# 📌 How to Choose the Right Metrics for Linear Regression

When evaluating a Linear Regression model, you need to choose metrics that measure accuracy, error, and model fit. The right metric depends on your dataset and business problem. Let’s break it down!

## 1️⃣ Key Metrics for Evaluating Linear Regression

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| --- | --- | --- |
| Metric | Measures | When to Use? |
| R² (R-Squared) | How well the model explains the data | Always useful to check model fit |
| Adjusted R² | R² but adjusted for multiple variables | When using multiple independent variables |
| Mean Absolute Error (MAE) | Average absolute error | When errors need to be easily interpretable |
| Mean Squared Error (MSE) | Squared error, penalizes large errors | When large errors are bad (e.g., stock price predictions) |
| Root Mean Squared Error (RMSE) | Square root of MSE (same unit as target variable) | Best for interpretability and penalizing large errors |
| Mean Percentage Error (MPE) | % error of predictions | When relative error matters more than absolute error |
| Mean Absolute Percentage Error (MAPE) | Absolute % error | Best for financial applications (e.g., stock price forecasting) |

## 2️⃣ Which Metric Should You Use?

✅ If you need to explain how well your model fits the data:  
🔹 Use \*\*R²\*\* (closer to \*\*1\*\* means better fit)

✅ If your predictions need to be in the same unit as the target variable:  
🔹 Use \*\*RMSE\*\* (interpretable, penalizes large errors)  
🔹 Use \*\*MAE\*\* (simpler but doesn’t penalize large errors)

✅ If you are dealing with multiple independent variables:  
🔹 Use \*\*Adjusted R²\*\* (prevents overfitting)

✅ If you are concerned about large errors impacting results:  
🔹 Use \*\*MSE\*\* or \*\*RMSE\*\* (since they give more weight to large errors)

✅ If you care about relative error instead of absolute error:  
🔹 Use \*\*MAPE\*\* (good for financial analysis)

## 3️⃣ Choosing the Right Metric for Stock Market Predictions

📌 \*\*Example Scenarios:\*\*  
  
1️⃣ \*\*Predicting stock prices for algorithmic trading?\*\* → Use \*\*RMSE or MAPE\*\*  
2️⃣ \*\*Evaluating a regression model on multiple features?\*\* → Use \*\*Adjusted R²\*\*  
3️⃣ \*\*Building a simple model where errors should be easy to interpret?\*\* → Use \*\*MAE\*\*

## 🚀 Final Takeaway

🔹 \*\*Use multiple metrics\*\* to get a complete picture of model performance.  
🔹 \*\*Choose RMSE for stock price prediction\*\* (since it penalizes large errors).  
🔹 \*\*Use R² for model explainability\*\*, and \*\*MAPE for financial forecasting\*\*.