DATA UPDATE

Updating the BLS Current Employment Statistics Survey

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IN JUNE OF 1995, the Bureau of Labor Statistics (BLS) announced plans for a comprehensive sample redesign of its monthly payroll survey. The bureau's plans called for a 2-year research effort to develop the new design, followed by a production test, and then phased-in implementation if the test results were satisfactory. As scheduled, the research phase for the Current Employment Statistics (CES) sample redesign is complete, and the production test of the new design is underway. A test period of parallel estimates from the new design allows BLS to conduct a comprehensive evaluation of the new sample methods, systems, and procedures before they become operational.

The CES program is a federal/state cooperative establishment survey that provides monthly estimates of nonfarm payroll jobs and the hours and earnings of workers. These data are some of the most closely watched and widely used economic indicators. Two limitations of the CES survey now hamper its ability to fully reflect current monthly employment trends: the lack of a probability-based sample design and the absence of a method for directly measuring employment from new business births.

The existing CES sample of some 400,000 business establishments is a quota sample whose inception over 50 years ago predated the introduction of probability sampling as the standard for sample surveys. The new design is a stratified, simple random sample, where the strata are specified by state, industry, and employment size. The sampling rates for each stratum are determined through a method known as *optimum allocation*. An optimum allocation distributes a fixed number of sample units across a set

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of strata in such a way as to minimize the overall variance, or sampling error, on the primary estimate of interest. The allocation methodology takes into account the population size and variability of the individual strata and any differential costs of sampling across strata.

The number of sample units is fixed to the approximate size of the existing CES survey—that is, a sample size supportable by current program resources. Total nonfarm employment is the primary estimate of interest, and the new design gives top priority to measuring it as precisely as possible. Optimum allocation strata are defined in terms of broad industry groupings, mostly at the major industry division level. The current sample size can support the publication of considerable industry and geographic detail within a state and provide for highly reliable national CES estimates at the total nonfarm and detailed industry levels.

The sampling frame, and the CES sample itself, will be updated on a quarterly basis, as each new quarter of unemployment insurance–based universe data becomes available. This quarterly frame maintenance will help keep the sample up-to-date by adding new firm births and deleting business deaths and provide the basis for a regular program of ongoing sample rotation. The exact rotation pattern will be determined based on statistical criteria and data-collection cost figures developed during the production test.

Estimation formulas. In order to take best advantage of the new sample design, improved estimators also have been developed for the CES survey. Estimates will be generated using a stratified expansion estimator that uses weights developed from the population sampling fractions to expand sample employment to an estimate of universe employment. This basic technique will be augmented by benchmark factors, or poststratification weights, that take advantage of information from the most recent unemployment insurance (UI) population count. These benchmark factors rely on a strong correlation between current month and benchmark month employment across business establishments to provide for variance reduction. Testing shows this estimation method performs better than the unweighted ratio of current to previous month sample employment totals currently in use.

Business births and deaths. New businesses form every month and affect the accurate measurement of monthly employment change in two ways. First, new businesses generally start up and contribute to overall employment prior to the time they first appear on the UI universe frame and are available for sampling. Second, new businesses tend to have

particularly rapid employment growth during their initial years in business. This underscores the necessity of introducing these units into the survey as soon as they appear.

BLS has researched both sample-based and model-based approaches to measuring birth units that have not yet appeared on the UI universe frame. The sample-based approach relies on having individual state employment security agencies (SESAs) generate files of new UI account registrations at the end of each calendar month and immediately forward these files to BLS, where they are compiled into a business birth sampling frame so that a simple random sample of new business births can be selected each month. This avoids the built-in lags associated with waiting for the end-of-quarter UI processing to be completed.

This approach to measuring the birth and death components of employment change is conceptually appealing because it keeps the CES estimates entirely sample-based and grounded in very current information. In practice, however, research has revealed some serious limitations with this method. The monthly files of new UI accounts often indicate that firms first registering for UI tax purposes already have been in existence and employing covered workers for several months prior to their registration. In addition, it is very costly to create a new frame and then select and screen a business birth sample each month. Early results from the birth-estimate simulations also indicate a high level of variability associated with these estimates.

BLS also has conducted research on model-based methods of estimating the employment contribution of business births and deaths. Modeling is less costly than sampling and does not rely on construction of auxiliary sampling frames. Exploratory analysis of this approach utilized information from the BLS longitudinal database of establishment-level data for the UI universe. In this research, the population of establishments was divided into three components: business births, business deaths, and continuing units. Overall indications are that while the birth and death components each are relatively large, the net contribution of births and deaths to over-the-month employment change is quite small and relatively stable. Most employment change within a given year results from the behavior of the continuing unit population. A model-based method for estimating the net employment change due business births and deaths thus may be a feasible alternative to sample-based estimates.

The most significant potential drawback to the model-based approach is that time series modeling assumes a predictable continuation of historical relationships. Therefore, such models are likely to have some difficulty producing reliable estimates at economic turning points or during

periods when there are sudden changes in trend. In addition, the forecast horizon of 6 to 12 months over which the employment for new business births must be estimated before those units appear on the regular UI-based sampling frame is relatively long for time series modeling.

Implementation Plans. If test results are satisfactory, BLS will proceed as scheduled with a phased-in implementation of the new CES sample design beginning in June of 1999, coincident with the publication of March of 1998 CES national benchmark revisions. The wholesale trade industry series for CES national estimates will be converted to the new probability-based procedures at that time. Probability-based estimates for state and area wholesale trade series are targeted for introduction in March of 2000 with the next state benchmark revision.

After the initial conversion of wholesale trade, BLS will continue a phase-in of the new design by major industry division. Implementation of the new sample and estimators for major divisions will be scheduled to coincide with the publication of benchmark revisions, in order not to disrupt published over-the-month changes for current month estimates with a continually changing sample composition. Thus implementation of the redesign for the second group of industries tentatively is scheduled to coincide with the publication of March 1999 benchmark revisions in June of 2000. Conversion of all industries is expected to be completed approximately 4 years from the start of implementation.