

page. Among the regions, the Northeast has the highest depreciation rates and therefore requires the largest adjustment. This may reflect the effects of the severe climate, but it also results from the prevalence of rent control and multi-unit housing in that region. The lower rates in the South result from the milder climate, more detached housing, and less rent control. □

—FOOTNOTES—

¹For a complete description of the Consumer Price Index, see chapter 19 of the *BLS Handbook of Methods*, Bulletin 2285 (Bureau of Labor Statistics, April 1988).

²Rental equivalence is described in the *BLS Handbook of Methods*, and in more detail in "Changing the Homeownership Component of the CPI to Rental Equivalence," *CPI Detailed Report*, January 1983, pp. 7-11.

³The full development of the aging adjustment is described in William C. Randolph, "Housing Depreciation and Aging Bias in the Consumer Price Index," *Journal of Business and Economic Statistics*, July 1988, pp. 359-71.

⁴See *Census of Population and Housing Technical Documentation* (Bureau of the Census, 1982), p. 221.

⁵For a complete development of the composite estimation procedure, see William C. Randolph and Kimberly D. Zieschang, "Aggregation Consistent Restriction Based Improvement of Local Area Estimators," *Proceedings of the Business and Economics Section* (American Statistical Association, January 1988).

⁶For a full development of the vintage effect question, see William C. Randolph, "Estimation of Housing Depreciation: Short-Term Quality Change and Long Term Vintage Effects," *Journal of Urban Economics*, March 1988, pp. 162-78.

Establishment survey incorporates March 1987 employment benchmarks

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With the release of data for May 1988, the Bureau of Labor Statistics introduced its annual revision of national estimates of employment, hours, and earnings from the monthly survey of establishments. The revision uses employment counts for March 1987 as a benchmark. As part of the annual benchmarking process, the Bureau also revised seasonally adjusted series for the past 5 years, and computed new seasonal adjustment factors.

Adjustment procedure

Monthly estimates from the Current Employment Statistics (CES) survey are based on information collected from a sample of approximately 300,000 establishments. To help improve their accuracy, the Bureau adjusts CES estimates each year to new benchmarks. Benchmarks are

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comprehensive counts of employment based primarily on mandatory unemployment insurance reports filed by employers with the State employment security agencies.

The current revisions are based on March 1987 benchmarks and affect all unadjusted series from April 1986 forward. As is the usual practice with the introduction of new benchmarks, the Bureau has also revised the seasonally adjusted series from January 1983 forward and has published new seasonal adjustment factors to be used for the coming year.

Current revisions. The March 1987 benchmark level for total nonagricultural employment—100.4 million—was only 35,000, or 0.04 percent, below the corresponding sample-based estimate, resulting in one of the survey's smallest benchmark revisions. The pattern of revisions was mixed across industry divisions, with downward revisions in the goods-producing industries (-0.7 percent) being about offset by upward revisions in the service-producing industries (0.2 percent). Table 1 provides the revisions for March 1987 by industry division.

New estimates were computed for April 1987 forward, based on the new March 1987 benchmark levels and recomputed seasonal adjustment and bias factors. In addition, the sample was redistributed into estimating cells that reflect their March 1987 employment size, and sample reports were added that had been received since the original estimates were made. The combined effect of the new benchmark level, recomputed seasonal and bias factors, the resized sample, and added late reporters resulted in the new estimates generally showing larger over-the-month employment gains than previously reported. The cumulative effect on the survey estimate from April 1987 through February 1988 was the addition of

Table 1. Differences between nonagricultural employment benchmarks and estimates, by industry division, March 1987

[Numbers in thousands]

Industry	Benchmark	Estimate	Difference	
			Number	Percent
Total nonagricultural ..	100,427	100,462	-35	(¹)
Total private	83,173	83,152	21	(¹)
Mining	696	718	-22	-3.2
Construction	4,531	4,599	-68	-1.5
Manufacturing	18,810	18,897	-87	-.5
Transportation and public utilities	5,274	5,275	-1	(¹)
Wholesale trade	5,763	5,725	38	.7
Retail trade	17,902	17,737	165	.9
Finance, insurance, and real estate	6,443	6,478	-35	-.5
Services	23,754	23,723	31	.1
Government	17,254	17,310	-56	-.3
Federal	2,916	2,916	0	0
State	4,050	4,036	14	.3
Local	10,288	10,358	-70	-.7

¹Less than 0.05 percent.

364,000 workers to the estimate of total nonagricultural employment. (See table 2.)

Sources of the differences. Differences between the benchmark totals and the sample-based estimates are caused by both sampling and nonsampling error. Sampling error occurs whenever inferences are drawn from a sample about its universe.

Nonsampling error in the CES survey has three major sources: (1) new firm bias, (2) procedures for handling changes in industrial classification, and (3) other errors of coverage, response, processing, and collection. New firm bias is attributed to the fact that the sample does not readily capture new firms, nor the employment growth from these firms. The survey's sample design also places a higher probability of selection on firms with greater employment. This too creates bias problems, because small, newer firms tend to be responsible for an important portion of the overall employment growth.

Revisions to other data. Benchmarks are not available for the series on women, production or nonsupervisory workers, and hours and earnings. Women and production workers series are revised by applying the sample-derived ratio to the revised employment estimate at the basic cell level. These revisions are then summarized to the broader industry groupings. Production and nonsupervisory worker employment estimates are used as weights in the estimation of hours and earnings at aggregate industry levels. Benchmark revisions to employment may cause shifts in these weights, affecting summary level estimates of hours and earnings.

Seasonal adjustment. Each year, employment, hours, and earnings data from the new benchmark are incorporated into the calculation of new seasonal adjustment factors. These new seasonal factors are applied to the

Table 2. Differences in seasonally adjusted levels and over-the-month changes, total nonagricultural employment, April 1987-February 1988
[Numbers in thousands]

Month	Levels			Over-the-month changes		
	As revised	As previously published	Difference	As revised	As previously published	Difference
1987						
April	101,615	101,598	17	355	269	86
May	101,829	101,708	121	214	110	104
June	102,078	101,818	260	249	110	139
July	102,430	102,126	304	352	308	44
August	102,672	102,275	397	242	149	93
September ..	102,906	102,434	472	234	159	75
October	103,371	102,983	388	465	549	-84
November	103,678	103,285	393	307	302	5
December ...	104,001	103,612	389	323	327	-4
1988						
January	104,262	103,827	435	261	215	46
February	104,729	104,365	364	467	538	-71

unadjusted monthly estimates to produce seasonally adjusted estimates for the period April 1988 through March 1989. The Bureau uses the X-11 ARIMA seasonal adjustment method, an adaptation of the standard ratio-to-moving average method, which provides for "moving" adjustment factors to take changing seasonal patterns into account.

Publication of revised estimates. Revised estimates for all CES series appear in the June issue of *Employment and Earnings*, along with a more complete explanation of the benchmarking procedure and the new seasonal adjustment factors. Revisions to historical series appear in the *Supplement to Employment and Earnings*, published in August. Estimates reflecting the new benchmarks appear in the Current Labor Statistics section of the *Monthly Labor Review* beginning with the July issue. □