

CONTROLLING RESPONSE ERROR IN THE CURRENT EMPLOYMENT STATISTICS SURVEY

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Introduction

The Bureau of Labor Statistics (BLS) issues monthly employment estimates from two national surveys: the Current Population Survey (CPS) and the Current Employment Statistics (CES) survey. Results from these sample surveys are published monthly in the BLS's "Employment and Earnings" publication.

The CPS, a monthly household survey of 60,000 units which is conducted by the Bureau of the Census for BLS, provides comprehensive data on the labor force, the employed and the unemployed by demographic characteristics. The CES, a monthly establishment survey of 200,000 units which is conducted by BLS in cooperation with State agencies, provides comprehensive data on employment, hours and earnings by detailed geography and industry. This paper will discuss the results of recent research in the area of data quality for the BLS's monthly CES establishment survey.

The CES survey is a federal-state cooperative survey which collects data on a monthly basis from a sample of nonagricultural establishments (including government). The survey currently collects 5 basic data items:

- total employment
- total women workers
- total production workers or non-supervisory workers
- total hours for production (non-supervisory) workers
- total earnings for production(non-supervisory) workers

Over the past few years the BLS has begun a long-range project to improve the CES program. In the CES Modernization (CES-M) Project, all survey aspects of the program at the national, state, and area levels are being reviewed.

Current research testing has been focused on collection methodology and the control of response/nonresponse errors for the national monthly first closing estimates. In addition, the collection of new data items is also being tested including: total payroll and total hours for all workers, and part-time employment, hours and earnings for workers in service and trade establishments.

Collection Methodology Issues

The CES is a monthly ongoing survey which requires an initiation technique for bringing new sample units into the survey and an ongoing collection technique for obtaining monthly responses over time. For a given month, there are approximately 3 weeks available to collect, key enter, edit, tabulate and publish the national 1st closing estimates, with data collection and keying coordinated across the 51 participating state agencies. While timing and decentralization pose some unique problems for CES collection methodology, the CES also has some unique strengths: a limited number of required data items (5 basic items), simple concepts and hard data sources. The major response/nonresponse error sources which a collection methodology for CES must control include: initiation response rates, initial data quality, timeliness of monthly responses, sample retention rates and data quality deterioration over time.

The current CES collection methodology uses initiation by mail followed by ongoing collection using a mail shuttle form. Due to the tight publication time constraints, there is only limited telephone contact of nonrespondents and edit failures for the 1st closing estimates. While this methodology is efficient from a cost perspective, it offers little direct control over the potential response/nonresponse error sources.

CES-M research testing has focused on the development of an alternative sample collection methodology which would contain initiation and ongoing collection components designed to control the individual error sources. The initiation phase would be conducted by personal visit (PV) to ensure a high initial response rate and would include administering a Response Analysis (records check) Survey (RAS) questionnaire to determine for each establishment:

- the proper data source(s) to be used for reporting,
- the exact data item reporting requirements and
- the earliest time period when data would become available.

The results of the RAS would then be used to develop an establishment-specific worksheet to be left with the respondent as a guide for accurate ongoing reporting along with a monthly telephone contact schedule. The CES collection schedule would be maintained by the respondent as an annual diary and would consist of the worksheet/guide, the questionnaire and the contact schedule. Ongoing collection would be conducted through direct telephone contact using Computer Assisted Telephone Interviewing (CATI) on a pre-arranged contact schedule. The establishment-specific worksheet/guide would be periodically updated through a telephone walkthrough to accommodate changes in the establishment recordkeeping practices.

A small pilot test, the All Employee Payroll Project (AEPP), has been conducted in Florida and Maine since mid 1983. This test was designed to evaluate a preliminary version of the new collection methodology against the existing collection methodology and to provide some basic data required for strengthening collection methodology and procedures. The test consists of four major components:

1. testing a new standardized personal visit (PV) training package for attaining high response rates,
2. conducting a Response Analysis (record check) Survey (RAS) during initiation to provide an initial profile of the potential sources and magnitude of response/nonresponse errors for different CES collection methodology approaches,
3. conducting a split panel test of ongoing data collection for 12 months using the current CES mail shuttle collection methodology for 50% of the sample and direct telephone collection for the remaining 50%, and
4. conducting a Quality Measurement (QM) reinterview survey after 12 months of ongoing data collection to assess data quality deterioration under the two methods and the frequency to change recordkeeping practices within the sampled establishments.

