varied from as little as 3 million unemployed to as many as 15 million, as I remember it. With such uncertainty it was difficult to get agreement on programs. Facts were needed to reduce debate on the numbers and to focus attention on the solutions. On August 30, 1937 Congress authorized the National Unemployment Census. Actually, in the interest of obtaining fast results, it was to be a voluntary registration of the unemployed and partially unemployed. The management of the project was to be in a temporary organization set up for that purpose, but it was to be staffed primarily by Census Bureau personnel. Many of us were transferred to work on it. The field work was to be carried out by the Post Office. The project was given exceedingly high priority. President Roosevelt's signature appeared on the voluntary registration form that was to be delivered to every household in the nation, and that requested the cooperation of each unemployed and partially unemployed person. It was perhaps the only statistical questionnaire in U.S. experience signed by the President.

Only a registration, using the vast facilities of the Post Office, was regarded as a feasible procedure to achieve results on an acceptable time schedule. However, some of the leading statisticians and social scientists of the country were greatly concerned with dependence solely on a voluntary registration. They took a lead role in indicating that the voluntary registration alone would yield unsatisfactory results of unknown accuracy and would not satisfy the need for information or quiet the debate. Those concerned and participating in the discussion included Stuart Rice of the Central Statistical Board (then newly formed), Calvert Dedrick of the Census Bureau, Howard Myers of the WPA, Sam Stouffer of the University of Chicago, and Fred Stephan, then, I believe the Secretary of the American Statistical Association. They strongly urged that a sample be taken immediately following the registration, enumerating the labor force activity of the total population in a sample of

postal routes, to evaluate the registration and in order to provide independent reliable facts.

This recommendation was accepted and they took on the task of designing a sample study. I was a participant and with Dedrick took a lead role in the sample survey effort. They proposed taking a complete census in a stratified random sample of 2 percent of the postal delivery routes in the United States. The data collection was to be carried out by the Postal Carriers. The Post Office cooperated fully in the registration and in the sample survey.

The registration cards were to be delivered to each dwelling in the United States on November 16, 1937 to be returned by November 28. The enumeration of the sampled postal delivery areas took place during the week from November 29 to December 4. A total of more than 2,000,000 persons were enumerated in the sampled areas. Clearly it was a fast moving project. Preliminary summary results were reported on January 1, 1938.

As soon as the returns were received and processed we undertook to prepare estimates by making joint use of the enumeration and the registration results in the sampled postal routes. However, we found that statistical theory, as we then understood it, was not adequate to deal with the issues. We had to learn fast. We came to recognize that the British were ahead of us and in particular, that work done by J. Neyman, a Pole who had done advanced sampling work in Poland and who had moved to Britain, could provide some guidance. He had given some lectures at the U.S. graduate school earlier in 1937, and had also published a remarkable paper in the *Journal of the Royal Statistical Society* in 1934. However, we had little chance to study and adapt the methods to our problems in this fast moving project.

The urgency was great and we did find our way. A number of us were working on the sample results at midnight on New Years Eve. We called our spouses to wish them a happy new year and continued for the rest of the night to get the preliminary results out by January 1. The voluntary registration reported 7.7 million unemployed. The sample survey provided an estimate of 11 million unemployed with an estimated sampling error of 280,000. This was a pioneering effort, and, so far as I am aware, was the first large scale application of area sampling using probability sampling methods.

I have dwelled on the sample survey to evaluate the unemployment registration because it taught us much and especially had the effect of demonstrating to the Census Bureau staff and many others what could be done with sampling. It set the stage for future developments.

In addition to providing a demonstration of what could be done with sampling, it provided an opportunity for developing and introducing greatly improved definitions and procedures for measuring unemployment and labor force participation of the population. The measurement approach, with further improvements, was adopted in the monthly survey of unemployment initiated shortly thereafter (later to be adapted and to become the Current Population Survey), and in subsequent censuses.

**The monthly survey of unemployment at WPA, and the CPS.** The 1937 survey lead to the highly innovative initiation in the WPA by John Webb, Lester Frankel, and others of a monthly sample survey of unemployment. Soon thereafter the Pearl Harbor attack brought the U.S. into World War II. With U.S. entrance into the war labor shortages rather than unemployment

became the problem. The WPA was then disbanded and the survey transferred to the Bureau of the Census, now to serve wartime needs in measuring employment, and labor force participation and availability. We still had much to learn. Turning the unemployment survey into a labor force survey created the need and opportunity to make important advances in the sample survey theory and practice. The advances that took place in the design of this survey have guided much of sample survey practice throughout the world.

