

Suggested Answers of Practice Problem Set – Linear Regression

- (a) Neither figure appears to have a constant mean or variance.
- (b) They appear to move together. In general, the one-year rate is greater than the three-month rate, as expected.
- (c) $\widehat{TB1yr}_t = 0.698 + 0.916TB3mo_t$
- (d) The positive coefficient near one tells us that long-run and short-run rates move in the same direction. It also tells us that a one-unit increase in the short term rate is followed by a one-unit increase in the long term rate.
- (e) $t = \frac{0.916-1}{0.010} = -8.4 \Rightarrow$ we reject the null that $\beta = 1$
- (f) We not observe any particular pattern.
- (g) The F-statistic for the test with no cross-equation restrictions is 19.020 with a p-value equal to 0.000. Therefore we reject the null of homoskedasticity.
- (h) $\widehat{TB1yr}_t = \underset{(0.088)}{0.698} + \underset{(0.017)}{0.916}TB3mo_t$
- (i) We see that both standard errors increase and that the coefficients do not change (as is the case for any data set). Recall that only the standard errors change when using robust standard errors after OLS regression.
- (j) $\widehat{TB1yr}_t = 0.556 + \underset{(0.081)}{(0.014) \cdot 945}TB3mo_t - 0.444D_t$
- (k) $t = \frac{-0.444-0}{0.152} = -2.931$ and the p-value is 0.004 \Rightarrow we reject the null that the dummy variable is irrelevant
- (l) The fit here (in terms of R^2) is raised to 0.981 from 0.979. We also see decreases AIC and SIC.