Chapter 3
Review of Statistics

3.1 (a) Average Hourly Earnings, Nominal $’s

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SE(Mean) | 95% Confidence Interval |
| *AHE*1992 | 11.63 | 0.064 | 11.50  11.75 |
| *AHE*2008 | 18.98 | 0.115 | 18.75  19.20 |
|  | Difference | SE(Difference) | 95% Confidence Interval |
| *AHE*2008  *AHE*1992 | 7.35 | 0.132 | 7.09  7.61 |

(b) Average Hourly Earnings, Real $2008

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SE(Mean) | 95% Confidence Interval |
| *AHE*1992 | 17.83 | 0.099 | 17.63 – 18.03 |
| *AHE*2008 | 18.98 | 0.115 | 18.75 – 19.20 |
|  | Difference | SE(Difference) | 95% Confidence Interval |
| *AHE*2008 − *AHE*1992 | 1.14 | 0.152 | 0.85 – 1.44 |

(c) The results from part (b) adjust for changes in purchasing power. These results should be used.

(d) Average Hourly Earnings in 2008

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SE(Mean) | 95% Confidence Interval |
| *High School* | 15.33 | 0.122 | 15.09 – 15.57 |
| *College* | 22.91 | 0.180 | 22.56 – 23.26 |
|  | Difference | SE(Difference) | 95% Confidence Interval |
| *College-High School* | 7.58 | 0.217 | 7.15 – 8.00 |

(e) Average Hourly Earnings in 1992 (in $2008)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SE(Mean) | 95% Confidence Interval |
| *High School* | 15.31 | 0.103 | 15.11 – 15.52 |
| *College* | 21.78 | 0.171 | 21.45 – 22.12 |
|  | Difference | SE(Difference) | 95% Confidence Interval |
| *College-High School* | 6.47 | 0.200 | 6.08 – 6.86 |

(f) Average Hourly Earnings in 2008

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SE(Mean) | 95% Confidence Interval |
| *AHEHS*,2008  *AHEHS*,1992 | 0.02 | 0.160 | –0.29 – 0.33 |
| *AHECol*,2008  *AHECol*,1992 | 1.13 | 0.248 | 0.64 – 1.61 |
|  |  |  |  |
| *Col-HS Gap* (1992) | 6.47 | 0.200 | 6.08 – 6.86 |
| *Col-HS Gap* (2008) | 7.58 | 0.217 | 7.15 – 8.00 |
|  | Difference | SE(Difference) | 95% Confidence Interval |
| *Gap*2008 − *Gap*1992 | 1.11 | 0.295 | 0.53 – 1.69 |

 Wages of high school graduates increased by an estimated 0.02 dollars per hour (with a 95% confidence interval of −0.29 to 0.33); Wages of college graduates increased by an estimated 1.13 dollars per hour (with a 95% confidence interval of 0.64 to 1.61). The College-High School increased by an estimated 1.11 dollars per hour.

(g) Gender Gap in Earnings for High School Graduates

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year |  | *sm* | *nm* |  | *sw* | *nw* | − | *SE*(−) | 95% CI |
| 1992 | 16.55 | 7.46 | 2769 | 13.48 | 5.96 | 1874 | 3.07 | 0.20 | 2.68 – 3.45 |
| 2008 | 16.59 | 8.16 | 2537 | 13.15 | 6.27 | 1465 | 3.43 | 0.23 | 2.98 – 3.89 |

There is a large and statistically significant gender gap in earnings for high school graduates. In 2008 the estimated gap was $3.43 per hour; in 1992 the estimated gap was $3.07 per hour (in $2008). The increase in the gender gap is somewhat smaller for high school graduates than it was for college graduates.

Chapter 4
Linear Regression with One Regressor

4.1. (a)  1.08  0.60 × *Age*

 Earnings increase, on average, by 0.60 dollars per hour when workers age by 1 year.

(b) Bob’s predicted earnings  1.08  (0.60 × 26)  $16.68

 Alexis’s predicted earnings  1.08  (0.60 × 30)  $19.08

(c) The regression *R*2 is 0.03.This means that age explains a small fraction of the variability in earnings across individuals.

4.2. (a)

 There appears to be a weak positive relationship between course evaluation and the beauty index.

(b)  4.00  0.133 × *Beauty*. The variable *Beauty* has a mean that is equal to 0; the estimated intercept is the mean of the dependent variable (*Course\_Eval*) minus the estimated slope (0.133) times the mean of the regressor (*Beauty*). Thus, the estimated intercept is equal to the mean of *Course\_Eval*.

(c) The standard deviation of *Beauty is* 0.789. Thus

 Professor Watson’s predicted course evaluations  4.00  0.133 × 0 × 0.789  4.00

 Professor Stock’s predicted course evaluations  4.00  0.133 × 1 × 0.789  4.105

(d) The standard deviation of course evaluations is 0.55 and the standard deviation of beauty is 0.789. A one standard deviation increase in beauty is expected to increase course evaluation by 0.133 × 0.789  0.105, or 1/5 of a standard deviation of course evaluations. The effect is small.

(e) The regression *R*2 is 0.036, so that *Beauty* explains only 3.6% of the variance in course evaluations.