

Recent Developments in Current Employment Statistics

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NBER Innovations in Measuring Employment
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Outline

1. Overview of Current Employment Statistics (CES) survey
2. Recent challenges/opportunities and CES is addressing:
 - ▶ Late sample, monthly revisions, and unit nonresponse
 - ▶ Seasonal adjustment's role in monthly revisions
 - ▶ Business openings, closings, and the birth-death model
 - ▶ Small area estimation and use of alternative data



Current Employment Statistics (CES) survey and methods



Current Employment Statistics (CES)



Nonfarm payroll employment, hours, and earnings data by industry and geography



Survey of about 119,000 businesses / 622,000 establishments



Initial National data released about 3 weeks after end of the week containing the 12th (reference for pay period)



Among the timeliest Principal Federal Economic Indicators, closely watched by policymakers, markets, many other data users

CES All Employees (AE) weighted link relative estimator

$$\widehat{AE}_t = \left(\widehat{AE}_{t-1} - \sum_j ae_{j,t-1}^A \right) \times \frac{\sum_i w_i \times ae_{i,t}^T}{\sum_i w_i \times ae_{i,t-1}^T} + \sum_j ae_{j,t}^A + b_t$$

- Matched current/prior month sample (reported employment > 0 in both months)
- “Atypical” data self-representing – influential reports, outliers, strikes, etc.
- Implicit imputation of late/non-respondents in NAICS/region, missing completely at random (MCAR) assumption within estimation cell
 - ▶ Manual imputation for select (largely seasonal) certainty units

