

How to Perform Simple Linear Regression in Power BI: A Step-by-Step Guide

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Perform Simple Linear Regression in Power BI

Simple linear regression is a fundamental **statistical technique** employed extensively in data analysis. Its primary purpose is to quantify and model the relationship between two continuous **quantitative variables**. In this model, one variable is designated as the dependent variable (the response), while the other is the independent variable (the predictor). This method enables analysts to understand how changes in the independent variable influence the dependent variable.

The core utility of regression lies in its predictive capability. By establishing a linear relationship, we can create a mathematical model that predicts the expected value of the **dependent variable** based on specific inputs of the **independent variable**. This makes it an invaluable tool for forecasting, risk assessment, and guiding strategic decision-making in various business contexts.

While specialized statistical software is often used for advanced modeling, powerful business intelligence platforms like Power BI offer robust capabilities for performing these complex calculations directly within the data visualization environment. Fitting a precise, formula-driven model requires leveraging Data Analysis Expressions (DAX) functions, such as `LINEST`, to generate the mathematical parameters necessary for a rigorous linear regression model.

Understanding Linear Regression within Power BI

As mentioned, simple linear regression provides a formal mathematical structure to quantify the relationship between a single predictor variable and a single response variable. Implementing this in Power BI requires leveraging the powerful features of its internal data engine and the DAX language. The following detailed, step-by-step guide demonstrates how to load data, fit the model using `LINEST`, interpret the resulting coefficients, and finally, create interactive visualizations for making real-time predictions based on the statistical findings.

Step 1: Preparing and Loading the Data

The initial step in any analytical process is ensuring the data is correctly loaded and structured within the Power BI environment. For this comprehensive example, we will utilize a dataset named **my_data**. This table contains crucial operational metrics related to retail performance: specifically, the total amount spent on advertising (**Ad Spend**) and the subsequent total revenue generated (**Revenue**) across a sample of retail outlets.

This sample dataset will serve as the foundation for our **linear regression** analysis, where we aim to determine the precise statistical impact of **Ad Spend** (our predictor) on **Revenue** (our response). Reviewing the loaded table structure confirms that our quantitative variables are correctly formatted and ready for formal statistical modeling:

The screenshot shows the Microsoft Power BI interface. The 'Table tools' ribbon is active, displaying options like 'Name' (set to 'my_data'), 'Mark as date table', 'Manage relationships', and 'Calculations' (with sub-options: 'New measure', 'Quick measure', 'New column', 'New table'). Below the ribbon, a data table is visible with the following columns and data:

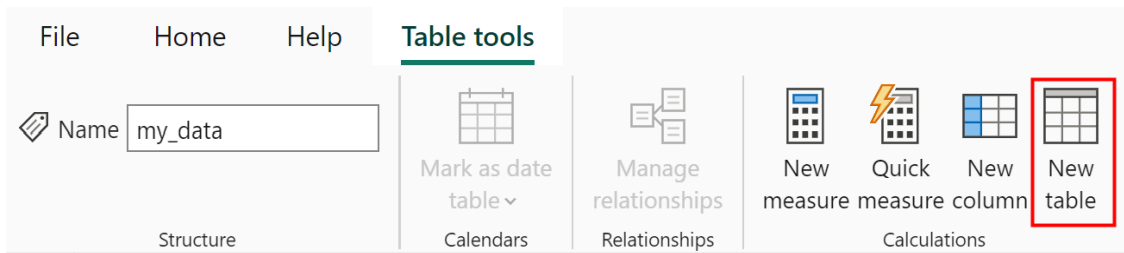
Store	Ad Spend	Revenue
A	4	12
B	5	15
C	7	19
D	8	16
E	8	15
F	9	18
G	10	20
H	12	24
I	13	23
J	13	23
K	14	28
L	17	24
M	19	30

Step 2: Fitting the Simple Linear Regression Model using DAX

With the data successfully loaded, the next critical step is to formally construct the **linear regression model**. Our objective is to define the relationship where **Revenue** is predicted based on the value of **Ad Spend**. Mathematically, the fitted relationship will adhere to the standard linear equation form, where β_0 represents the intercept and β_1 represents the slope:

$$\text{Response} = \beta_0 + \beta_1 * (\text{Ad Spend})$$

In Power BI, we accomplish this by creating a new calculated table utilizing the powerful DAX function LINEST. To initiate this process, navigate to the **Table tools** tab in the ribbon menu and select the **New table** icon.



