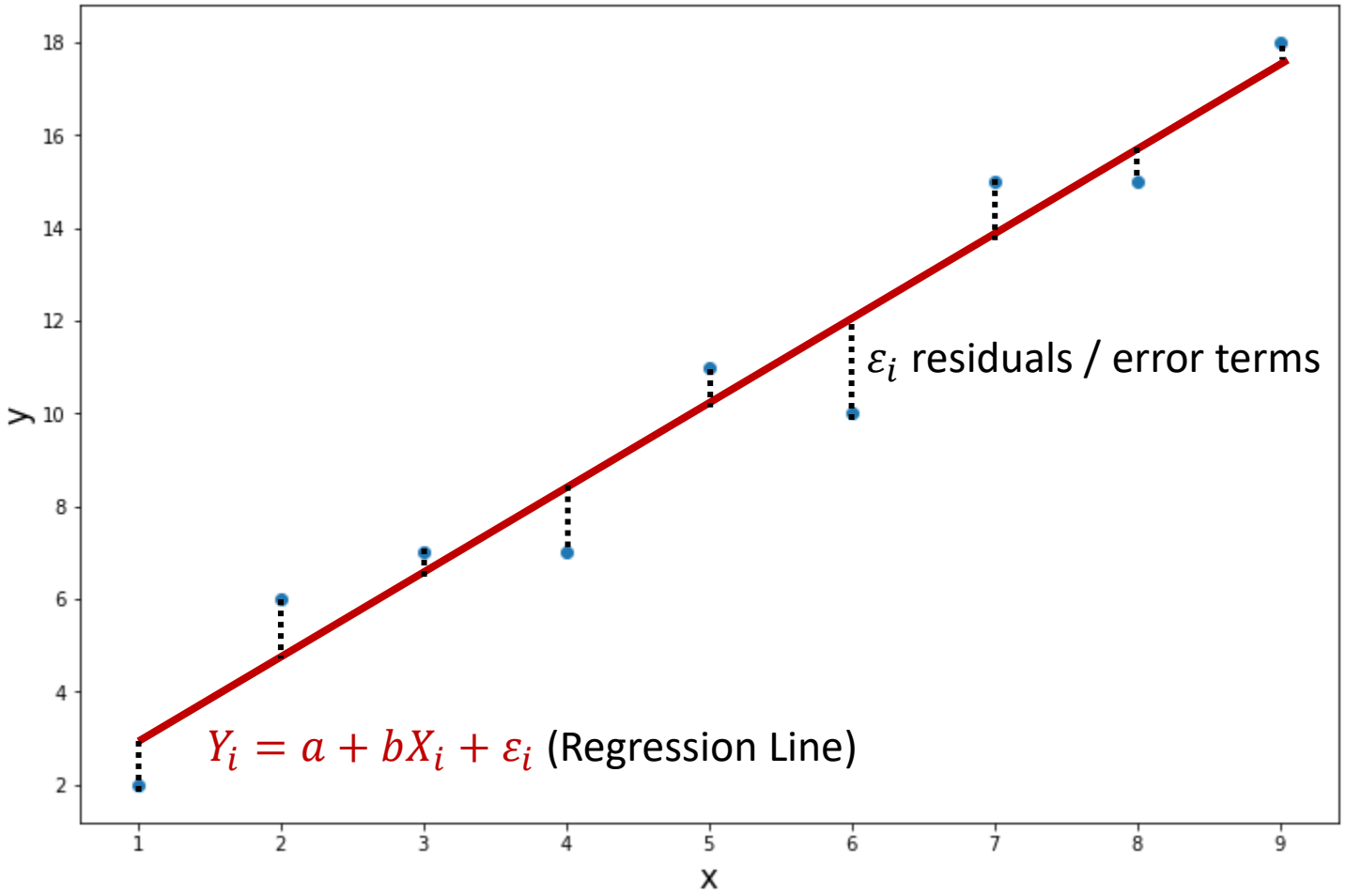
What is Autocorrelation?

Autocorrelation, also known as Serial Correlation, refers to the situation in which the residual terms (see right graph for definition of residuals) in a regression are correlated with each other. Autocorrelation is a relatively common problem with Time Series Data.