Late sample, monthly revisions, and nonresponse



CES revision process

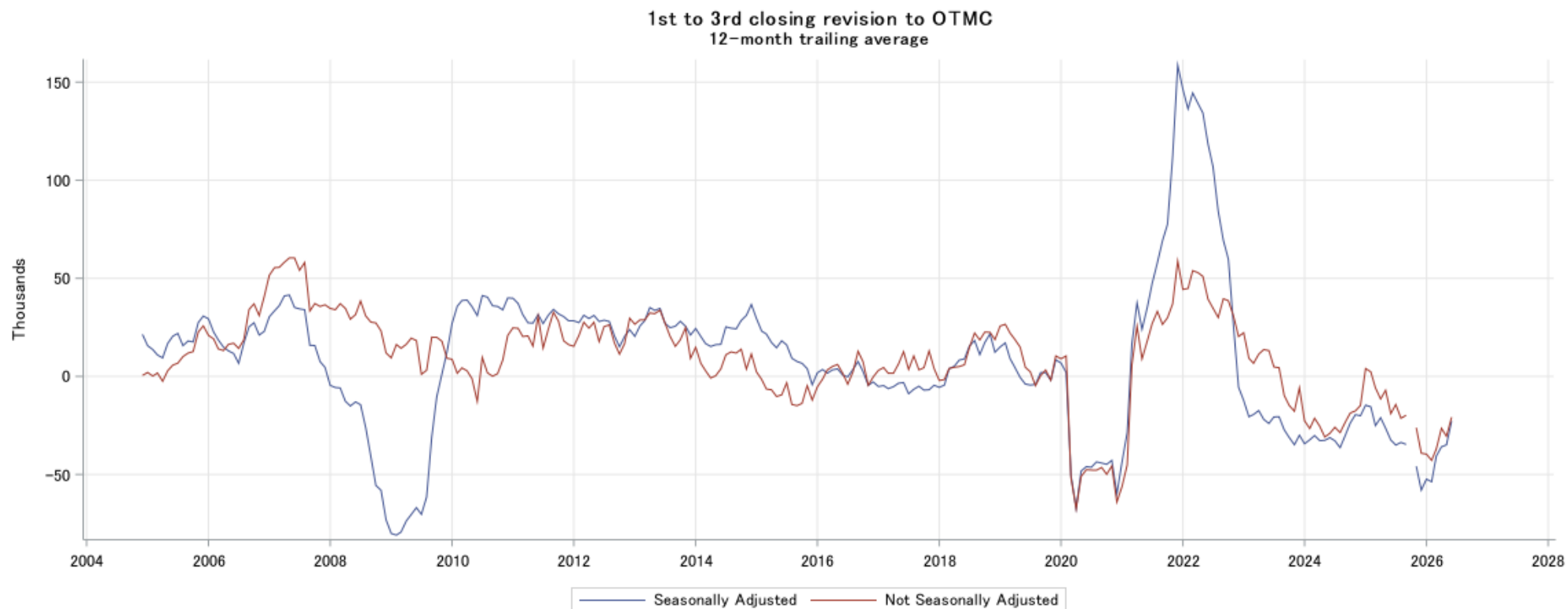
Monthly Revisions

- Prior 2 months revised with each monthly release
- About 1/3 of responding establishments report too late for initial release
- Also incorporates resubmitted/corrected data and other processing changes
