Business Employment Dynamics: Technical Aspects

Introduction
The Connecticut Business Employment Dynamics (BED) data are a product of a federal-state cooperative program known as the *Quarterly Census of Employment and Wages* (QCEW). The Office of Research at the Connecticut Labor Department (CTDOL) compiles the BED data from existing quarterly state Unemployment Insurance (UI) records. Most employers in the state are required to file quarterly reports on the employment and wages of workers covered by UI laws and to pay quarterly UI taxes. These data form the basis of CTDOL's establishment universe. These reports also produce the QCEW data on total employment and wages. Other important BLS uses of the UI reports are in the *Current Employment Statistics* (CES) program. See Table 2 for differences between the QCEW, CES, and BED.

In the BED program, the quarterly UI records are linked across quarters to provide a longitudinal history for each establishment. The linkage process provides time series data on gross job gains and losses, which, when subtracted from one another, yield the net change in employment. In addition, the BED provides an estimation of jobs gained at opening and expanding establishments and jobs lost at closing and contracting establishments.

Coverage
Employment and wage data for workers covered by state UI and Unemployment Compensation for Federal Employees (UCFE) laws are compiled from quarterly contribution reports submitted to CTDOL by employers. In addition to the quarterly contribution reports, employers who operate multiple establishments within the state complete a questionnaire called the "Multiple Worksite Report," which provides detailed information on the location of their establishments. These reports are based on place of employment rather than place of residence. UI and UCFE coverage is broad and relatively comparable from state to state. Major exclusions from UI coverage are self-employed workers, religious organizations, most agricultural workers on small farms, all members of the armed forces, elected officials in most states, most employees of railroads, some domestic workers, most student workers at schools, and employees of certain small nonprofit organizations.

Gross job gains and losses in this release are derived from longitudinal histories of over 94,000 private sector employer reports out of 111,000 total reports of employment and wages submitted to CTDOL in 2006Q4. The data do not report estimates for government employees or private households, and they do not include establishments with zero employment over three quarters. As an illustration, Table 1, below, shows the number of establishments excluded from the gross job gains and losses data in 2006Q4.

TABLE 1: Number of Active Establishments Included in the CT BED Data

Establishment Breakdown	Number of Connecticut Establishments (2006Q4)
Total establishments: QCEW Program	**111,559**
Excluded: Public Sector	1,938
Private Households (NAICS 814)	5,290
Zero Employment (Dec. 2006)	10,022
Total Excluded Establishments	**17,250**
Total Establishments included in BED Data	**94,309**

Unit of analysis
Establishments are used in the tabulation of the BED statistics by industry. An *establishment* is defined as an economic unit that produces goods or services, usually at a single physical location, and engages in one, or predominantly one, activity. A *firm* is a legal business, corporate or otherwise, and may consist of several establishments. Firm level data are compiled based on an aggregation of establishments under common ownership by a corporate parent using employer tax identification numbers. The firm level aggregation, which is consistent with the role of corporations as the economic decision makers, is used for the measurement of the BED data elements by size class. Because of the difference in the unit of analysis, total gross job gains and gross job losses by size class are lower than total gross job gains and gross job losses by industry, as some establishment gains and losses within a firm are offset during the aggregation process. However, the total net changes in employment are the same for not seasonally adjusted data and are similar for seasonally adjusted data.

Concepts and methodology
Since the statistics come from establishment level data, it is important to understand the four different types of establishments. The formal definitions of are as follows:

> *Openings:* These establishments had positive employment in the current quarter, and they either had no links to the prior quarter, or had zero employment in the previous quarter.

> *Expansions*: These establishments had positive employment in the previous and current quarters, and they experienced positive net employment growth between the previous and current quarter.

> *Closings*: These establishments had positive employment in the previous quarter, and they either had zero employment in the current quarter, or had no links to the current quarter.

> *Contractions*: These establishments had positive employment in the previous and current quarters, and they experienced net employment declines between the previous and current quarter.

All establishment-level employment changes are measured from the third month of each quarter. Not all establishments and firms change their employment levels. Units with no change in employment count towards estimates of total employment, but not for levels of gross job gains and losses.

Linkage methodology
Before the measurement of gross job gains and losses, QCEW records are linked across two quarters. The linkage process matches establishments' unique UI identification numbers (UI-ID). Between 95 and 97 percent of establishments identified as continuous from quarter to quarter are matched by UI-ID. The rest are linked by one of three methods. The first method uses predecessor and successor information, which relates records with different UI-IDs across quarters. Predecessor and successor relations can come about for a variety of reasons, including a change in ownership, a firm restructuring, or a UI account restructuring. If a match cannot be attained in this manner, a probability-based method is used. This method attempts to identify two establishments with different UI-IDs as continuous. The match is based upon comparisons such as the same business name, address, and phone number. Third, an analyst examines unmatched records individually and makes a possible match. In order to ensure the highest possible quality of data, state analysts verify with employers and update, if necessary, the industry, location, and ownership classification of all establishments on a 3-year cycle. Changes in establishment classification codes resulting from the verification process are introduced with the data reported for the first quarter of the year. Changes resulting from improved employer reporting also are introduced in the first quarter.

