

Cost Estimation - High Low Method

The number of blood tests performed and the related costs over the last nine months in Generic Hospital are given below:

Month	Blood Tests Performed	Blood Test Costs
January	3,125	\$ 14,000
February	3,500	\$ 14,500
March	2,500	\$ 11,500
April	2,125	\$ 10,000
May	2,250	\$ 11,000
June	1,500	\$ 8,500
July	1,875	\$ 9,000
August	2,750	\$ 12,000
September	2,875	\$ 13,000

Required:

1. Using the high–low method, estimate the cost formula for blood tests.
2. Using the cost formula you derived above, what blood test costs would you expect to be incurred during a month in which 2,300 blood tests are performed?

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Required:

Calculate the mean absolute percentage error (MAPE) for the cost equation you developed

Cost Estimation - High Low Method

The Mason Daniels Company specializes in the purchase, renovation, and resale of older homes. It is essential for him to have accurate cost estimates so he can determine total renovation costs before he purchases a piece of property.

Mason has been using the home's interior square feet for his exterior paint cost estimations. Recently, he decided to include the number of external openings – the total number of doors and windows in a house – as a cost driver. Mason has kept careful records of these exterior painting costs on his last 12 jobs:

House	Square Feet	External Openings	Costs
1	2,500	13	\$2,810
2	3,010	15	3,742
3	2,800	12	3,100
4	2,850	12	3,150
5	4,600	19	4,700
6	2,700	13	3,225
7	2,600	11	2,920
8	2,550	11	2,836
9	2,600	10	3,242
10	3,700	16	4,112
11	2,650	13	3,210
12	3,550	16	3,965

Required

- Using the high-low estimation technique and square feet as the independent variable, determine the cost of painting a 3,400 square-foot house with 15 external openings.
- Repeat requirement a) but use the number of external openings as the independent variable.
- Plot the cost data against square feet and against openings. Which variable is better cost driver? Why?

Cost Estimation - Regression

Question from: Blocher et al. *Cost Management: A Strategic Emphasis*, 8th edition, © 2019, McGraw-Hill Education ISBN: 978-1-260-09172-4

Interpreting Regression Results Recent research into the cost of various medical procedures has shown the impact of certain complications encountered in surgery on the total cost of patient's stay in the hospital. The researchers used regression analysis and found the following results:

Total Cost for Patient = Constant, plus

- a x length of stay (measured in days), plus
- b x presence of one or more complications (1 if true, 0 if false), plus
- c x use of a laparoscope (1 if true, 0 if false)

Where:

- a , b , c are coefficients of the regression model, and
- The laparoscope is an instrument somewhat like a miniature telescope with a fiber optic system which brings light into the abdomen. It is about as big around as a fountain pen and twice as long.

The research, based on 57 patients, showed the following regression results:

r -squared: 53%

constant term: \$3,719

Coefficients and t -values for independent variables:

	Length of Stay	Complication	Laproscope
Coefficient	\$ 861.00	\$ 1,986.00	\$ 908.00
t-value	10.76	4.89	2.54

Required:

- What is the estimated cost for a patient who has complications and stays in the hospital two days, and whose surgery requires a laparoscope?
- Which, if any, dummy variables are used in this regression?

Cost Estimation – Regression

- **R-squared**, also known as the coefficient of determination
 - *R-squared measures the strength of the relationship between your dependent variable that the independent variables*
 - Between 0 & 1. **The closer to 1 the greater reliability**

- **The p-value**
 - *values of 5% or less are expected in useable regression models*

- **The standard error of the estimate (SE)**
 - *A measure of the precision/accuracy of the regression's estimate*
 - *Used to make estimates of confidence in the prediction of the regression equation.*
 - **Smaller the SE, the better.**

- **The t-value**
 - *Variables with a low t-value should be evaluated and possibly removed to improve cost estimation*
 - **t-value > 2 preferred**

Example:

The plant manager at one of Generic Foods Company's processing plants is concerned about the increase in plant overhead costs in recent months. He has collected data on overhead costs for the past 24 months and has decided to use regression to study the factors influencing these costs. He has also collected data on direct materials cost, direct labor hours, and machine hours as potential independent variables to use in predicting overhead. He performed two regression analyses on these data, with the following results:

	Regression 1	Regression 2
	(materials cost and labor hours)	(materials cost, labor hours, and machine hours)
R-squared	0.65	0.58
Standard error	12,554	13,793
Standard error as a percent of the average dependent variable	12%	14%
t-values:		
Direct materials	2	-1.6
Labor hours	4.5	3.8
Machine hours		1.4

Required: Which of the two regressions is better and why?