- Seasonal adjustment factors also updated for prior 2 months

Annual Revisions

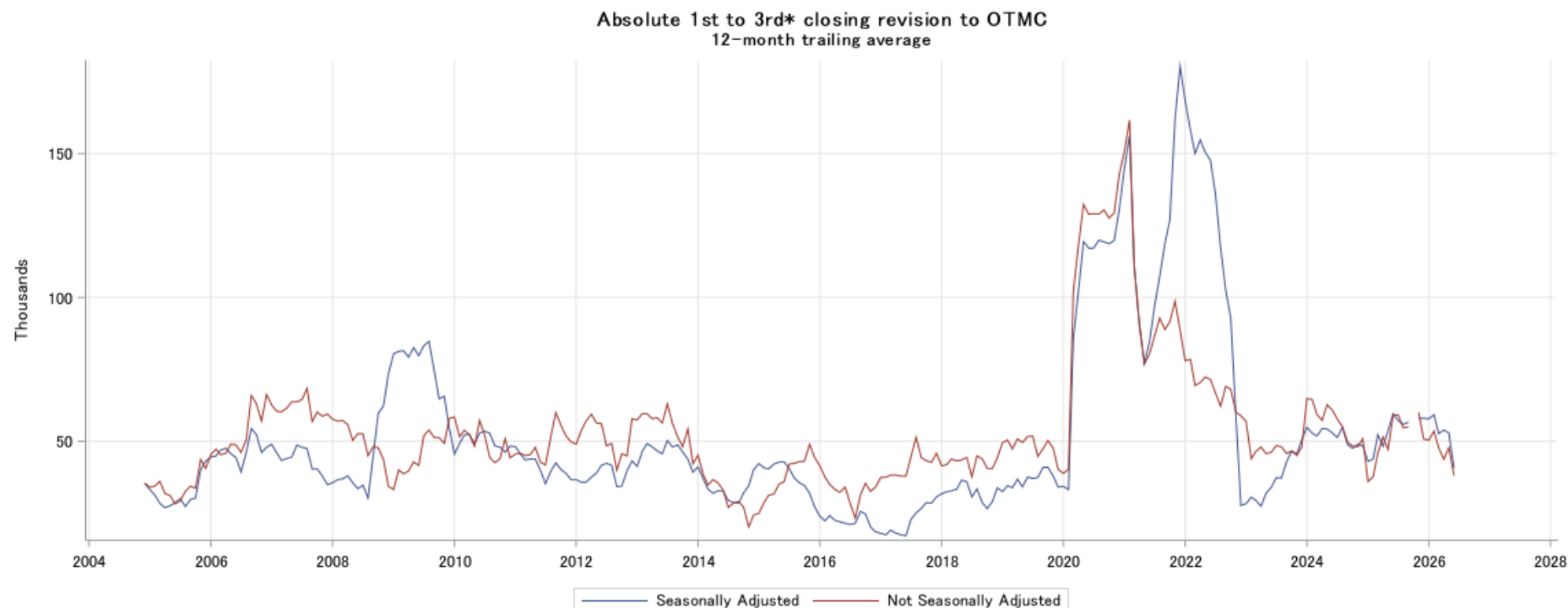
- CES AE levels benchmarked primarily to March Quarterly Census of Employment and Wages (QCEW)
- QCEW: Administrative count from Unemployment Insurance tax filings
- Annual process: revises 21 months not seasonally adjusted (NSA) and 5 years SA

