

Class 9. Autocorrelation

Advanced Econometrics I

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Problem 1

Suppose Vassily estimated the following model based on 100 observations:

$$y_t = \alpha + \beta \times x_t + \varepsilon_t.$$

After the estimation procedure, he became concerned about the presence of autocorrelation. He decided to implement a Durbin-Watson test to check the model for the first-order autocorrelation. We know the following data:

$$RSS = 120, \quad \sum_{t=2}^{100} \hat{\varepsilon}_t \hat{\varepsilon}_{t-1} = -50, \quad \sum_{t=1}^{99} \hat{\varepsilon}_t^2 = 116, \quad \sum_{t=2}^{100} \hat{\varepsilon}_t^2 = 119.$$

Help Vassily to make a right statistical inference. Find the approximate value of $\hat{\rho}$.

Problem 2

Now Vassily again wants to test the autocorrelation. But now he believes that there may exist a second-order autocorrelation. To check this he wants to implement a Breusch-Godfrey test. He estimated the auxiliary regression and got the value of $R^2 = 0.8$. Help Vassily to perform a Breusch-Godfrey test and make a conclusion.