**Statistics for the Japanese evacuation—and confidentiality.** I return now more directly to discussion of the paper. My principal concern is about the point of view implied, although not stated explicitly, that questions the integrity of the Census Bureau staff. My concern relates to the evacuation of the Japanese shortly after Pearl Harbor. I quote from her book (not in the paper), “Although the Bureau claims it did not release individual names and addresses from the 1940 Census schedules as prescribed by law, it did prepare detailed counts of the Japanese for small geographic areas. These provided the parameters for finding and interning the population.” The implication that confidentiality may have been violated is unfounded. There is also an implication that providing the numbers for small areas may have been unethical if not in violation of confidentiality. I note, however, that a primary function of the census is to provide statistics for small areas to be applied in whatever ways users desire to use them for or against various programs. The use of census statistics to guide the evacuation was not in any sense an ethical violation by the Census Bureau. It was an unfortunate action by the U.S. Government. Emotions were high, and judgments were not always sound. The Congress has recently apologized and made amends in the form of belated financial compensation.

**Guiding influences on censuses.** Margo emphasizes strongly and properly the interaction of political considerations and census programs. The census content and programs respond to the political needs of the country. The political programs of the country are also influenced by the census results. She also states, but gives much less emphasis to the impact, especially in recent decades, of the needs of the business, local government, and research communities on the census. The business community needs the census results for planning, marketing, and other purposes. Local governments need census results for planning and to guide health, education, and other programs. The collection of information on children ever born is an illustration of a response to research needs.

An illustration of the impact of the business community is concerned with another census, the Census of Business. When Eisenhower brought in a Republican administration in 1952, the new management at the Commerce Department took steps to stop the Census of Business that was to be taken in 1953. The business community protested vigorously and with such strength that the Census was reinstated for 1954.

**Impact of "burden" on 1990 Census—the Paperwork Act.** Margo did not mention some relatively recent developments that have had substantial impact on the census and other statistical programs, and especially on the 1990 Census. One is the Paperwork Act and its emphasis on the control of response burden. In my judgment, for business and other institutions like schools, response burden may be a problem, and responsible efforts to control the burden are well justified. However, letting minor burden considerations greatly influence decisions on the census of population is quite a different thing. In reviewing the 1980 Census questionnaires, the OMB ordered the removal of some questions on housing from the 1990 Census questionnaire in order to reduce burden, citing the Paperwork Act.

The reduced time for a household to respond amounted to perhaps five minutes per household. Few households are concerned about spending an added five minutes filling out the census form once in a decade (even though it aggregates to about 8,000,000 hours). After much delay and wasted effort, the director of OMB showed the good judgment to overrule his staff and restore most but not all of the missing questions. There were still some losses of information in the name of reducing burden, perhaps to the extent of a minute or two per household. A great deal of professional time was lost. Corrective legislation is needed.

### **Decennial Census Research and Evaluation Program—Its History and Influence**

The authors of this paper have done an excellent job of assembling and reporting on the extensive efforts over the years to deal with an exceedingly complex set of issues. They demonstrate the effectiveness of beginning with the identification of a problem, the development of hypotheses on how to improve, and then doing empirical studies to evaluate potential solutions. My comments supplement and provide emphasis on particular points.

We early learned that things that were “known to be true” because of long history and experience did not mean that they were true. Empirical studies in well-designed randomized experiments are powerful means for learning.

The paper has covered many studies that have taken place over a half a decade. This is both a source of strength and of weakness in the paper. They have covered much and reported accurately on various issues, studies, and experiments. A problem is that in the time and space available to them they have had to highlight and could not provide many important details or results even in the restricted areas that were the primary target of the paper. I would like to see this paper serve as the basis for a monograph of sufficient length to provide the REX history in far great detail.

The main thrust of the paper is limited to research on improving census coverage. But even with this limitation the topics could be dealt with only briefly and important details needed to understand had to be omitted. Even so, the paper has properly not attempted in the time available to deal with the most controversial current problem with respect to Census coverage—that of adjusting the census for estimated net under- or overcoverage. Only limited attention has been given to studies of questionnaire content or definitions of who is to be covered. I mention a few of these that could be given attention in an expanded report.

**Coverage of college students.** A decision was made in the 1940's that affected the 1950 Census, for the first time, to cover college students living at college rather than at home. Studies during and after the 1940 Census (as I remember it) had shown substantial omissions of college students living away from home. Consequently, the decision was made to change where to enumerate them. It was an important decision. The result was that communities that are primarily college communities had their population greatly increased, while minor losses took place in other communities. There were two basic reasons for this decision: (1) it was demonstrated that coverage of college students would be substantially improved by the change; and (2) it seemed to be the more logical place to put the college students because their services from the community for the principal part of the year come from the community in which they go to school.

**Tests of questionnaire content.** They have also not mentioned the various tests of questionnaire content to identify potential misses and various efforts to achieve coverage by this means. One of the approaches was an effort to cover both *de facto* and *de jure* populations, people that are visiting away from home at the time of the census in

private homes and in vacation homes, etc., as well as in hotels and other temporary residences. Also, there were numerous interesting tests, not directly related to coverage, on the effect of questionnaire design on response rates, and on accuracy of responses. These were randomized experiments designed to produce valid comparisons between alternative procedures. While some randomized experiments are mentioned, such experiments might receive even greater attention, in view of the fact that randomized experiments are often not regarded as feasible in social science studies.