Direction of revisions to seasonally adjusted (SA) data are more cyclical than to not seasonally adjusted (NSA) data



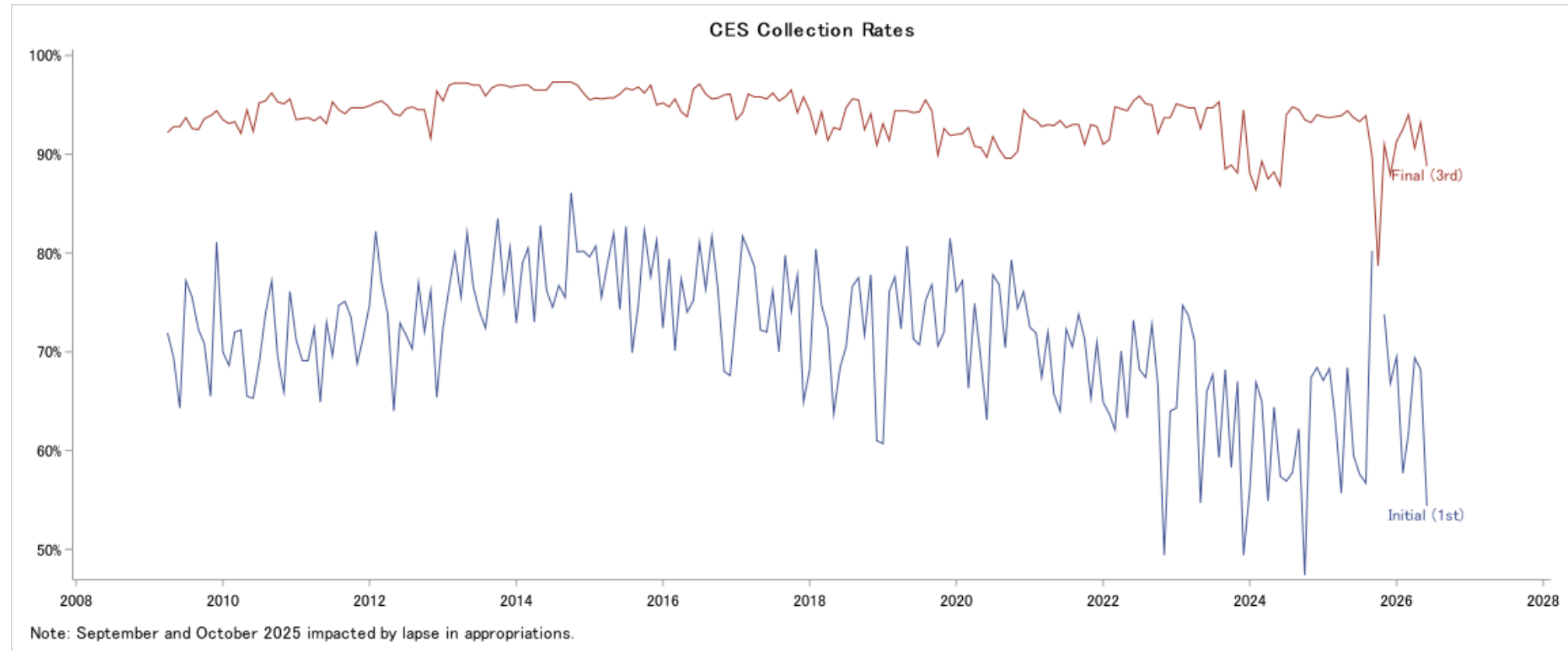
Note: Excluding October 2025

Size of SA revisions also grew more than NSA around Great Recession, COVID-19 pandemic



