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Supplementary Notes

Abstract
Nonresponse follow-up was the most expensive and labor-intensive of all Census 2000 operations. According to the Bureau of the Census, it cost $1.2 billion (about 29 percent of the $4.1 billion spent on decennial activities in fiscal year 2000) and required over 500,000 enumerators to obtain census information from about 42 million nonresponding households in under 10 weeks. Because of this colossal workload, even small variations in productivity can have significant cost implications. For example, if enumerators had needed as little as half a day more to complete their workloads, it would have added over 2 million staff hours and at least $16 million to the cost of the operation, assuming everyone worked at the Bureaus minimum pay rate of about $8.25 per hour.1 Not surprisingly, workload and enumerator productivity have historically been two of the largest drivers of census costs, and the Bureau developed its budget for the 2000 Census using a model that contained key assumptions about these two variables.

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October 4, 2001

The Honorable Henry A. Waxman
Ranking Minority Member
Committee on Government Reform
House of Representatives

The Honorable Carolyn B. Maloney
House of Representatives

Nonresponse follow-up was the most expensive and labor-intensive of all Census 2000 operations. According to the Bureau of the Census, it cost $1.2 billion (about 29 percent of the $4.1 billion spent on decennial activities in fiscal year 2000) and required over 500,000 enumerators to obtain census information from about 42 million nonresponding households in under 10 weeks. Because of this colossal workload, even small variations in productivity can have significant cost implications. For example, if enumerators had needed as little as half a day more to complete their workloads, it would have added over 2 million staff hours and at least $16 million to the cost of the operation, assuming everyone worked at the Bureau's minimum pay rate of about $8.25 per hour.[1] Not surprisingly, workload and enumerator productivity have historically been two of the largest drivers of census costs, and the Bureau developed its budget for the 2000 Census using a model that contained key assumptions about these two variables.

In our January 2001 response to your request for information on enumerator productivity, we reported that productivity data for the 2000 Census was unavailable because the Bureau had not yet assessed its reliability.[2] Since then, the Bureau completed its reliability assessment and made certain refinements. As agreed with your offices, this report follows up on that earlier request and presents information on (1) enumerator productivity rates by type of local census office and (2) the Bureau's methodology for refining the productivity data.

[1]Enumerator wage rates ranged from about $8.25 to $18.50 depending on location.

[2]*Decennial Censuses: Historical Data on Enumerator Productivity Are Limited* (GAO-01-208R, Jan. 5, 2001).

We obtained information on enumerator productivity rates by analyzing Bureau productivity data and the underlying assumptions used to calculate them. To obtain information on the Bureau's methodology for refining the data and factors that could improve the collection and analysis of productivity data in the future, we interviewed officials from the Bureau's Decennial Management Division and reviewed, but did not audit, relevant Bureau documents. On August 20, 2001, we requested comments on a draft of this report from the Secretary of Commerce. In his September 18, 2001, written response, the Secretary of Commerce informed us that Department of Commerce and Bureau of the Census officials generally agreed with the report and had no specific comments on its content or recommendations. We performed our work from April through July 2001, in Washington, D.C., in accordance with generally accepted government auditing standards.

Results in Brief

Nationally, enumerators completed their nonresponse follow-up workload at a rate of 1.04 housing units per hour—slightly exceeding the Bureau's expected rate of 1.03 housing units per hour. Productivity varied for the four primary types of local census offices, ranging from 0.90 housing units per hour in inner-city and urban areas, to 1.10 cases per hour in rural areas.

In refining the data thus far, the Bureau corrected for what it believes was the most significant discrepancy: a misclassification of certain employees' time charges that overstated the number of hours worked by nonresponse follow-up enumerators and understated enumerator production rates. The Bureau has not yet made any adjustments for a second problem identified in the data--employees who worked on both earlier census operations and nonresponse follow-up and who charged their time to codes for those earlier activities rather than nonresponse follow-up. Better application of the Bureau's quality assurance procedures could have produced more reliable data initially and eliminated the need to correct the data once nonresponse follow-up was completed.