In the formula bar that appears, input the following specific **LINEST** expression. This function takes the response column (Revenue) as the first argument and the predictor column (Ad Spend) as the second:

```
Model = LINEST(
'my_data',
'my_data'
)
```

Executing this formula successfully fits the **simple linear regression model** to the underlying data and generates a new table named **Model**. This table contains a comprehensive summary of the regression statistics, crucially including the slope and the intercept, which are the coefficients that define the linear relationship found between the two variables:

The screenshot shows the Power BI interface with the 'Table tools' tab. The 'Name' field is set to 'Model'. Below the ribbon, the formula bar shows the following DAX formula:

```
1 Model = LINEST(
2 'my_data'[Revenue],
3 'my_data'[Ad Spend]
4 )
```

Below the formula bar, a table is displayed with the following data:

Slope1	Intercept	StandardErrorSlope1	StandardErrorIntercept	CoefficientOfDetermination
1.10958466453674	8.67444089456869	0.135742967981728	1.56455859704547	0

Interpreting the Regression Output

The resulting **Model** table provides the necessary coefficients to formulate the fitted regression equation rigorously. The two most critical values in the output for a simple regression are **Slope1** and **Intercept**. These coefficients allow us to write the precise equation that estimates revenue based on ad spend:

$$\text{Revenue} = 8.67444 + 1.10958 * (\text{Ad Spend})$$

We can derive significant business insights directly from these numerical parameters and the underlying statistical meaning:

The **Intercept** ($\beta_0 = 8.67444$) signifies the predicted baseline revenue when **Ad Spend** is exactly zero dollars. Based on our model, a store with no advertising spending is predicted to generate **\$8.67444** in revenue.

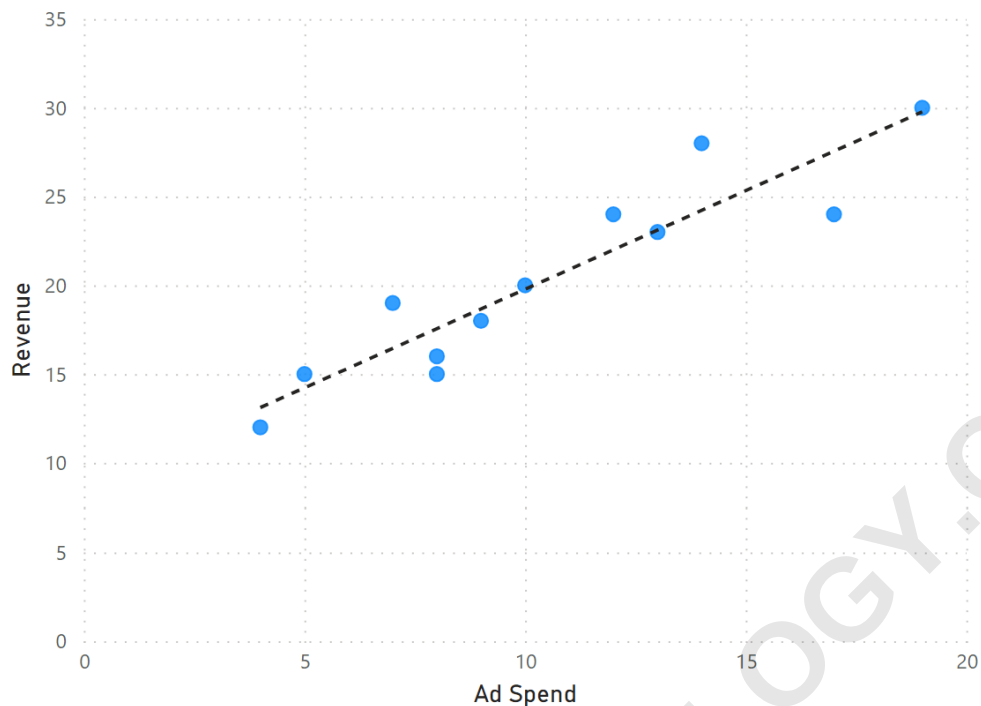
The **Slope** ($\beta_1 = 1.10958$) quantifies the marginal effect of the predictor. It indicates that for every additional dollar a store allocates to advertising, their predicted revenue increases by an average of **\$1.10958**, holding all other potential variables constant.