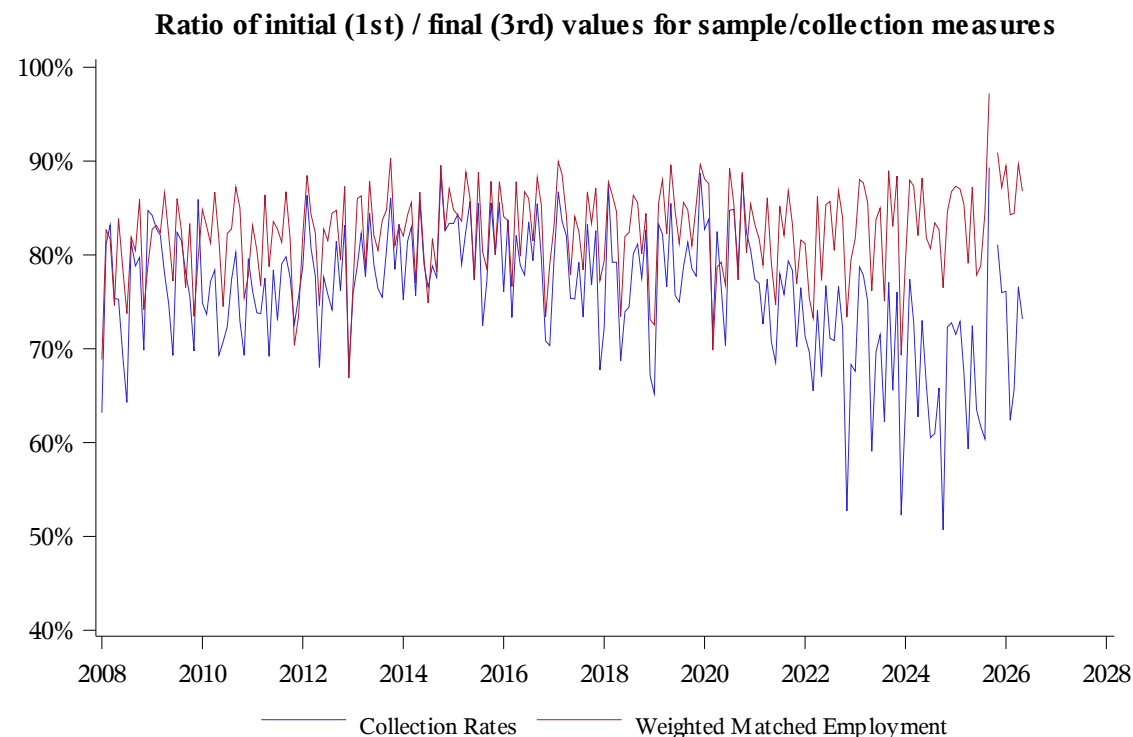
Note: Excluding October 2025

Gap between initial (1st) and final (3rd) collection rates has grown



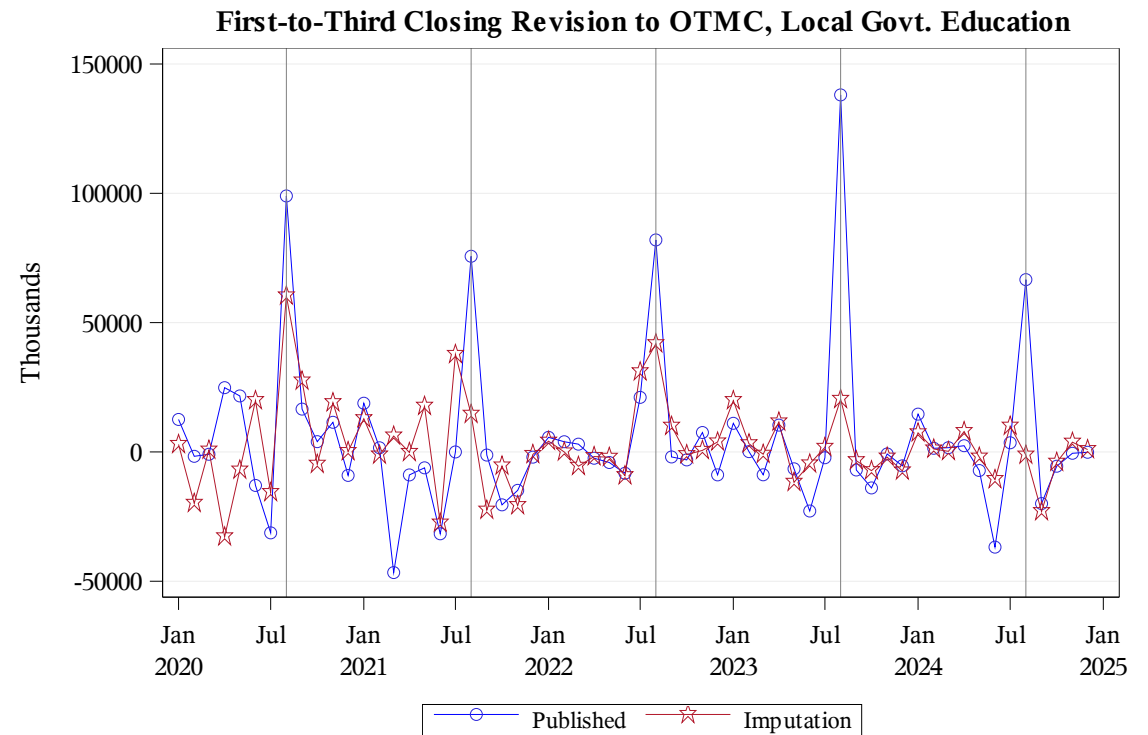
Why haven't revisions gotten larger?