Seasonal adjustment

Over the course of a year, the levels of employment and the associated job flows undergo sharp fluctuations due to such seasonal events as changes in the weather, reduced or expanded production, harvests, major holidays, and the opening and closing of schools. The effect of such seasonal variation can be very large. Because these seasonal events follow a more or less regular pattern each year, adjusting these statistics from quarter to quarter can eliminate their influence. These adjustments make non-seasonal developments, such as declines in economic activity, easier to recognize. The employment data for opening, expanding, closing, and contracting units are seasonally adjusted independently. The establishment counts data series for opening, expanding, closing, and contracting establishments are also adjusted independently. Additionally, the seasonally adjusted rates are calculated by using the seasonal factors for the independently adjusted establishment and employment levels. Concurrent seasonal adjustment is run using X-12 ARIMA. Seasonally adjusted data series for the total private sector are calculated by summing the seasonally adjusted data for all sectors, including the unclassified sector, which is not published separately.

Reliability of the data

Since the BED is based on administrative rather than sample data, there are no issues related to sampling error. Non-sampling error, however, still exists. Non-sampling errors occur for many reasons, such as the employer submitting corrected employment data after the end of the quarter or typographical errors made by businesses when providing information. Such errors, however, are likely to be distributed randomly throughout the dataset. Changes in administrative data sometimes create complications for the linkage process. This can result in overstating openings and closings while understating expansions and contractions. The states and BLS continue to refine methods for improving the linkage process to alleviate the effects of these complications. The BED data series are subject to periodic minor changes based on corrections in QCEW records, updates on predecessor and successor information, and seasonal adjustment revisions.

Differences between QCEW, BED, and CES Employment Measures

The CTDOL publishes three different establishment-based employment measures for a given quarter. Each of these measures—QCEW, BED, and CES—makes use of the quarterly UI employment reports in producing data; however, each measure has a somewhat different universe coverage, estimation procedure, and publication product. Differences in coverage and estimation methods can result in somewhat different measures of quarter-to-quarter employment changes. It is important to understand program differences and the intended uses of the program products. See Table 2, next page. The net employment change derived by summing the BED component series will differ from the net employment change estimated from the CES program. The intended use of BED statistics is to show the dynamic labor market changes that underlie the net employment change statistic. Additional information on each program can be obtained from the program web sites shown in the table.

TABLE 2: Summary of Differences: CT QCEW, BED, and CES Employment Measures

	QCEW	BED	CES
Source	• Count of UI administrative records submitted by 111,000 establishments	• Count of longitudinally-linked UI administrative records submitted by 94,000 private sector employers	• Sample survey: 6,000 establishments
Coverage	• UI and UCFE coverage, including all employers subject to state and federal UI laws.	• UI coverage, excluding government, private household, and establishments with zero employment	• Non-farm wage and salary jobs: • UI coverage, excluding agriculture, private house-hold, and self-employed workers • Other employment, including railroads, religious organizations, and other non-UI-covered jobs
Publication frequency	• Quarterly – 7 months after the end of each quarter	• Quarterly – 8 months after the end of each quarter	• Monthly – Usually first Friday of following month
Use of UI file	• Directly summarizes and publishes each new quarter of UI data	• Links each new UI quarter to longitudinal database and directly summarizes gross job gains and losses	• Uses UI file as a sampling frame and annually realigns (benchmarks) sample estim-ates to first quarter UI levels
Principal products	• Provides a quarterly and annual universe count of establishments, employment, and wages at the town, county, LMA, MSA, WIA, and State level by detailed industry	• Provides quarterly employer dynamics data on estab-lishment opening, closing, expansions, and contractions at the State level. • Future expansions will include data by NAICS supersectors and by size of firm, and at the county, MSA, WIA, and LMA level	• Provides current monthly estimates of employment, hours, and earnings at the MSA, LMA, WIA, and State level by industry
Principal uses	• Major uses include: Detailed locality data, periodic universe counts for benchmarking sample survey estimates, sample frame for CTDOL establishment surveys	• Major uses include: Business cycle analysis, analysis of employer dynamics underlying economic expansions and contractions, an analysis of employment expansion and contractions, and, in the future, by size of firm and industry	• Major uses include: principal State, and sub-state regional economic indicator, official time series for employment change measures, input into other major economic indicators
National program web sites	www.bls.gov/cew	www.bls.gov/bdm	www.bls.gov/ces
CT DOL LMI Web Page: http://www.ctdol.state.ct.us/lmi/bed.htm			