Accurate productivity information is important for future planning decisions. At the same time, the complexity and importance of nonresponse follow-up requires that the Bureau place a premium on completing the enterprise according to its operational plan. Nevertheless, with proper planning, the two functions could be complementary, since the Bureau's personnel/payroll and management information systems already collect the raw data needed to assess enumerator productivity. Therefore, as the Bureau plans for 2010 nonresponse follow-up, to ensure that the Bureau develops a baseline of reliable productivity data for informing

future planning decisions consistent with the operational demands of nonresponse follow-up, we recommend that the Secretary of Commerce direct the Bureau to (1) determine the productivity measures needed to gauge nonresponse follow-up and (2) design procedures, information systems, and quality control mechanisms to reliably capture and analyze those measures in accordance with nonresponse follow-up's operational requirements.

Background

In our January 2001 review, we described how the Bureau planned to assess and refine its data on enumerator productivity because a significant number of individuals on enumerator applicant lists at some local census offices were hired instead as crew leader assistants—a different position.[3] In some instances, the position change was not reflected in the Bureau's personnel/payroll system. To the extent that this occurred, Bureau officials said that it would overstate the number of hours that enumerators actually worked and understate productivity (it did not, however, affect actual payments to employees because enumerators and crew leader assistants were paid at the same wage rate). Bureau officials also had questions concerning the extent to which enumerators who worked on more than one census operation charged the codes for these earlier operations rather than the code for nonresponse follow-up. Our review also noted that enumerator productivity rates could not be calculated for the 1940 through 1990 censuses because needed data on staffing levels and hours worked were unavailable, incomplete, or not comparable.[4]

Because productivity information will be important for informing the Bureau's planning and budgeting processes for the next national head count in 2010,[5] we recommended that the Secretary of Commerce ensure that the Bureau, in refining its productivity figures, identify the extent and nature of any data anomalies, the impact they have on data quality, and the extent to which the data can be compared by type of local census office. To help ensure the comparability of data for the 2000 and future censuses, we also recommended that the Bureau fully document how it calculates enumerator productivity rates, and report the data by type of local census

[3]GAO-01-208R.

[4]GAO-01-208R.

[5]GAO-01-208R.

office. In response to our recommendations, as part of its analysis of enumerator productivity data, the Bureau included information on enumerator production rates at the local office and national levels. This information included an explanation of the extent and nature of certain anomalies in the data, the impact they had on data quality, and the adjustments made for them. In addition, the Bureau's analysis included a detailed methodology that documented how these rates were adjusted and calculated.

Enumerator Productivity Rates

The Bureau issued preliminary enumerator productivity data in May 2001. Nationally, enumerators completed 1.04 housing units per hour—slightly exceeding the 1.03 housing units per hour that the Bureau estimated for budgetary purposes. The Bureau calculated productivity by dividing its nonresponse follow-up workload (42.4 million housing units nationally) by enumerator production hours (40.7 million hours nationally). The Bureau derived this information from its personnel/payroll and management information systems.

Enumerator production hours refer to the total time enumerators spent in the field collecting data and meeting with supervisors, and covers the actual duration of the operation (April 24 through July 2, 2000). The hours exclude time spent in training and conducting follow-up activities after the Bureau completed the initial operation. The Bureau also said it excluded subsequent fieldwork that it believes was inadvertently charged to the nonresponse follow-up code after its completion. Bureau officials noted that the productivity rates are subject to minor change as the Bureau further refines its data, in part by conducting a comprehensive analysis of payroll and personnel data.