**Infant check in 1940.** Another important study not mentioned is the "infant check" that was done in the 1940 Census in which recent birth records were matched against the census enumeration of infants. The results were surprising to us. Undercoverage of infants in the censuses had been established earlier by demographic analysis. A widely accepted hypothesis was that infants were missed because they were not yet thought of as persons. The matching of birth records, with field follow-up, showed the surprising result that the parents were generally missed when the infants were missed. Apparently these were households that tended to be movers and had a much greater chance of being missed. So far as I am aware, the dual system estimation was first applied in this study.

**Self-enumeration and response error model.** In the discussion of the testing and introduction of self-enumeration I would like to have seen greater emphasis on the impact of the response error model that we developed in the 1940's that shows the potential and substantial impact of intraclass correlations, and that led to and greatly influenced the design of the randomization experiments in the 1950 Census. In those experiments enumerators were given two enumeration assignments chosen at random, within a defined area, which made it possible to measure the variance between and the variance within enumerators. The resulting intraclass correlations demonstrated the substantial impact of correlated response errors within the work of an enumerator. These errors were found to be a major source of error in small area statistics. Self-enumeration was proposed as a means of reducing these correlations by providing independent measures for each self-responding household.

These randomized experiments also provided important information that helped to greatly expand the application of sampling in the 1960 and subsequent population and housing censuses. Many of the principal and especially the conceptually more difficult items in the census (such as employment status, occupation, industry, education, income, and others) were collected in the 1960 Census from a 20, or a 5, or a 25 percent sample. The resulting reduction in enumerator contributions to variance was substantial, as was the reduction in cost, along with a substantial increase in timeliness of the census results. The influence of the response error model was that it was demonstrated through it and the supporting empirical measurements in the randomized experiments that small area statistics (which involved the work of only one or a few enumerators) would benefit much from the reduction of enumerator contribution to variance. For small area statistics the added variance from the introduction of sampling would approximately offset the reduction of enumerator variance. The reduction results because, with self-enumeration, a household's responses are independent of those of other households, and enumerator impact is thus greatly reduced. The shift to sampling was justified, especially because for small areas the precision was about equivalent. For very large areas the reductions of bias which resulted for many items from self-enumeration were net gains because, for large areas, the samples were large and the sampling variances were relatively small or trivial.

**Ethnographic studies.** The authors have only mentioned participant observers, and have not mentioned ethnographic studies and their potential role in future coverage studies. The first ethnographic study was done prior to the 1960 Census and yielded interesting and promising results. As a result the Census staff went to the National Research Council and asked them to establish a committee in an effort to get other agencies interested and to evaluate and support this potentially useful procedure. The National Research Council report was, I thought, very disappointing and led to delays in progress in this promising area. I am delighted to learn that it may be revived in the 1990 Census. I would like to see more emphasis on this in the expanded report that I hope develops out of greatly elaborating the paper that has been presented here.

**Cost benefit.** The paper does not examine directly the implications of cost benefit. It might be inferred that improving the coverage of the census is worth any price. Actually the Census Bureau has to take account of costs and benefits. The paper recognizes this in some cases where it is indicated that a proposed solution to problems resulted in only modest gains with costs too great. But the philosophy of cost benefit might usefully be introduced more explicitly.

**Concluding remarks.** My role is to be a critic and I have been, but my remarks may leave the wrong emphasis. I think the authors have done an excellent job of covering as much as they did on many important developments with the time they had available. They have chosen to emphasize especially areas in which research has made important contributions to census coverage: mobility, vacancy, address list quality and coverage, and administrative lists. My emphasis focuses on what I would like to see covered later in a monograph. Presumably the errors of history are repeated unless they are well recorded. Even when well recorded there is a question as to whether we learn sufficiently from them. I believe that this effort is a valuable one that can guide future work on the REX programs and on improving the census in many ways.

I note in concluding that much has been accomplished in improving the coverage of the census as a result of the REX programs. The following is from the NRC report on the Bicentennial Census: *New Directions of Methodology in 1990*, where total population net undercount rates estimated from demographic analysis are summarized as follows:

| Census year | 1950 | 1960 | 1970 | 1980        |
|-------------|------|------|------|-------------|
| Percent     | 3.3  | 2.7  | 2.2  | 0.5 to 1.4* |

\*0.5 assumes that 2 million illegal aliens were actually counted; the 1.4 assumes an additional 2 million not counted.

However, the estimated undercount for blacks relative to whites was reduced only from 7.2 percent in 1950 to 5.5 in 1980—progress but still a problem.

Again, I commend the authors of both papers for most interesting and useful reports.

## References

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