Step 3: Visualizing the Relationship and Making Predictions

While the mathematical equation provides the numerical structure of the relationship, visualization is essential for confirming the model's fit and effectively communicating the results to stakeholders. We begin by inserting a scatter chart into the Report view. Configure this visualization by assigning **Ad Spend** to the X-axis (predictor) and **Revenue** to the Y-axis (response).

To visually represent our fitted **linear regression** model, we must add a trendline to the scatter plot. This line directly corresponds to the calculated regression equation, allowing us to see how closely the actual data points align with the predicted linear path:

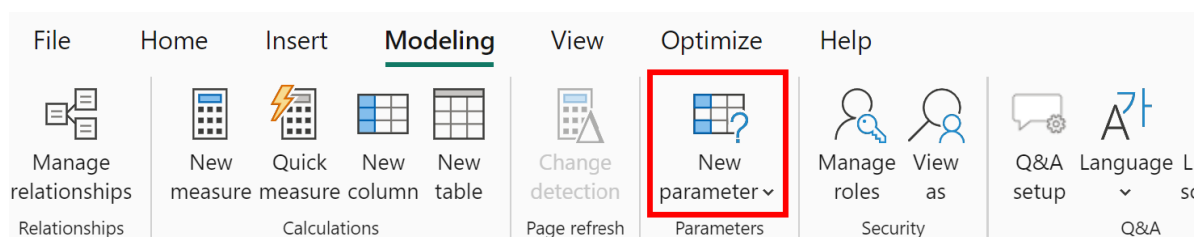
Ad Spend and Revenue



To transform this static visualization into a dynamic, predictive tool, we will next introduce a parameter-based slicer. This interactive element will allow users to dynamically change the input value for **Ad Spend** and instantly observe the corresponding predicted **Revenue** output, calculated in real-time by referencing our derived regression equation.

Creating the Interactive Prediction Parameter

The first step in building the interactive input slider is defining a numeric range parameter. Navigate to the **Modeling** tab in the Power BI ribbon and select the **New parameter** icon, choosing the **Numeric range** option from the resulting dropdown menu.



In the configuration window that appears, we must name the parameter **Ad Spend**. We will

establish the predictive range by setting the **Minimum** value to **0** and the **Maximum** value to **20**, ensuring the range covers typical input scenarios for our data. It is essential to check the box labeled **Add slicer to this page** before confirming by clicking **OK**. This action automatically generates the interactive slicer visualization on the current report page.

Parameters

Add parameters to visuals and DAX expressions so people can use slicers to adjust the inputs and see different outcomes. [Learn more](#)

What will your variable adjust?