According to the Bureau, productivity varied by type of local office--ranging from 0.90 to 1.21 housing units per hour. For the 2000 Census, the Bureau had four primary types of local census offices (referred to as types A, B, C, and D)--which differed by enumeration methods used and geographic makeup. Type A offices, located in the hardest-to-enumerate, inner-city, and urban areas, used mailout/mailback and urban/update leave enumeration methodologies. [6] Type B offices, located in urban and metropolitan areas, also used mailout/mailback and urban/update leave methodologies. Type C offices, located in suburban areas, small and medium-size cities, towns, and rural areas, used update/leave, mailout/mailback, and rural update/enumerate methodologies.[7] Type D offices, located in more rural areas, used list/enumerate, update/leave, and some mailout/mailback methodologies.[8] Type E offices—a fifth office type—were located in Puerto Rico and used update/leave methodology.

As shown in table 1, according to the Bureau, actual enumerator productivity was 20 percent higher than expected at the Bureau's urban or type A offices. Productivity was about 11 percent lower than expected at rural or type D offices. A Bureau official told us that, as part of its evaluation of the 2000 Census, the Bureau is studying reasons for these variations.

[6]For the mailout/mailback methodology, the Bureau used U.S. Postal Service (USPS) letter carriers to deliver questionnaires to the vast majority of housing units that had city-style addresses (house number and street name) for household members to mail back. For the urban update/leave methodology, in pre-identified census blocks in urban areas--where the USPS might usually deliver a quantity of questionnaires to a building lobby--enumerators delivered questionnaires to each unit and updated the address list.

[7]The Bureau conducted an update/leave methodology in areas with primarily non-city-style addresses. For this methodology, enumerators delivered questionnaires to housing units and updated their address list in their assignment areas at the same time. For the rural update/enumerate operation, in pre-identified census blocks, enumerators canvassed an area, updated the address list and associated maps, and completed census questionnaires for all occupied and vacant housing units.

[8]For the list/enumerate methodology, in very remote or very sparsely populated areas, enumerators visited every household to update census maps, conduct interviews, and list each address or location.

Table 1: Enumerator Productivity During Nonresponse Follow-up Varied by Type of Local Census Office

Office type	Total offices	Total housing unit workload	Enumerator production hours[a]	Budgeted housing units per hour	Actual housing units per hour[a]	Difference between budgeted and actual productivity	Percentage difference
National level	520	42,382,492	40,698,936	1.03	1.04	0.01	0.97%
Type A	102	6,347,900	7,078,897	0.75	0.90	0.15	20
Type B	51	4,080,754	4,012,296	1.11	1.02	(0.09)	(8.1)
Type C	316	28,008,736	26,073,280	1.11	1.07	(0.04)	(3.6)
Type D	42	3,247,754	2,960,354	1.24	1.10	(0.14)	(11.3)
Type E	9	697,348	574,109	N/A	1.21	N/A	N/A

N/A = Data was not available from the Bureau at the time of our review.

[a]Preliminary data.

Source: U.S. Bureau of Census data.

Bureau officials cautioned against comparing the productivity of individual offices because of location-specific circumstances. The officials said that the data are more reliable when aggregated by local census office type and at the national level.

For the 1990 Census, the Bureau reported that enumerators completed 1.56 housing units per hour. However, Bureau officials said the 1990 figure should not be directly compared to the 2000 rate because the Bureau does not have documentation on how the 1990 figure was calculated, and thus does not know if a direct comparison would be valid.

How the Bureau Refined Its Productivity Data

According to Bureau officials, the Bureau made a "coarse" adjustment for what it considered to be the most significant anomaly--the misclassification of crew leader assistant hours. As noted earlier, some local census offices hired a substantial number of crew leader assistants from lists of applicants for enumerator positions. In some cases, the position change was not entered into the Bureau's personnel/payroll system. To the extent this happened, Bureau officials said that it would overstate the number of hours that enumerators actually worked and thus understate enumerator productivity.