A description of the objectives and approach for each of the major test components along with an evaluation of the results in terms of initiation response rates, initial data quality, time per contact and number of contacts required under telephone collection, timeliness of responses and attrition

rates over time are discussed in the following sections. Results from the QM reinterview study will not be available until July 1985.

PV Initiation Test

Objective - The objective of the PV initiation test is to determine the amount and type of training required for state data collectors in order to yield high initial response rates which would be sustained over time.

Approach - An initial centralized PV initiation training program for state data collectors was developed by BLS's Washington office. All state data collectors received this training prior to conducting any initiation visits. The training consisted of:

- pre-training collection observations where the state personnel observed BLS personnel conducting AEPP visits,
- a 4-day central training session on technical requirements, operation procedures, and interviewing techniques,
- state personnel conducting 3-4 unaccompanied field visits,
- a 5-day state training session where BLS personnel observed state personnel conducting AEPP visits followed by a review and discussion of each visit, and
- periodic ongoing review by BLS regional office staff.

Results - Initiation response rates were 78% in Maine and 82% in Florida. This response rate was calculated by dividing the number of establishments providing information to the Response Analysis Survey by the number of in-scope establishments selected. Since a sizeable portion of a probability sample would be current CES reporters (which were out-of-scope for this study), a response rate in these states including current reporters could be considerably higher.

Response Analysis Survey Test

Objective - The objective of the RAS is to profile and provide a basis for controlling the major sources of response/nonresponse errors to which the survey estimates are subject. Specifically the RAS is to establish:

- the existence of a data source for the required survey items,
- the characteristics of that data source, e.g., firm's records, manual calculations, rough estimates,

- the limitations on each required data item with respect to the survey definition,
- the best sources of data for respondents to use consistent with timing requirements,
- the feasibility of response (i.e., time/effort required and timing), and
- the basis for developing an establishment specific worksheet/guide for accurate ongoing reporting by the firm.

The major intent of the RAS component of the study was to identify ways in which a data item could be accurately measured; and where the potential for quality loss existed, to profile the magnitude of that error. While the RAS was to provide the initial basis for identifying and controlling response error, the worksheet was to provide the ongoing basis.

Approach - Each establishment selected in the sample received a RAS interview at the time of PV initiation. From this interview, the establishment specific worksheet/reporting guide was developed and used for collecting the current month's data. The respondent was then set up for 11 months of ongoing data collection by either mail shuttle or telephone collection. A copy of the worksheet was left with the respondent to be used as a guide for accurate ongoing reporting.

Results - Tables 1 and 2 are in terms of percent of establishments. The results indicate the hardness of the establishments employment and earnings data along with timeliness/availability of the required data for monthly reporting. While establishments will often have actual records (hard data) available in summary form for these characteristics, this data may require adjustments in order to conform to BLS's definition. The tables also provide an indication of the proportion of establishments requiring one or more adjustments to the summary data along with an indication as to whether or not hard data existed within the establishment in order to make the required adjustment(s). Where hard data did not exist for a required adjustment, the respondent was asked whether or not an estimate (soft data) of the value could be made. In certain instances the respondent could not provide an estimate for the missing value. The major items requiring adjustment along with their magnitude are discussed below.

Employment data existed or could be developed from hard data sources for

over 99% of all establishments (Table 1). Of this, 43% existed in exact summary form while 57% required one or more adjustments. Primary adjustments for employment included manual tabulation of employees, adding in persons on vacation and sick leave and deleting persons on leave without pay. Less than 1% of the establishments could not provide all required adjustments to employment from hard data sources for all employees. This accounted for less than 0.1% of total employment.

Earnings data existed or could be developed from hard data sources for approximately 90% of all establishments (Table 2). Of this, 29% existed in exact summary form while 61% required one or more adjustments. Primary adjustments for earnings included adding in vacation pay, commissions and regular bonuses, subtracting out nonregular bonuses and reimbursement for fuel and meals. Approximately 10% of the establishments could not provide all required adjustments to earnings from hard data sources for all employees. This accounted for less than 3% of total earnings.

Hours data were about as hard as earnings, with adding in scheduled hours for salaried workers and vacation hours the most common adjustments.

