

Residual Analysis

1.3 Errors in Forecasting 12-18

5.2 Residual Analysis in Simple Regression 236-250

Residual Plots	
The Constant Variance Assumption	
	Absolute Residuals Plot & Trendline: low R^2 for linear fit to absolute residuals
	<u>Barbiturates</u> : Fan-out of residuals plot on "Pills" tab shows interaction with a variable not in the model (alcohol).
The Assumption of Correct Functional Form	
	Residuals plot: low R^2 for quadratic fit to residual
	<u>Pies</u> Linear demand model implies quadratic revenue model
	<u>Population</u> : Log transform hints world population fits exponential model better than linear
	Beware of blind fishing!
The Normality Assumption	
	Normalized Residuals plot: should be linear Note: Excel's so-called "Normal ProbabilityPlot" is NOT a normal residuals plot! Skewness & kurtosis of residuals: should each be between -1 and +1
The Independence Assumption ages 242-284	
	(Autocorrelated Time Series) We will come back to this when we cover 6.6 and 7.4

Transforming the Dependent Variable When it Makes Business Sense To

Home Maintenance: square root transformation is a close relative of quadratic regression

Interval estimates based on transformed variables almost always lead to confusion, which is why page 251 is so confusing!

Beware of making variance constant by raising it where it's low without lowering it where it's high!

Case: Forecasting With Regression Analysis p. 15-18

5.3 Residual Analysis in Multiple Regression 251-253

Check skewness and kurtosis of all variables and the residuals, then wade through plots looking for patterns

5.4 Outlying and Influential Observations 253-260

Three Sigma test on all variables and the outliers

Software tools:	Residuals Plot and Absolute Residuals Plot Diagnostics In SAS, SPSS, and Minitab Leverage Values Residuals and Standardized Residuals Deleted Residuals and Deleted Standardized Residuals
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What to Do about Outlying and Influential Observation

Check, verify, clean, Think!

Population: Effect of Depression, W.W.II, Chinese Revolution