Numeric range

Name

Ad Spend

Data type

Whole number

Minimum

0

Maximum

20

Increment

1

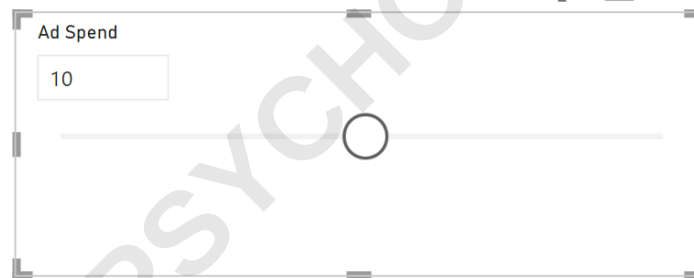
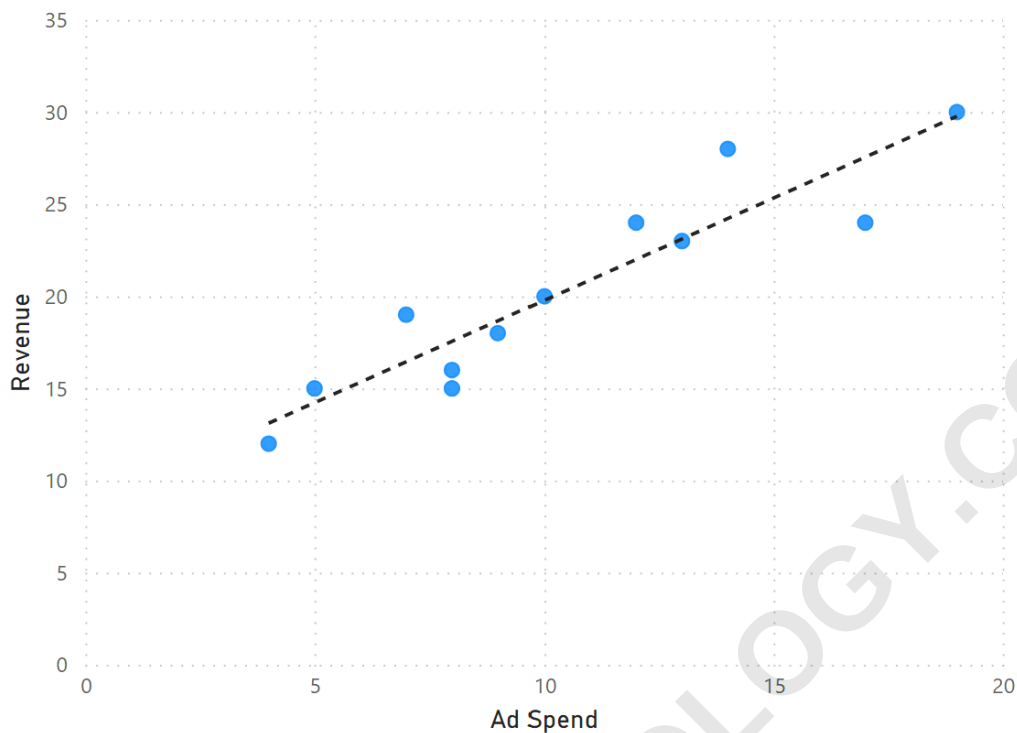
Default

☒ Add slicer to this page

Create Cancel

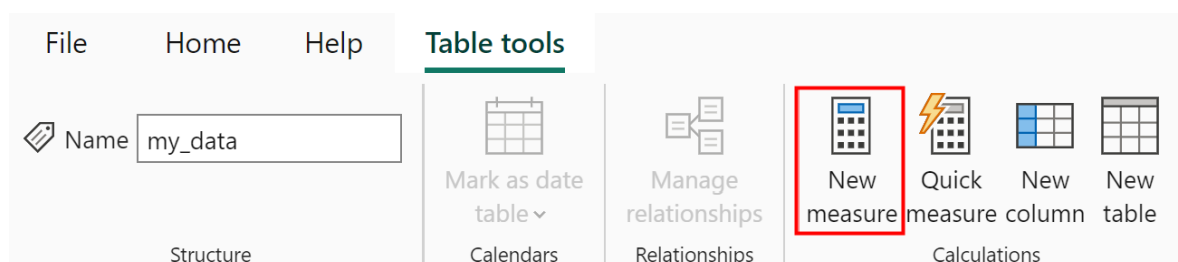
The newly created slicer provides the dynamic input mechanism, allowing users to select any value between 0 and 20. This slider is automatically associated with a generated table containing the selected input value, which we will reference in the subsequent step to calculate the predicted revenue based on the model.

Ad Spend and Revenue



Calculating Predicted Revenue with a DAX Measure

To successfully link the interactive slider value with our regression coefficients, we must define a new measure that executes the regression formula. Switch back to the Data or Table view, go to the **Table tools** tab, and click **New measure**.



The following DAX formula implements the fitted regression equation. It retrieves the Intercept and Slope values from the previously created **Model** table and multiplies the Slope by the current value selected by the user in the **Ad Spend** slicer:

Predicted Revenue = SELECTCOLUMNS('Model',) + SELECTCOLUMNS('Model',)*'Ad Spend'

This new measure, named **Predicted Revenue**, dynamically calculates the expected revenue based on the input variable defined by the slider. It successfully translates the static statistical model coefficients into a functional, dynamic forecasting tool within Power BI, ready for display.