The timing categories in tables 1 and 2 indicate the availability of payroll data relative to the release date of CES survey estimates. The 74% "Readily Available" includes those establishments which have payroll data available in adequate time for mail or telephone collection by the State Employment Security Agency. The 15% "Marginally Available" includes those establishments which have payroll data available in time to report it by telephone but not by mail to the State Employment Security Agency. Thus based on data availability dates for the establishments a maximum of 74% of the establishments had the potential to make 1st closing by mail collection whereas a maximum of 89% (74% + 15%) had the potential to make 1st closing by telephone collection. The 11% "Not Available" include those establishments which do not have payroll data available in time to be processed for national estimates no matter how the data is collected. Approximately half of the establishments which had data "not available" have a monthly payroll system for some or all of their employees. The payroll systems where data was "not available" accounted for 5% of total employment.

The results of the RAS are intended to indicate the potential or "best possible" case for both hardness and timeliness of reported data. The resultant hardness and timeliness of reported data and how closely this can approximate the potential will depend on the specific collection methodology used. While the proportion of data which cannot be obtained using hard data sources provides an initial potential for response error, the required adjustments represent another significant potential source of response error since it may not be obvious to the respondent that the adjustment is necessary or how to accurately make the adjustment.

The new collection methodology which is being tested attempts to control these potential sources of response error by administering a RAS during initiation to determine the most accurate method for the development of the required data items from the establishments records and leaving with the respondent an establishment-specific worksheet as a guide for ongoing reporting. The use of telephone for ongoing collection attempts to control timeliness and sample attrition which are potential sources of nonresponse error.

Ongoing Collection Methodology Test

Objective - The goal for determining an ongoing collection method is to control sources of response error and the level of nonresponse in ongoing data collection. The current test is to assess the feasibility and to compare the error profiles resulting from the use of telephone collection versus mail shuttle as an ongoing collection methodology. The specific objectives of the test are to assess:

- the differences in the ability to maintain timely monthly responses over the year,
- the differences in attrition rates under the two collection techniques,
- the problems, time/effort, and cost associated with telephone collection for CES, and,
- to simulate the elementary components of a CATI type environment of data collection.

Approach - The sample, at the time of selection, was divided into two panels: a telephone-only ongoing collection panel and a mail-shuttle ongoing collection panel.

For the telephone collection panel, the CES questionnaire was maintained by the respondent as a diary (or log) with the worksheet as a guide for accurate reporting. A contact schedule was arranged with the respondent based on the earliest date accurate data became available within the establishment. The state data collector maintained an identical CES questionnaire (diary), updating it based on the results of the monthly telephone collection.

For the mail shuttle collection panel, the current CES collection procedures are being used with the exception that the respondent now has available a worksheet (developed during the initiation) to aid in developing accurate monthly figures. The monthly mail shuttle procedures involve:

- mailing the questionnaire to the respondent during the week of the 12th of the month and a
- follow-up letter by mail or telephone reminder after 6 weeks

Results - A primary concern for a CES collection methodology is the ability of the respondent to provide timely monthly estimates. Table 3 profiles the potential percent of 1st closing respondents from the RAS results to the actual percent achieved during the test for both mail shuttle and telephone collection. The results of the RAS indicate a potential of 74% of the establishments would be able to make 1st closing under mail shuttle, currently only 47% of the respondents are actually making that date. The potential under telephone collection was 89%, currently 77% of the respondents are making 1st closing. While telephone collection is proving to be the more effective method for ensuring timeliness, test results indicate the need for both improved methodology and improved control over the placement of calls.

Table 4 profiles the attrition rates under mail shuttle versus telephone collection. The percent of units still participating after an average of six months of collection was significantly larger for the telephone than the mail panel. Virtually all units agreeing to the 11 month test were still participating by telephone, while the mail panel dropped by 21%. For the total attrition rates listed, approximately 2% in both mail and telephone was due to units going out of business during the test period.

The average number of calls required to collect the current months data was 1.6 (see table 5). This includes calls from the respondent as well as calls made by the state agency to collect the current months data. There has been a slight systematic decrease over the months in the number of calls per report as the respondent became more accustomed to the monthly collection schedule. The average length of a phone call was 2.9 minutes (see table 6). Calls in which the establishment was not reached (busy signals, wrong numbers, or no answer) were not counted as a call for this study. During this initial test no attempt was made to structure the telephone interview process or to control the time per call. Under future CATI testing the differences between the two states' average interview time per report (currently 3.9 minutes versus 2.0 minutes) should be reduced.

