QWI Update – Full Quarter Employment Flows/Separation Earnings

Local Employment Dynamics ⬛⬛⬛⬛⬛ / ⬛ **All About Jobs**

BACKGROUND

The Census Bureau received inquiries from two state data users, starting with the 2008 Local Employment Dynamics (LED) Partnership workshop, identifying anomalies in various Quarterly Workforce Indicators (QWI) measures. One commenter noted a systematic large difference between full quarter accessions and full quarter separations that was not reflected in the actual change in employment, particularly noticeable when examining state aggregates. A second commenter noted that separation earnings were much lower than other wage measures, suggesting a timing issue in the calculation.

These issues were investigated, and we have developed improvements in the methodology used to produce these calculations in order to create more reliable estimates. After successful test and evaluation, these modifications are being implemented in the 2008Q4 production cycle. Since QWI is produced as a time series, the historical anomalies will be corrected with the release from this production cycle.

It should be noted that many of the specific measures discussed here are not included on QWI Online or OnTheMap, but are available for download from the Cornell Virtual Research Data Center (VRDC) or the DVDs that were sent to the state partners.

This QWI Update provides a description of the identified issues and an assessment of their effects. Additional comments and questions should be sent to CES.local.employment.dynamics@census.gov.

FULL QUARTER EMPLOYMENT FLOWS

Identification of Issue
An anomaly was found in state aggregates in which full quarter accessions (HirAS) were consistently significantly higher than full quarter separations (SepS). This difference was not reflected in the actual growth in full quarter employment levels (EmpS) from the previous to current quarter. Though these numbers would not be expected to be related exactly across time periods because of various factors including weighting, the high level of sustained bias was unusual.

Problematic Calculation
An investigation found that much of this discrepancy was related to the methodology used to account for predecessor-successor employment relationships. When a firm is identified as reporting under a new account number, LEHD adjusts employment flow figures so that workers at the firm do not appear as separations from the "old" firm and accessions into the "new." However, the technique that had been employed to make this adjustment used only a partial employment history from the related firm on job records, resulting in inaccurate calculations.

A revised technique has been developed that incorporates a more complete history when calculating the employment flow measures.

Effect on QWI Measures

Looking at the before and after effect on flow aggregates, we found that most of the large, sustained bias between the estimates of calculated job flows and actual full quarter employment levels has been eliminated with the revised methodology. Examining the data on a cell by cell basis, the most significant impact will be observed on the set of full quarter (stable)[1] measures. There is also a more marginal impact on the non-full quarter measures. The overall level of impact will vary by state, depending on how much predecessor-successor transition activity is present. Generally, for non-full quarter measures, at least 95% of cells would experience minimal impact (<2% difference). Full quarter measures, and others with longer time horizons, will tend to have a higher impact with the methodology change. The following table presents a measure-by-measure assessment of the general magnitude and direction of expected impact for the 30 QWIs.

