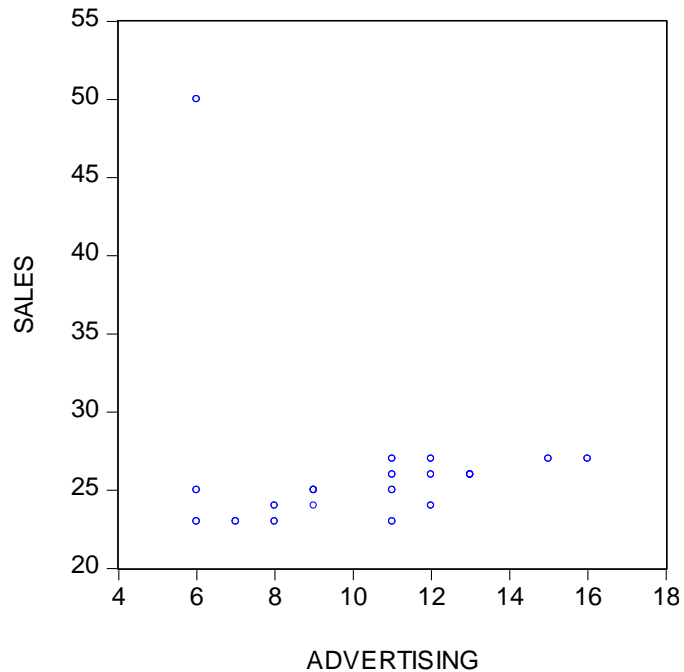


Test Exercise 1

(a) Make the scatter diagram with sales on the vertical axis and advertising on the horizontal axis. What do you expect to find if you would fit a regression line to these data?

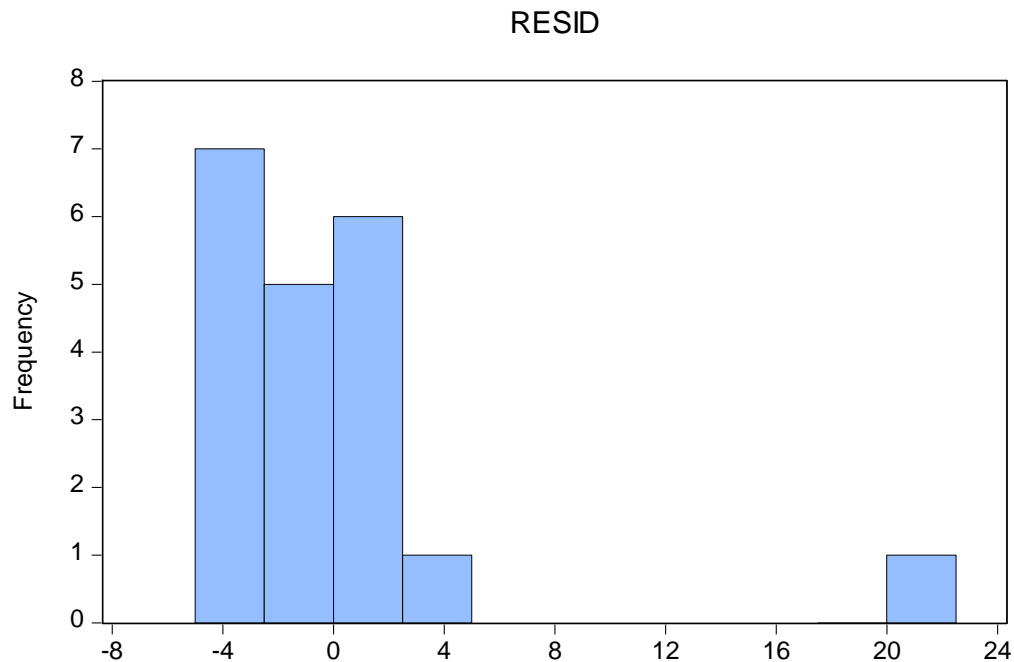


(b) Estimate the coefficients a and b in the simple regression model with sales as dependent variable and advertising as explanatory factor. Also compute the standard error and t-value of b. Is b significantly different from 0?

Dependent Variable: SALES
Method: Least Squares
Date: 11/07/15 Time: 10:19
Sample: 1 20
Included observations: 20

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | 29.62689 | 4.881527 | 6.069185 | 0.0000 |
| ADVERTISING | -0.324575 | 0.458911 | -0.707272 | 0.4885 |
| R-squared | 0.027039 | Mean dependent var | | 26.30000 |
| Adjusted R-squared | -0.027014 | S.D. dependent var | | 5.759203 |
| S.E. of regression | 5.836474 | Akaike info criterion | | 6.460770 |
| Sum squared resid | 613.1598 | Schwarz criterion | | 6.560344 |
| Log likelihood | -62.60770 | Hannan-Quinn criter. | | 6.480208 |
| F-statistic | 0.500234 | Durbin-Watson stat | | 1.993831 |
| Prob(F-statistic) | 0.488454 | | | |

(c) Compute the residuals and draw a histogram of these residuals. What conclusion do you draw from this histogram?



(d) Apparently, the regression result of part (b) is not satisfactory. Once you realize that the large residual corresponds to the week with opening hours during the evening, how would you proceed to get a more satisfactory regression model?

Obtain more observations

(e) Delete this special week from the sample and use the remaining 19 weeks to estimate the coefficients a and b in the simple regression model with sales as dependent variable and advertising as explanatory factor. Also compute the standard error and t-value of b . Is b significantly different from 0?

Dependent Variable: SALES
Method: Least Squares
Date: 11/07/15 Time: 11:37
Sample: 1 20
Included observations: 19

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|--------|
| C | 21.12500 | 0.954848 | 22.12394 | 0.0000 |
| ADVERTISING | 0.375000 | 0.088196 | 4.251873 | 0.0005 |
| R-squared | 0.515372 | Mean dependent var | 25.05263 | |
| Adjusted R-squared | 0.486864 | S.D. dependent var | 1.470967 | |
| S.E. of regression | 1.053705 | Akaike info criterion | 3.041803 | |
| Sum squared resid | 18.87500 | Schwarz criterion | 3.141217 | |
| Log likelihood | -26.89713 | Hannan-Quinn criter. | 3.058628 | |
| F-statistic | 18.07842 | Durbin-Watson stat | 1.842853 | |
| Prob(F-statistic) | 0.000538 | | | |

(f) Discuss the differences between your findings in parts (b) and (e). Describe in words what you have learned from these results.

R-squared of (e) is improve and p-value of advertising in (e) is accepted while in (b) is not significant at significant level.