Conclusions

Business establishments maintain records on employment, hours and earnings, but often not in a manner which allows for easy and accurate reporting of the data items in the CES survey. An initiation visit (or possibly telephone call) to explain the proper and simplest way to report can minimize response error, and maximize response rates. The most effective initiation technique needs further study. Under consideration at this time is personal visit initiation of large units, telephone initiation of small units, and telephone conversion of current CES reporters, all of which will make use of modified variations of the response analysis survey questionnaire.

Telephone collection is considerably more effective in retaining reporters over time, and in obtaining response in a timely manner for 1st closing estimates. There appeared to be no significant loss in units agreeing to ongoing telephone collection. The QMS results should provide an indication of the effectiveness of telephone collection in maintaining high quality data over time.

The additional cost of personal visit/telephone initiation with ongoing collection by telephone has not yet been determined. The initial study has shown that ongoing telephone collection can be handled by a relatively small staff, since the number of calls required is small and the length of the call is short.

Future Testing

The AEPP was a small prepilot study

designed to provide an indication of the scope of the problems which will need to be addressed in the development of an effective CES collection methodology. While the basic framework for future research studies will be similar (ie., PV, RAS, worksheet, telephone/CATI collection, QM) several of the components will be significantly enhanced over the next few years of research testing.

- The RAS form will be streamlined and tested both under PV initiation and telephone initiation. For telephone initiation the RAS and worksheet will be collected using a CATI survey instrument.
- Telephone collection will be replaced by on-line CATI collection with automated scheduling and full editing capabilities including longitudinal editing features.
- Telephone respondents will receive a periodic RAS telephone walkthrough to ensure the establishment's worksheet/guide is current and accurate.
- Telephone respondents will be given the option of self-responding their data directly by telephone to the computer (or a recording device) or waiting for the monthly CATI collection call.
- Individual state CATI collection sites will be linked to a national network for the constant flow of reported data.

The BLS will be conducting this research to develop test methodology and to determine the operational feasibility, quality enhancements and cost associated with this form of data collection.

References:

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Table 1

AVAILABILITY AND POTENTIAL
HARDNESS OF
EMPLOYMENT DATA

	Readily Avail.	Marginally Avail.	Not Avail.	Total
Hard/Unadjusted	33%	6%	4%	43%
Hard/Adjusted	41%	9%	7%	57%
Soft/Estimated	0%	0%	0%	0%
Soft/Not Estimated	0%	0%	0%	0%
Total	74%	15%	11%	100%

Table 2

AVAILABILITY AND POTENTIAL
HARDNESS OF
EARNINGS DATA

	Readily Avail.	Marginally Avail.	Not Avail.	Total
Hard/Unadjusted	21%	6%	3%	29%
Hard/Adjusted	47%	8%	6%	61%
Soft/Estimated	2%	1%	1%	3%
Soft/Not Estimated	6%	1%	2%	8%
Total	74%	15%	11%	100%

Hard Data: where summary data and all required adjustments for all employees come directly from employers records.
Soft Data: where summary data or any required adjustment cannot be obtained directly from employers records.

Table 3

PERCENT OF CES REPORTS PROCESSED
FOR 1st CLOSING IN MAINE

	MAIL		TELEPHONE	
	On Time	Late	On Time	Late
POTENTIAL	74%	26%	89%	11%
RESULTANT	47%	53%	77%	23%

Table 4

ATTRITION RATES
MAIL vs TELEPHONE COLLECTION

	MAIL	TELEPHONE
MAINE	17%	1%
FLORIDA	25%	5%
TOTAL	21%	3%

Table 5

TELEPHONE COLLECTION
NUMBER OF CALLS

	1 Call	2 Calls	3 Calls	4+ Calls	Calls Per Report
FLORIDA	71%	20%	6%	3%	1.4
MAINE	51%	33%	10%	6%	1.7
TOTAL	61%	26%	8%	5%	1.6

Table 6

TELEPHONE COLLECTION
LENGTH OF CALLS

		Min. Per Call	Calls Per Rept.	Time(min.) Per Report
FLORIDA	Oct-Dec	4.1	1.5	6.2
	Oct-Jun	3.9	1.4	5.5
MAINE	Oct-Dec	2.1	1.9	4.0
	Oct-Jun	2.0	1.7	3.4
TOTAL	Oct-Dec	2.9	1.7	4.9
	Oct-Jun	2.8	1.6	4.5