Autocorrelation

- Adjacent residuals should not be correlated with each other (**autocorrelation**).
- If you can use one residual to predict the next residual, there is some predictive information present that is not captured by the predictors.
- Typically, this situation involves time-ordered observations.

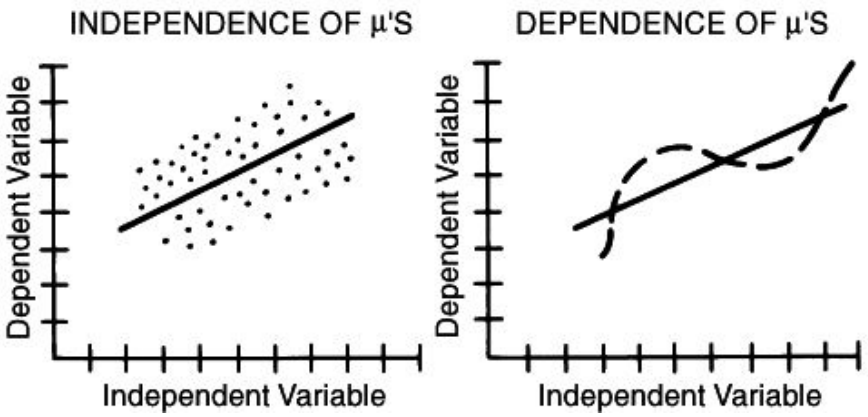

Figure 1: (disregard the titles)

- For example, if a residual is more likely to be followed by another residual that has the same sign, adjacent residuals are positively correlated.
- You can include a variable that captures the relevant time-related information, or use a time series analysis.

Durbin-Watson Test for Autocorrelated Errors

The ***Durbin-Watson*** procedure is commonly used to to test for autocorrelation of residuals. To perform this test, we use the `durbinWatsonTest()` from the car R package. All you have to do is to specify the name of the fitted mode.

```
 FitMod <- lm(mpg~wt+cyl,data=mtcars)

# library(car)
durbinWatsonTest(FitMod)
```

- The null hypothesis can simply be stated as "There is no autocorrelation present in the residuals"..
- The `R` code output provides a $p-$value to base a determination on.

```
> durbinWatsonTest(FitMod)
 lag Autocorrelation D-W Statistic p-value
   1       0.1302185      1.671096   0.252
 Alternative hypothesis: rho != 0
```