- [Wilcox \(2025\)](#) “BLS is gaining more information than ever before between the first and second estimates of payroll employment. Nonetheless, the first revision is no more variable now than it was two decades ago.”
- We compared ratios of weighted employment received at 1st/3rd versus collection rates
- Late respondents increasingly represent fewer (weighted) jobs per establishment

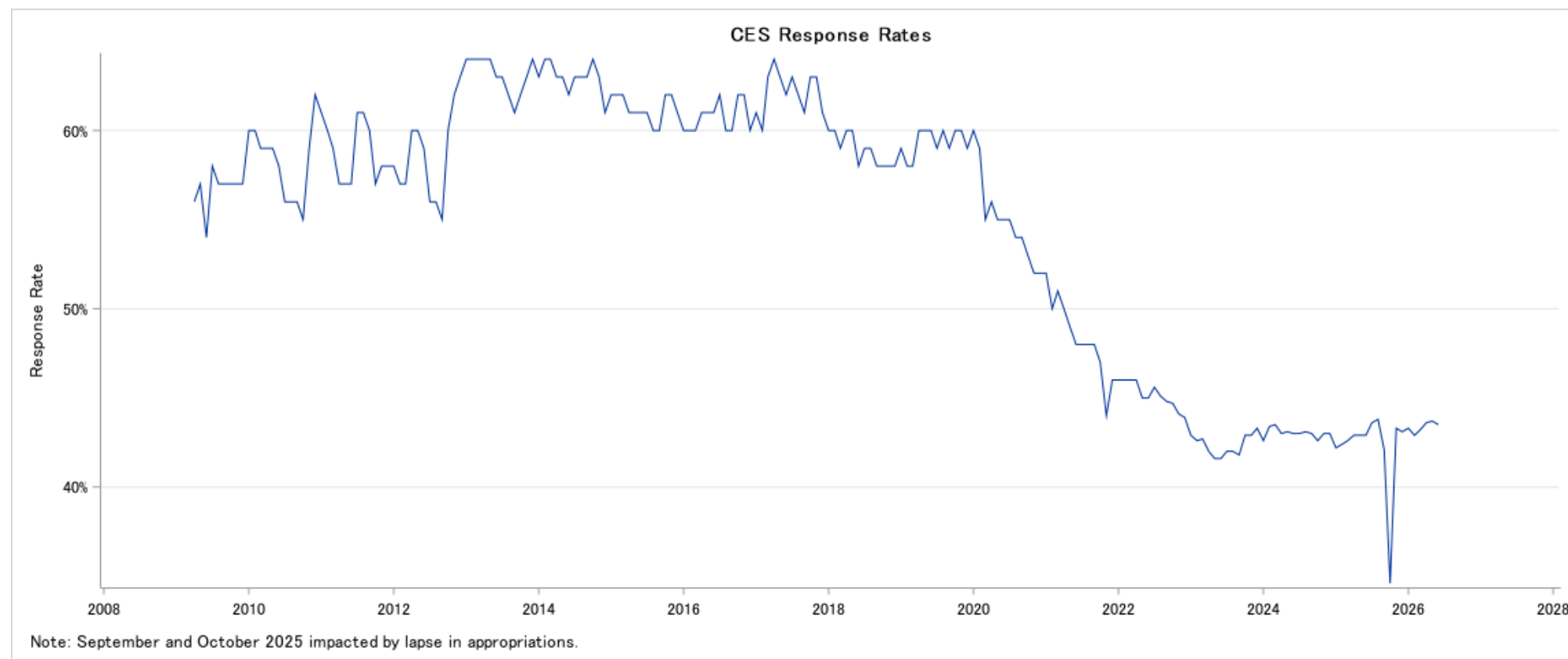


Predicting Revisions and Imputing for Late Sample

- Exercise forecasting NSA revisions for 100 industries (2016-2025)
- Local government education revisions predictable, very positive in August
- Developed RegARIMA-based nowcast imputation to guide BLS analysts since Aug-2025
- Private sector revisions less predictable, but attempting to develop imputations where possible



Response rates trended down during the COVID-19 pandemic but have stabilized since 2023



Addressing Nonresponse

- Units that never respond may contribute to benchmark (but not monthly) revisions
- Investigating multiple imputation and multivariate tree-based methods to develop weight calibrations
 - ▶ Industry-specific approaches may also work (e.g., sports teams)
- BLS contracted with outside research firm to conduct nonresponse bias analysis planned to be posted publicly by end of CY2026

Seasonal adjustment's role in monthly revisions



Seasonal Adjustment and Monthly Revisions

- CES directly adjusts 148 series and aggregates to total nonfarm
- Without revisions to NSA data, SA revisions would have been consistently negative in 2025, suggesting forecast error important in cyclical
- BLS plans to research multivariate forecasting and other seasonal adjustment approaches in 2027

Revision to SA over-the-month change due to:

NSA data revisions: Underlying data revises, also affects calculation of SA factor

Publication decisions: Over-the-month change at 3rd closing compares two different seasonal adjustments – [Wright \(2013\)](#) recommend updating entire time series each month

Forecast error: Series are extended with RegARIMA forecasts/backcasts before applying X11 seasonal adjustment filters
- especially challenging at turning/inflection points

