Issues in Labor Statistics:

How the Business Birth/Death Model Improves Payroll Employment Estimates

Bureau of Labor Statistics
October 3, 2008

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Each year, the Current Employment Statistics (CES) program adjusts its sample-based estimates of industry employment for the previous year to universe employment counts derived primarily from the Quarterly Census of Employment and Wages (QCEW).[1] CES recently announced a preliminary benchmark revision of -21,000 for its March 2008 total nonfarm employment estimate, an adjustment of less than one-tenth of one percent; the average absolute revision over the past decade is two-tenths of one percent.[2] (See table below.) The preliminary 2008 benchmark calculation indicates that the CES estimate of March 2007 – March 2008 employment change (+500,000) is nearly identical to that reflected in QCEW universe counts (+479,000).[3] Accurate CES employment estimates are made possible in part by the use of the "birth/death" model, an adjustment developed by BLS to account for the net employment change stemming from business births and deaths that cannot be captured in real-time by the CES sample.[4] The birth/death adjustment has consistently resulted in a smaller benchmark revision than would have been the case if the sample alone were used to measure payroll employment change. (See chart 1.)

Historical Benchmark Revisions in the CES Survey, Preliminary and Final

| Benchmark Year	Preliminary Revision	Final Revision	Final Revision (% of Total Nonfarm Employment)	Difference (Preliminary to Final)
1999	146,000	258,000	0.2	112,000
2000	392,000	468,000	0.4	76,000
2001	-76,000	-123,000	-0.1	-47,000
2002	-284,000	-313,000	-0.2	-29,000
2003	-145,000	-122,000	-0.1	23,000
2004	236,000	203,000	0.2	-33,000
2005	-191,000	-158,000	-0.1	33,000
2006	810,000	752,000	0.6	-58,000
2007	-297,000	-293,000	-0.2	4,000
2008	-21,000	(N/A)	(N/A)	(N/A)

Chart 1: Impact of Birth/Death Model on Benchmark Revisions (in thousands)
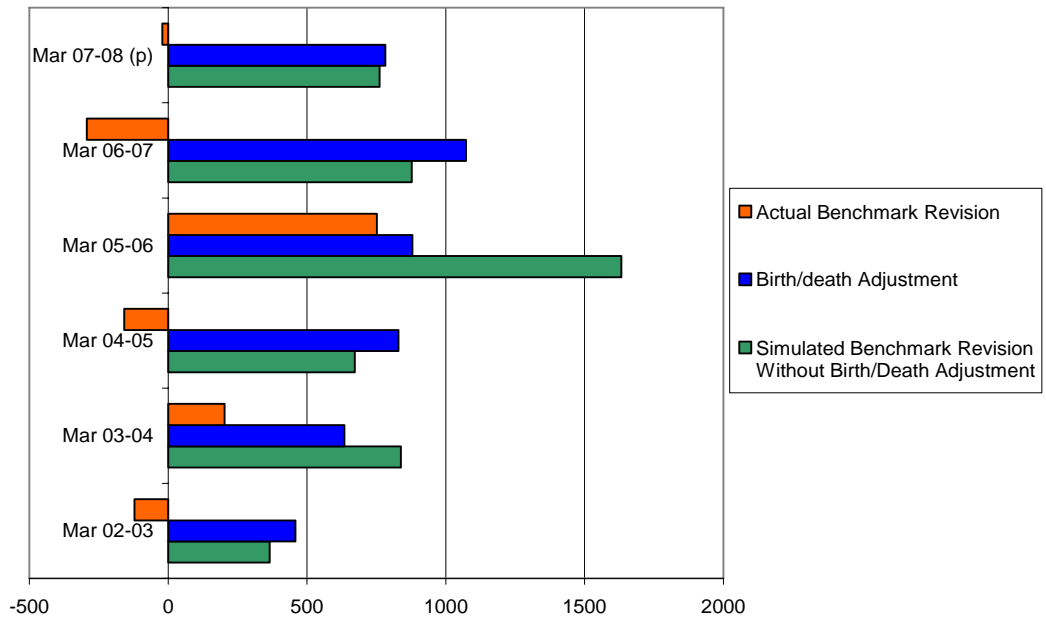
	Mar 02-03	Mar 03-04	Mar 04-05	Mar 05-06	Mar 06-07	Mar 07-08 (p)
■ Actual Benchmark Revision	-122	203	-158	752	-293	-21
■ Birth/death Adjustment	458	635	830	880	1073	782
■ Simulated Benchmark Revision Without Birth/Death Adjustment	366	838	672	1632	877	761

Actual net employment change from business births and deaths follows a relatively stable trend across years and is not highly correlated with changes in the business cycle, or even with changes in overall employment. The stability of this component enables BLS to produce reasonably accurate forecasts of birth/death employment despite the model's use of historical data as its input. Chart 2 illustrates the stable trend of actual net employment change from business births and deaths over the past decade in contrast with the changes in total nonfarm employment.

