

Understand multiple linear regression

Video: Welcome to week 3
4 min

Video: Introduction to multiple regression
3 min

Reading: Multiple linear regression scenarios
10 min

Practice Quiz: Test your knowledge: Understand multiple linear regression
2 questions

Model assumptions revisited

Model interpretation

Variable selection and model evaluation

Review: Multiple linear regression

Multiple linear regression scenarios

Goals of Reading

Now that you have learned what multiple linear regression is, in this reading, you will explore three scenarios in which multiple regression models can help a company or organization understand a business problem. The goal of the reading is to understand the versatility of multiple linear regression, and to get you thinking about various applications of this powerful and flexible regression technique.

Scenario 1: Selling graphic design services

Let's say that you're a data professional working at a company that sells graphic design services. The company you work for might be interested in understanding the factors related to customer satisfaction and retention. There are many ways you can measure this, and you can use any of the following factors to develop a promising multiple linear regression model.

Potential dependent variables (Y)

- Customer satisfaction
- Number of returning customers
- Net Promoter Score
- Satisfaction with customer service

Potential independent variables (X)

- Cost of services
- Customer service response time
- Adding new graphic design packages
- Changing page layout

Scenario 2: Running a restaurant

Imagine that you are working at a restaurant, and you want to determine how to improve the success of your business. Like any other client-facing business, you want to keep your costs down, your revenue high, and your customers happy. Similar to the prior example, there are many ways to measure the restaurant's success. There are also a number of variables that could be correlated with the chosen metric of success.

Potential dependent variables (Y)

- Total revenue
- Number of reviews online
- Number of five-star reviews online
- Number of reservations per week

Potential independent variables (X)

- Spending on advertising/marketing
- Operational costs
- Size of menu
- Foot traffic
- Cancellation of reservations
- Business partnerships (ex: delivery apps, farmers' markets, community organizations)

Scenario 3: Agricultural production

Suppose you are working in agricultural production, perhaps on a farm or a ranch. Even though this is a very different environment from a restaurant or online service, multiple regression can still be helpful. For example, let's say that you are trying to predict crop yield, revenue for the season, or amount of crops sold. From the weather to soil conditions to labor and resource usage, there are many factors that could contribute to a good year or a bad year for a farm or any kind of agricultural production. Multiple regression can be used to help better plan and predict for worse years.

Potential dependent variables (Y)

- Crop yield
- Revenue
- Crops sold

Potential independent variables (X)

- Weather (rainfall, temperature)
- Nutrients in soil
- Historic crop yield
- Cost of fertilizer
- Cost of fuel, water, or energy used to maintain crops
- Cost of labor
- Partnerships with local restaurants or, grocery stores

Key Takeaways

- Multiple regression is a versatile and effective way to understand and describe more complex relationships between variables.
- Multiple regression can be used in a variety of industries and contexts.

Resources for more information

- "Multiple Regression: Definition, Uses, and 5 Examples." Indeed Editorial Team
- "Multivariate Regression Analysis | STATA Data Analysis Examples." UCLA: Statistical Consulting Group

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