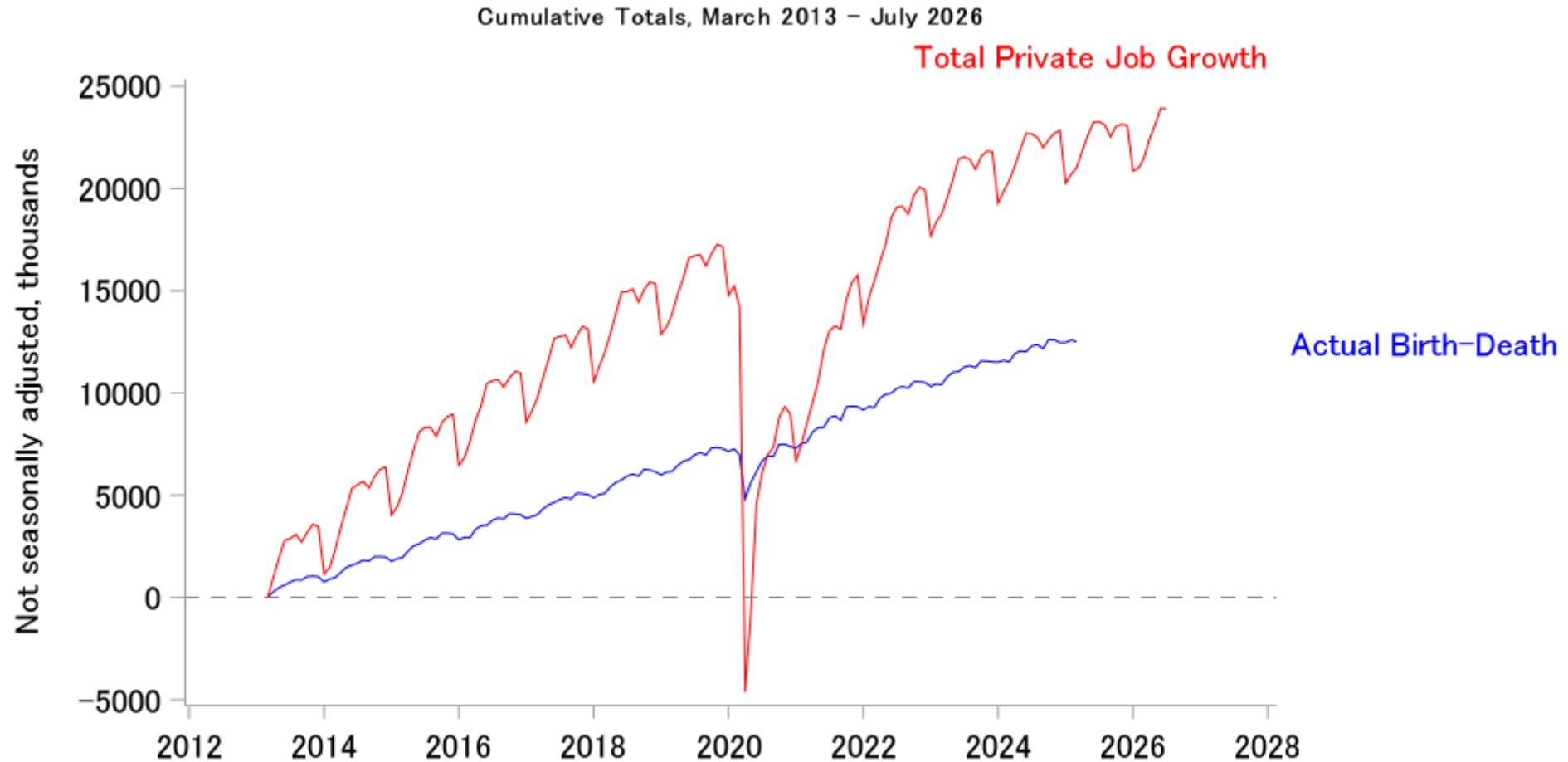
Business openings, closings, and the birth-death model