**Chart 2: Total Nonfarm Employment Change vs.
Actual Net Birth/Death Employment Change (in thousands)**
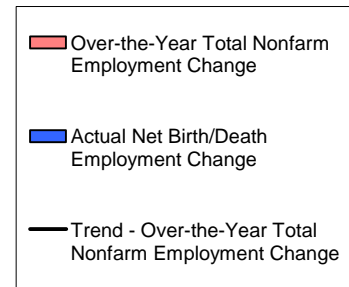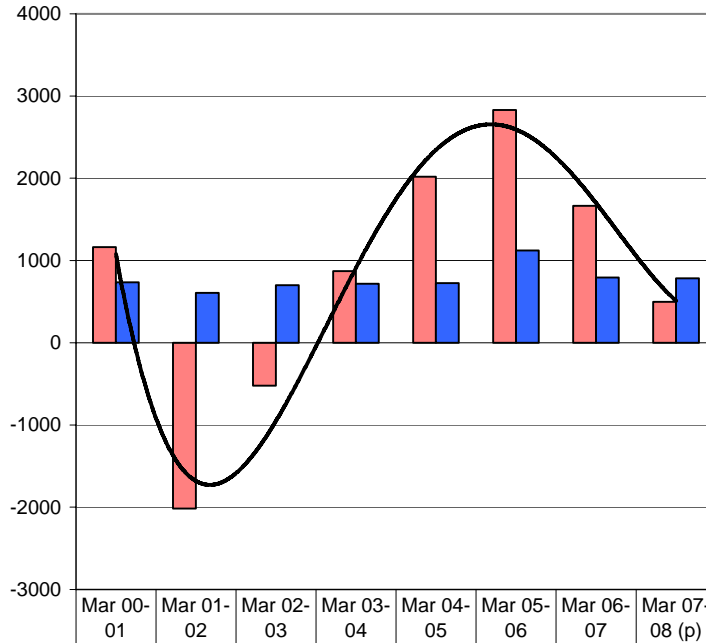
	Mar 00-01	Mar 01-02	Mar 02-03	Mar 03-04	Mar 04-05	Mar 05-06	Mar 06-07	Mar 07-08 (p)
Over-the-Year Total Nonfarm Employment Change	1163	-2017	-524	871	2019	2830	1665	500
Actual Net Birth/Death Employment Change	735	607	700	718	726	1122	792	785

Legend:
- Over-the-Year Total Nonfarm Employment Change
- Actual Net Birth/Death Employment Change
- Trend - Over-the-Year Total Nonfarm Employment Change

The relative stability of the birth/death component means that it is the sample, rather than the birth/death component, that primarily drives year-to-year changes in the trend of CES payroll employment estimates.

The ratio of the birth/death contribution to the overall net employment change varies substantially from month to month and year to year because the birth/death model measures a component that does not reflect the business cycle and is not intended to. While birth/death forecasts follow different trends than those of the sample, their contribution toward the accuracy of CES payroll employment estimates is well-documented via their role in reducing benchmark error. CES continues to investigate methods to enhance the birth/death model to further improve the accuracy of its forecasts.

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Notes

[1] The QCEW is a nearly complete count of employment for all businesses in the US and is based on administrative records of the Unemployment Insurance tax system that most businesses are required to file with their state. The benchmark adjustment procedure replaces the March sample-based employment estimates with the employment levels from the universe for March of each year. For more information on the QCEW, see http://www.bls.gov/qcew/.

[2] The final benchmark revision will be incorporated with the release of January 2009 estimates, and is subject to change; historically, the preliminary revision has not differed greatly from the final revision. Revision is based on not seasonally adjusted data.

[3] Preliminary number, based on not seasonally adjusted data.

[4] See http://www.bls.gov/ces/cesbdtech.htm for additional technical information regarding the birth/death model.