U.S. Department of Labor   Bureau of Labor Statistics
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LAUS Technical Memorandum No. S-21-01

MEMORANDUM FOR: STATE WORKFORCE AGENCY ADMINISTRATORS
                 AND BLS REGIONAL COMMISSIONERS

FROM   : JAY A. MOUSA
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                       Office of Field Operations

  SUBJECT   : Implementation of the Fifth Generation Local Area Unemployment
                       Statistics (LAUS) Models

Purpose: This memorandum provides states with information on the fifth generation of LAUS models, which will replace the fourth generation models during next year's annual processing period and January 2021 estimation. It also includes the plan for providing states with monthly fifth generation estimates during the autumn 2020 dual estimation period.

Background: The LAUS Program introduced the current improved fourth generation models in 2018 during the 2017 Annual Processing (AP) cycle. LAUS Technical Memorandum No. S-17-19, "Review of Improved Fourth Generation Local Area Unemployment Statistics Models and Request for Feedback", provided states with information on the improvements to the fourth generation models and asked states to evaluate the performance of their improved models. LAUS Technical Memorandum No. S-18-05, "Local Area Unemployment Statistics (LAUS) Improved Model Implementation Plans", announced the implementation of improved fourth generation LAUS models during the 2017 Annual Processing (AP) cycle.

The COVID-19 pandemic caused abrupt changes that resulted in a structural break in the relationship between the model inputs, the Current Population Survey (CPS) and the state covariates. These changes required re-running the entire annual processing system each month as the design of the fourth generation models could not handle this structural break in real time. To accurately capture the impact of the rapidly changing model inputs, the LAUS program performed model interventions on a monthly basis. Normally the LAUS Program introduces model interventions, such as level shifts, during annual processing after the addition of a full year of subsequent data and holds such interventions constant during the production year. To measure the effects of the pandemic, the identification, estimation, and adjustment of level shifts took place in real time, with limited information, and without modifying the model specifications for monthly real-time benchmarking.

Summary of the New Models: The fifth generation models address the unprecedented structural changes that occurred this past year with new bivariate models and external real-time benchmarking using ratio adjustment.

The re-specified fifth generation models remove the regression component from signal estimation. They separately model the CPS and the state covariate simultaneously, allowing the correlation of trend disturbances in the CPS with like disturbances in the covariate model. The CPS and covariate series also have independently estimated level shifts.

External ratio adjustment replaces model-based benchmarking. External ratio adjustment adjusts each area's labor force component by the same ratio to match the separately estimated level of the benchmark area. This method does not require the combination of state models within a Census Division into a single multivariate model, making it much easier to modify state models during current-year estimation without re-running the annual processing system. External ratio adjustment also does not require pre-adjusting the state CPS for level shifts. This approach allows for more flexible state model specification.

Revised STARS Tables: To support analysis under dual estimation, the National Office will issue separately updated STARS analysis tables conforming to the fifth generation models.

All months of seasonally adjusted current-year estimates will show the effects of the Reproducing Kernel Hilbert Space (RKHS) smoothing filter, which directly impacts smoothed seasonally adjusted estimates shown on Table 1a and motivates the restoration of Tables B-1 and B-2 showing contributions to smoothed estimates.

The bivariate structure of the new model necessitates several changes in the STARS Components of Change tables (Tables 4, 5, and 6.). Tables 4a, 5a, and 6a ("SA Filter and SSA Smoother") will have three new columns. The column titled "SSA Change No LS" will display the over-the-month change in the smoothed seasonally adjusted (SSA) estimate without any change in level shift. The "LS Change" will display the monthly change in the level shift. The "SSA Change with LS" column will show the combined effect of the level shift on the monthly change of the SSA estimate. Tables 4b, 5b, and 6b will no longer have a regression component to the decomposition of the signal, because a bivariate model does not incorporate the state-supplied covariate in this way. The lack of a regression component also makes Table 10b unnecessary. Tables 4b, 5b, and 6b will display the signal broken out into trend, seasonal, and irregular components, which will reflect the combined contributions of the CPS and the covariate. Tables 4b, 5b, and 6b will also show a level shift column showing the contribution of level shift changes to the signal.