Description of Measure	Abbreviation	Impact	Direction
Hires All: Counts	HirA	Minimal	Increase
Employment: Counts *	Emp	Minimal	Decrease
Employment end-of-quarter: Counts	EmpEnd	Minimal	Decrease
Employment stable jobs: Counts	EmpS	Minimal	Decrease
Turnover stable jobs: Ratio *	TurnOvrS	High	Decrease
Hires All stable jobs: Counts	HirAS	High	Decrease
Firm Gain stable jobs: Counts	FrmJbGnS	Very High	Decrease
Firm Loss stable jobs: Counts	FrmJbLsS	High	Increase
Firm Change stable jobs: Net Change	FrmJbCS	Very High	Either
Separations stable jobs: Counts	SepS	High	Increase
Hires New: Counts *	HirN	Minimal	Increase
Hires New stable jobs: Counts	HirNS	High	Decrease
Firm Job Gains: Counts *	FrmJbGn	Moderate	Increase
Firm Job Loss: Counts	FrmJbLs	Moderate	Either
Firm jobs change: Net Change *	FrmJbC	High	Either
Hires Recalls: Counts	HirR	Moderate	Increase
Separations: Counts *	Sep	Minimal	Increase
Employment reference quarter: Counts	EmpTotal	Minimal	---
Total quarterly payroll: Sum	Payroll	Minimal	---
Hires All: Average quarters of non-employment	NempHirA	Minimal	Either
Hires New: Average quarters of non-employment	NempHirN	Minimal	Either
Hire Recalls: Average quarters of non-employment	NempHirR	Moderate	Either
Separations: Average periods of non-employment	NEmpSep	Minimal	Either
Employees end-of-quarter : Average monthly earnings	EarnEnd	Minimal	Either
Employees stable jobs: Average monthly earnings *	EarnS	Minimal	Either
Hires All stable jobs: Average monthly earnings	EarnHirAS	High	Either
Separations stable jobs: Average monthly earnings	EarnSepS	[See following discussion of separate calculation issue]	
Hires New stable jobs: Average monthly earnings *	EarnHirNS	High	Either
Hires All: Average change in monthly earnings	EarnHirAC	Minimal	Either
Separations: Average change in monthly earnings	EarnSepC	Minimal	Either

* Indicates the 8 measure included in *QWI Online* application.

Impact Assessments

Minimal: 95+% of cells with <2% difference, few cells with high (>25%) differences
Moderate: 85+% of cells with <2% difference, less than 2% of cells with high differences
High: 75+% of cells with <2% difference, more than 2% of cells with high differences
Very High: 70+% of cells with <2% difference, more than 10% of cells with high differences

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[1] An individual is defined as full quarter employed if that individual has valid UI-wage records in the current quarter, the preceding quarter, and the subsequent quarter at the same employer.

Direction
Increase: Revised data usually higher than previous data, when different
Decrease: Revised data usually lower than previous data, when different
Either: Revised data can be higher or lower than previous data, when different

Note: This analysis is based on the percentage difference for each measure within cells of the four digit NAICS by county QWI tabulation.

SEPARATION EARNINGS

Identification of Issue
An anomaly was found in the separation earnings variable noting that those earnings were frequently much lower than other earnings measures.

Problematic Calculation
This was found to be a timing error in the average earnings calculation. Separation earnings are defined as the average monthly earnings of employees with stable (full quarter) jobs. The calculation averages the total earnings from stable jobs in time t for individuals who separated from a firm in period t+1. Consider the following hypothetical earnings histories:

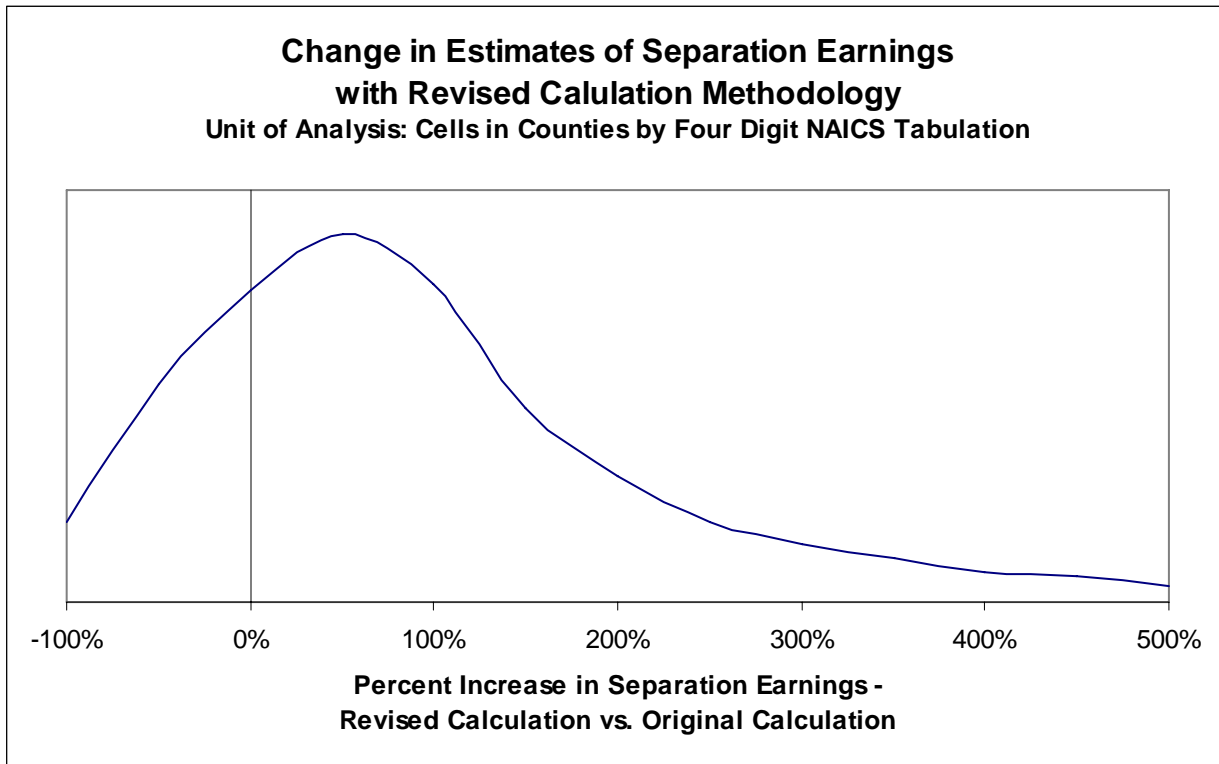| Job Spell	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 5	FQ Separator in Q4?
A	**0**	**3,000**	**3,500**	**1,500**	**0**	**Yes**
B	0	0	750	500	0	No
C	2,000	2,000	2,500	0	0	No
D	**2,500**	**2,500**	**2,500**	**2,500**	**0**	**Yes**
E	**0**	**1,200**	**1,200**	**1,000**	**0**	**Yes**
F	0	3,000	3,000	3,500	3,500	No
Total Earnings in Q3 for Separators from Stable Jobs in Q4	7,200					
Number of Separators from Stable Jobs in Q4	3					
Average Earnings of Separators from Stable Jobs in Q3 (EarnSepS)	2,400					

The calculation sums earnings in quarter 3 for all job spells that are full quarter in quarter 3 (receiving positive earnings in quarter 2, 3, and 4), and separations in quarter 4 (no earnings received in quarter 5). In this hypothetical example, three individuals meet this criterion. The earnings from quarter 3 is summed and divided by 3.

The old LEHD methodology, however, mistakenly aggregated earnings from quarter 4 rather than from quarter 3. In this example, the numerator 7,200 would have been replaced by 5,000 (1,500+2,500+1,000). The wages were also counted in the period of separation, rather than the period of full quarter employment. The calculation has been corrected in this revision.

Effect on QWI Measures
Individuals will frequently receive wages for only part of the quarter during which they separated, because their actual separation date will typically not coincide with the end of the quarter. Thus, the calculation previously used often resulted in a substantially lower estimate of separation earnings. A

comparison of the results from the two methodologies found that most estimates of separation wages do increase substantially with the revised calculation. The following graph illustrates the general distribution of the percent change in the separation wage from the old calculation to the revised. Note while there are some decreases in wages, the highest density is around a 50% increase.

**Change in Estimates of Separation Earnings
with Revised Calulation Methodology**
Unit of Analysis: Cells in Counties by Four Digit NAICS Tabulation

-100%   0%   100%   200%   300%   400%   500%

**Percent Increase in Separation Earnings -
Revised Calculation vs. Original Calculation**

FUTURE ACTIVITIES

We wish to express our gratitude to the state data users for identifying the anomalies. The Census Bureau will continue to review the published QWIs and make improvements in accuracy and consistency as part of our ongoing quality assurance activities. If you have any questions related to this analysis or have other data quality issues, please contact us by email at CES.Local.Employment.Dynamics@census.gov.