The Gender Gap of Earnings of College Graduates in the United States

The box in Chapter 2 "The Distribution of Earnings in the United States in 2012" shows that, on average, male college graduates earn more than female college graduates. What are the recent trends in this "gender gap" in earnings? Social norms and laws governing gender discrimination in the workplace have changed substantially in the United States. Is the gender gap in earnings of college graduates stable, or has it diminished over time?

Table 3.1 gives estimates of hourly earnings for college-educated full-time workers ages 25–34 in the United States in 1992, 1996, 2000, 2004, 2008, and 2012, using data collected by the Current Population Survey. Earnings for 1992, 1996, 2000, 2004, and 2008 were adjusted for inflation by putting them in 2012 dollars using the Consumer Price Index (CPI).[1] In 2012, the average hourly earnings of the 2004 men surveyed was \$25.30, and the standard deviation of earnings for men was \$12.09. The average hourly earnings in 2012 of the 1951 women surveyed was \$21.50, and the standard deviation of earnings was \$9.99. Thus the estimate of the gender gap in earnings for 2012 is \$3.80 (= \$25.30 − \$21.50), with a standard error of \$0.35 ($= \sqrt{12.09^2/2004 + 9.99^2/1951}$). The 95% confidence interval for the gender gap in earnings in 2012 is $3.80 \pm 1.96 \times 0.35 =$ (\$3.11, \$4.49).

The results in Table 3.1 suggest four conclusions. First, the gender gap is large. An hourly gap of \$3.80 might not sound like much, but over a year it adds up to \$7600, assuming a 40-hour workweek and 50 paid weeks per year. Second, from 1992 to 2012, the estimated gender gap increased by \$0.36 per hour in real terms, from \$3.44 per hour to \$3.80 per hour;

TABLE 3.1 Trends in Hourly Earnings in the United States of Working College Graduates, Ages 25–34, 1992 to 2012, in 2012 Dollars

	Men			Women			Difference, Men vs. Women		
Year	$\bar{Y}_m$	s_m	n_m	$\bar{Y}_w$	s_w	n_w	$\bar{Y}_m - \bar{Y}_w$	$SE(\bar{Y}_m - \bar{Y}_w)$	95% Confidence Interval for d
1992	24.83	10.85	1594	21.39	8.39	1368	3.44**	0.35	2.75–4.14
1996	23.97	10.79	1380	20.26	8.48	1230	3.71**	0.38	2.97–4.46
2000	26.55	12.38	1303	22.13	9.98	1181	4.42**	0.45	3.54–5.30
2004	26.80	12.81	1894	22.43	9.99	1735	4.37**	0.38	3.63–5.12
2008	26.63	12.57	1839	22.26	10.30	1871	4.36**	0.38	3.62–5.10
2012	25.30	12.09	2004	21.50	9.99	1951	3.80**	0.35	3.11–4.49

These estimates are computed using data on all full-time workers ages 25–34 surveyed in the Current Population Survey conducted in March of the next year (for example, the data for 2012 were collected in March 2013). The difference is significantly different from zero at the **1% significance level.

(*continued*)

however, this increase is not statistically significant at the 5% significance level (Exercise 3.17). Third, the gap is large if it is measured instead in percentage terms: According to the estimates in Table 3.1, in 2012 women earned 15% less per hour than men did ($3.80/$25.30), slightly more than the gap of 14% seen in 1992 ($3.44/$24.83). Fourth, the gender gap is smaller for young college graduates (the group analyzed in Table 3.1) than it is for all college graduates (analyzed in Table 2.4): As reported in Table 2.4, the mean earnings for all college-educated women working full-time in 2012 was $25.42, while for men this mean was $32.73, which corresponds to a gender gap of 22% $[= (32.73 - 25.42)/32.73]$ among all full-time college-educated workers.

This empirical analysis documents that the "gender gap" in hourly earnings is large and has been fairly stable (or perhaps increased slightly) over the recent past. The analysis does not, however, tell us *why* this gap exists. Does it arise from gender discrimination in the labor market? Does it reflect differences in skills, experience, or education between men and women? Does it reflect differences in choice of jobs? Or is there some other cause? We return to these questions once we have in hand the tools of multiple regression analysis, the topic of Part II.

[1]Because of inflation, a dollar in 1992 was worth more than a dollar in 2012, in the sense that a dollar in 1992 could buy more goods and services than a dollar in 2012 could. Thus earnings in 1992 cannot be directly compared to earnings in 2012 without adjusting for inflation. One way to make this adjustment is to use the CPI, a measure of the price of a "market basket" of consumer goods and services constructed by the Bureau of Labor Statistics. Over the 20 years from 1992 to 2012, the price of the CPI market basket rose by 63.6%; in other words, the CPI basket of goods and services that cost $100 in 1992 cost $163.64 in 2012. To make earnings in 1992 and 2012 comparable in Table 3.1, 1992 earnings are inflated by the amount of overall CPI price inflation, that is, by multiplying 1992 earnings by 1.636 to put them into "2012 dollars."

3.6 Using the *t*-Statistic When the Sample Size Is Small

In Sections 3.2 through 3.5, the *t*-statistic is used in conjunction with critical values from the standard normal distribution for hypothesis testing and for the construction of confidence intervals. The use of the standard normal distribution is justified by the central limit theorem, which applies when the sample size is large. When the sample size is small, the standard normal distribution can provide a poor approximation to the distribution of the *t*-statistic. If, however, the population distribution is itself normally distributed, then the exact distribution (that is, the finite-sample distribution; see Section 2.6) of the *t*-statistic testing the mean of a single population is the Student *t* distribution with $n - 1$ degrees of freedom, and critical values can be taken from the Student *t* distribution.

The *t*-Statistic and the Student *t* Distribution

The t-statistic testing the mean. Consider the *t*-statistic used to test the hypothesis that the mean of Y is $\mu_{Y,0}$, using data $Y_1, \ldots, Y_n$. The formula for this statistic is