

How SAS Performs Simple Linear Regression

In order to create your simple linear regression model, you estimate the unknown population parameters β_0 and β_1 . They define the assumed relationship between your response and predictor variable. Estimate β_0 and β_1 to determine the line that's as close as possible to all the data points using the method of least squares. This method determines the line that minimizes the sum of the squared vertical distances between the data points and the fitted line. Estimated parameters are denoted with a hat above the parameter, in this case, $\hat{\beta}_0 + \hat{\beta}_1 X$.

The method of least squares produces parameter estimates with certain optimum properties. If the assumptions of simple linear regression are valid, $\hat{\beta}_0$ and $\hat{\beta}_1$ are unbiased estimates of the population parameters and have minimum variance. The least squares estimators are often called BLUE, best linear unbiased estimators. The term best refers to the property of minimum variance.

For a good representative sample, the estimated parameters $\hat{\beta}_0$ and $\hat{\beta}_1$ should closely approximate the true population parameters β_0 and β_1 . In turn, the fitted regression line should closely approximate the relationship between the response and the predictor variables in the population.

Statistics 1: Introduction to ANOVA, Regression, and Logistic Regression

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