To adjust for the misclassified crew leader assistant hours, the Bureau analyzed productivity rates to distinguish between those hours that

belonged to crew leader assistants and those hours that belonged to enumerators. Based on its analysis of daily productivity rates at six local census offices (three that had reliable crew leader assistant data and three with no crew leader assistant data), employees with a production rate greater or equal to 0.2 cases per hour were considered to be enumerators, and their noncase hours (production in which no households were completed) were included in the Bureau's adjusted production hour variable. Employees with a production rate less than 0.2 cases per hour were considered to be crew leader assistants, and their noncase hours were excluded from the adjusted production hour variable.

Compared to the original, unadjusted data, using the refined figures, enumerators completed nonresponse follow-up in 40.7 million production hours versus 44.3 million production hours, a difference of 3.6 million production hours or 8.1 percent. This revised estimate of production hours could be important for future budgeting and planning purposes. For example, using the lowest enumerator wage rate of about $8.25 per hour, the 3.6 million production hour difference would change the Bureau's cost estimates by about $29.7 million.

The Bureau has not yet made any corrections for a second problem identified in its productivity data: employees who worked on earlier census operations who continued to charge their time to those codes rather than nonresponse follow-up. According to Bureau officials, the extent and impact of this problem is unknown.

With both problems, better application of quality assurance procedures at the time the productivity data were collected could have produced more reliable data initially, and eliminated the need to correct the data later in the census cycle. Indeed, enumerators charged codes other than nonresponse follow-up despite the fact that supervisors were to review payroll forms to ensure that enumerators entered the correct task codes.

Conclusions

Accurate productivity information is important for gauging the performance of nonresponse follow-up, validating planning assumptions, preparing and justifying budgets, and devising more cost-effective census-taking techniques for the future. However, in past censuses, the Bureau has encountered problems obtaining complete and comparable productivity data, and the Bureau appears to have repeated this pattern in 2000. As a result, the Bureau needed to spend additional resources to

refine the information, and even then, the adjustment was coarse and addressed just one of the two known problems.

At the same time, given the size and decentralization of nonresponse follow-up, a certain amount of procedural error and unreliable data is unavoidable. Moreover, because of the complexity and importance of nonresponse follow-up, it is important for the Bureau to emphasize completing the endeavor according to its operational plan.

As the Bureau develops nonresponse follow-up plans for the 2010 Census, a key challenge will be developing systems and procedures for collecting reliable productivity data needed for evaluation and planning, without detracting from higher-priority operational demands. However, these goals are not necessarily incompatible. In fact, as the Bureau's personnel/payroll and management information systems already collect the raw data needed to assess enumerator productivity, with proper planning, the two functions can be complementary. Consequently, it will be important for the Bureau to (1) determine the productivity information it needs to evaluate nonresponse follow-up during the 2010 decennial and plan for future censuses and (2) integrate those evaluative requirements into its operational plans and management information systems.

Recommendations for Executive Action

To ensure that the Bureau develops a baseline of reliable productivity data for evaluating nonresponse follow-up and informing future planning decisions, we recommend that the Secretary of Commerce direct the Bureau to, as part of its planning effort for the 2010 Census, (1) determine the productivity measures needed to assess nonresponse follow-up and (2) design procedures, information systems, and quality control mechanisms to capture and analyze those measures consistent with nonresponse follow-up's operational requirements. Possible measures include average number of hours worked by enumerators, cases completed per production hour, and number of cases completed per enumerator. The data should, at a minimum, support the analysis of variation in these measures by census region and type of local census office (type A, B, C, D, or E).

We are sending copies of this report to the Chairman of the House Committee on Government Reform; Chairman and Ranking Minority Member of the Subcommittee on the Census, House Committee on

Government Reform; Secretary of Commerce; and Acting Director of the Bureau of the Census. Copies will be made available to others upon request. Robert Goldenkoff and Victoria E. Miller made major contributions to this letter. If you have any questions concerning this letter, please contact me at (202) 512-6806.

J. Christopher Mihm
Director
Strategic Issues

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