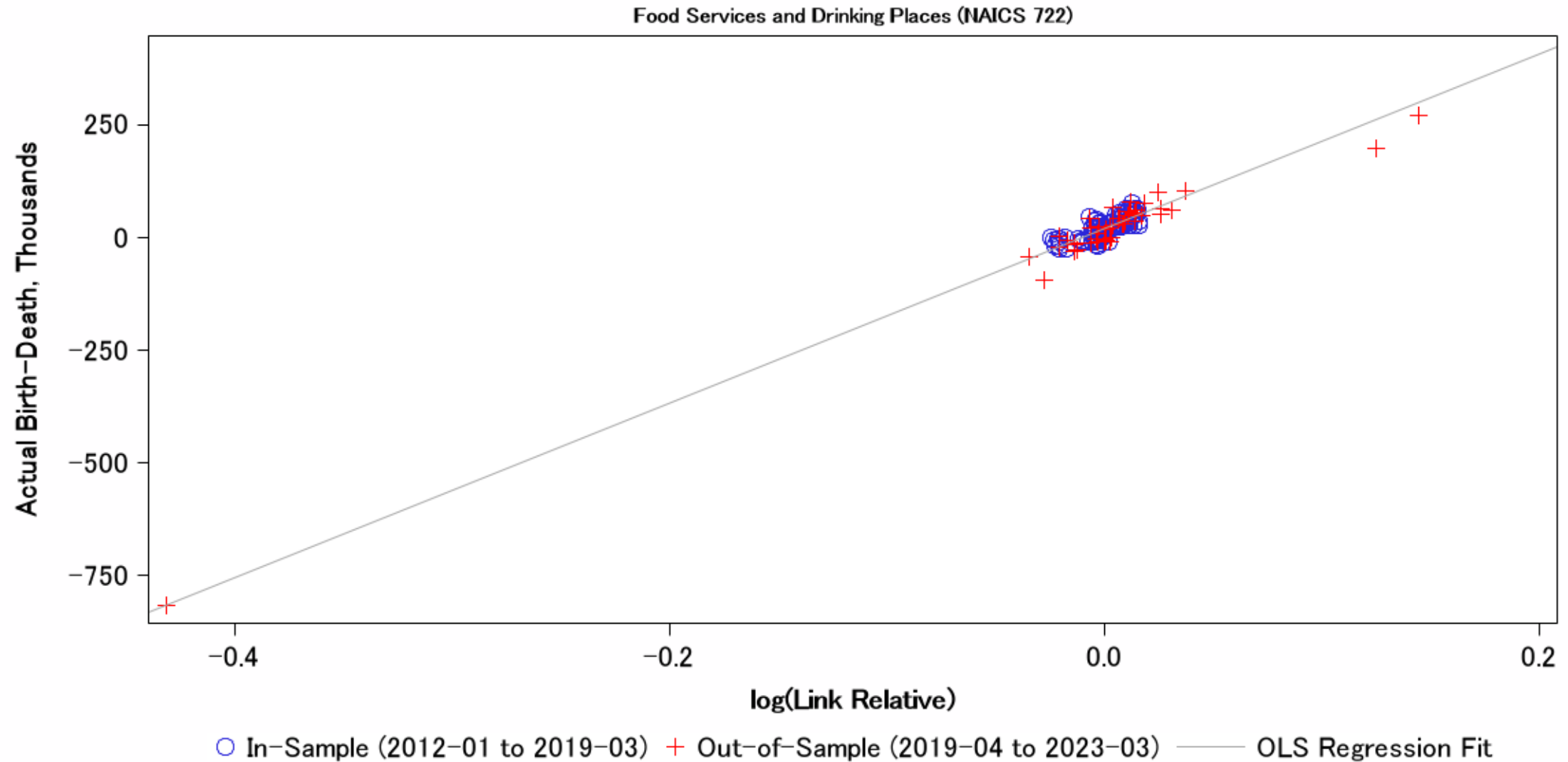
CES Birth-Death Model

- Actual birth death: Amount needed to offset CES's inability to capture business openings and closings in real time
 - ▶ Derived from QCEW (UI tax administrative universe)
 - ▶ Forecast for use in estimates (historically with a SARIMA)
- 2020-2021: used reported drops-to/returns-from 0 employment
- RegARIMA-based forecasting models developed post-pandemic
 - ▶ Used in Apr-Oct 2024 “post-benchmark” re-estimates
 - ▶ Used in ongoing monthly estimates since January 2026

Birth-Death matters mostly for long-term trend, but contributes to seasonal and cyclical variation



CES sample can be used to predict birth-death



Further Work on Birth-Death

- RegARIMA forecasts using the sample-link worked well in simulations and reduced size of Mar-2025 benchmark
- Room for improvement at detailed estimating cell level and to improve operational aspects
- Additional sample information (extreme change in small establishments) may offer further improvements
- Use of alternative data to model births/deaths?

Small area estimation and the use of alternative data



Alternative Data and Small Area Estimation

- BLS, BEA, Census, and Opportunity Insights are jointly working with large payroll provider data
 - ▶ [Dunn et al. \(2026\)](#) demonstrated how these payroll provider data could be used in a model to expand the “accuracy-granularity frontier” of payroll employment estimates
 - ▶ [Bell et al. \(2026\)](#) show how these data could complement official employment statistics with additional geographic detail, higher frequency, and increased timeliness
- BLS is laying the theoretical groundwork for blending or augmenting CES with payroll provider data:
 - ▶ [Savitsky and Gershunskaya \(2023\)](#): Bayesian approach to co-model employment point estimates and their variances, used to produce CES small area estimates, that could use alternative data-derived covariates
 - ▶ [Savitsky et al. \(2023\)](#): Method to combine convenience samples with probability survey data, including in circumstances where the overlap between samples is unknown
 - ▶ [Savitsky et al. \(2025\)](#): Improved accuracy by developing a threshold for inclusion for the convenience sample
 - ▶ [Beresovsky et al. \(2026\)](#): Extend these approaches under deterministic and probabilistic data linkage



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