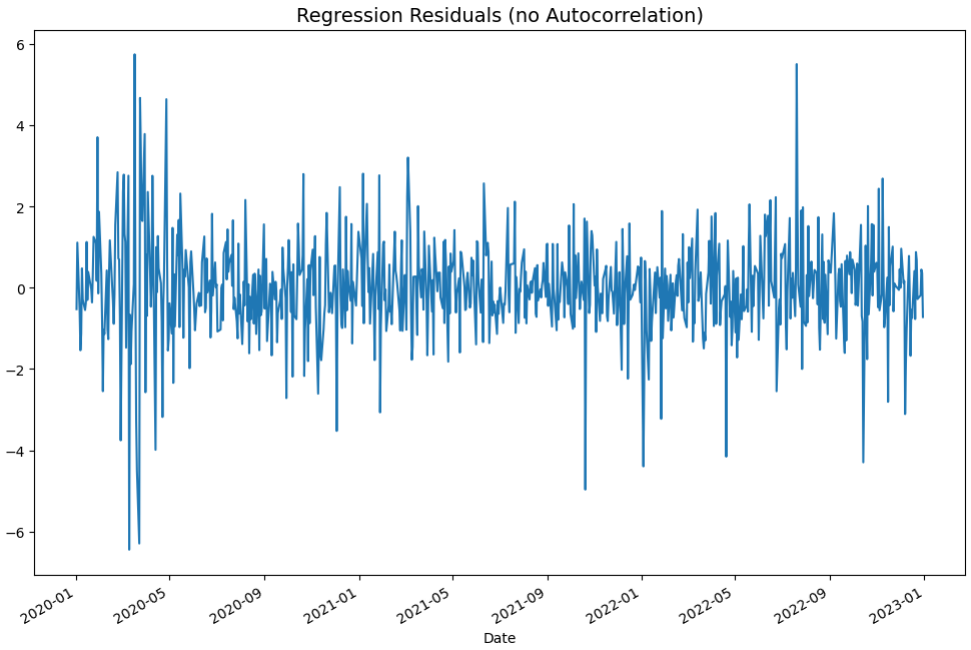
Autocorrelation can make the results of Regression Analysis and Hypothesis Testing totally meaningless.

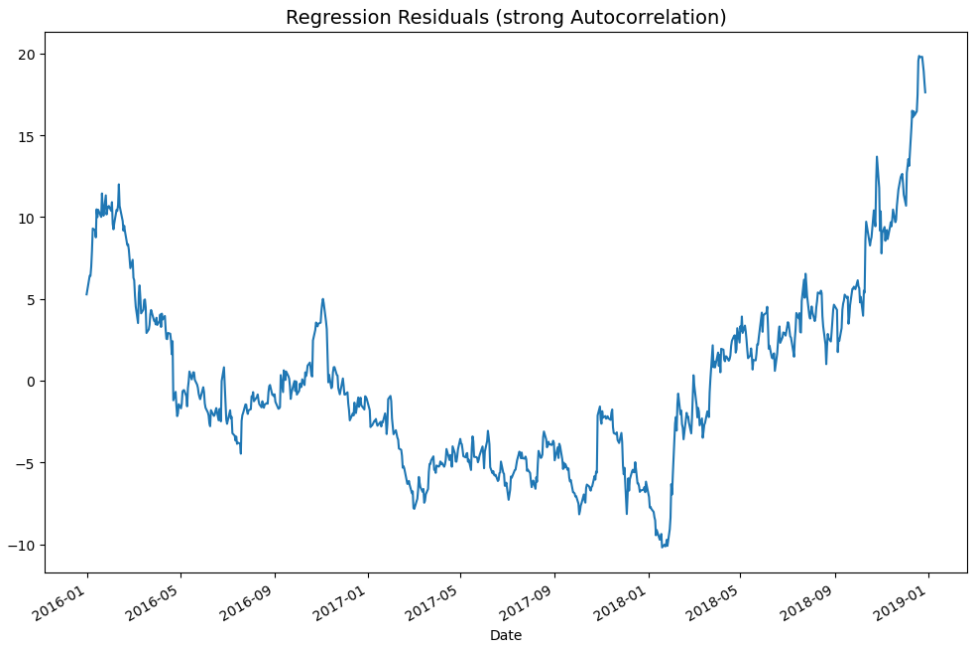


How to detect Autocorrelation?

Two ways to detect Autocorrelation:

1. Plotting Regression Residuals (see below examples). Residuals should randomly oscillate around Zero when there is no Autocorrelation.
2. Testing for Autocorrelation with the Durbin-Watson Test (DW). The DW Statistic (can take values between 0 and 4) is close to 2 when there is no Autocorrelation.





How to avoid / deal with Autocorrelation?

There are various advanced statistical methods (e.g. Hanson Method) to correct for (modest) Autocorrelation (beyond the scope). But, most Important, you can avoid Autocorrelation issues with the following simple rule:

When working with Financial Time Series in Regression Analysis,

always use Returns (Covariance Stationary)

and **not Prices** (non-stationary)!