The use of external ratio adjustment for real-time benchmarking will allow for the more straightforward analysis of several factors impacting estimates. Tables 4a, 5a, and 6a will show the impact of current-year level shift changes in seasonally adjusted estimates. Seasonal factors noted as not being benchmarked in Table 9 will reflect model-based seasonal adjustment used in creating the not seasonally adjusted estimate, as distinct from the benchmarked seasonal factors issuing from the X-11 seasonal filter. Because benchmarking will be external to the model, it will not impact the model's CPS predictions (allowing the simplification of Table 11a) and it will not differentially impact the components of the estimated signal (allowing the simplification of Table 12).

Attachment 1 contains examples of the revised STARS tables.

Data for State Review: With the release of this memorandum, states may access LAUS estimates from the fifth generation of LAUS models via EUSweb in the file "ST Gen5.xlsx" (where "ST" is the state's two-character abbreviation). Each file contains historical data from 1976 through 2019 and concurrent data for 2020. The estimates utilize the same Reproducing Kernel Hilbert Space (RKHS) filter as the current LAUS models. In addition to the fifth generation data, each file includes the current official fourth generation estimates for comparison, as well as the monthly model inputs. All estimates directly compare with data currently published by BLS and contained in STARS covering all 50 states, and the District of Columbia, and the following substate areas and their respective balance-of-state areas: the Los Angeles-Long Beach-Glendale, CA Metropolitan Division; the Miami-Miami Beach-Kendall, FL Metropolitan Division; the Chicago-Naperville-Arlington Heights, IL Metropolitan Division; the Detroit-Warren-Dearborn, MI Metropolitan Statistical Area; New York city, NY; the Cleveland-Elyria, OH Metropolitan Statistical Area; and the Seattle-Bellevue-Everett, WA Metropolitan Division. (For the layout of these files, see attachment 2.)

In addition to the data files, historical graphs are available that compare the fourth and fifth generation model estimates. The state graph files are also available in the state folders on EUSWeb in the file "ST New 5th Gen Graphs.pdf" (where "ST" is the state's two-character abbreviation).

Dual Estimation: Beginning October 16th, BLS will provide states with output from the fifth generation models. The methodology updates do not require changes to the STARS web interface or additional production steps for states. LAUS program office staff will produce the estimates and resulting draft STARS diagnostic tables. Each month, program office staff will provide these files to states via EUSweb no later than the Friday following the STARS due date.

Training: The national office will provide training with additional information on the fifth generation models and a discussion of the revised STARS output tables. A WebEx training session for states is scheduled for Monday, October 19, from 2:00 PM – 3:00 PM for state LAUS staff; regions may also attend this training along with their states.

Actions required: States should review their fifth generation model estimates and provide feedback to their regional office by November 20, 2020. States should also review the concurrent 2020 estimates and diagnostic tables provided during dual estimation on an ongoing basis and provide comments to their regional office as they arise. In addition, BLS would like to solicit any comments or concerns states have regarding the use of monthly level shifts in their current 2020 official estimates that were added after the April reference month. (For information on level shifts and their effect on the estimates, see STARS Tables 4b, 5b, and 6b, Decomposed Benchmarked CPS Signal.)

For recent guidance on use of the STARS tables see the document titled Interpreting STARS Tables under COVID-19-Related Model Improvements.) This information will be helpful in specifying state models during annual processing.

Effective Date: This memorandum is effective immediately.

Workload Impact: Neutral; these activities are included in the Cooperative Agreement.

Inquiries: Direct all inquiries to the appropriate BLS regional office.

<u>Attachments</u>:

Attachment 1 - Modifications to the Monthly STARS Tables

Attachment 2 - ST Gen5.xlsx file layout