The screenshot shows the Power BI interface with the **Measure tools** ribbon active. The measure name is **Predicted Revenue**, and the source table is **Model**. The DAX formula bar displays the following formula:

```
Predicted Revenue = SELECTCOLUMNS('Model', [Intercept]) + SELECTCOLUMNS('Model', [Slope1])*'Ad Spend'[Ad Spend Value]
```

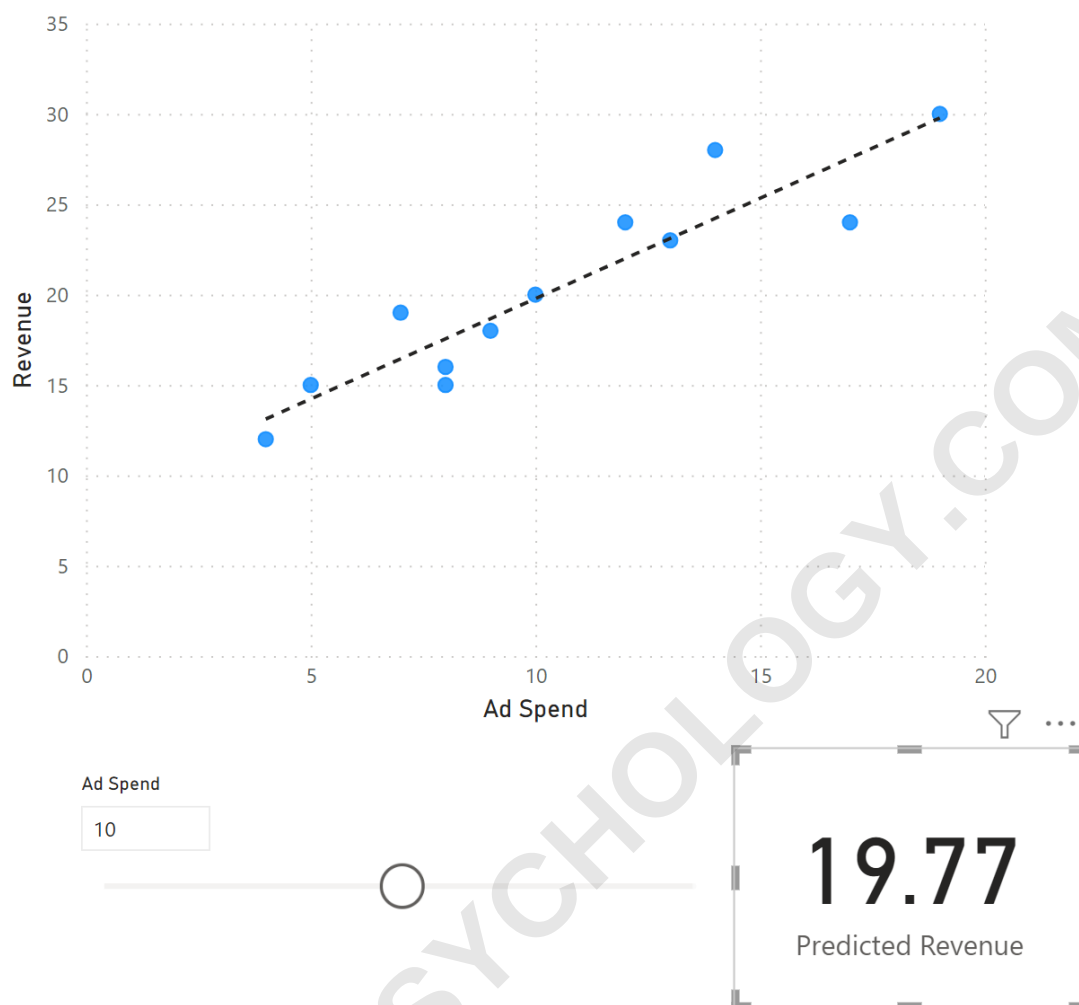
Below the formula bar, a table displays the statistical results of the regression model:

Slope1	Intercept	StandardErrorSlope1	StandardErrorIntercept	CoefficientOfDetermination	StandardError	FStatistic
1.10958466453674	8.67444089456869	0.135742967981728	1.56455859704547	0.858642499985763	2.10628838711075	66.816882

Displaying Real-Time Predictions

The final step in the process is to display the calculated result in a clear, highly visible format on the report page. Return to the Report view and insert a standard **Card visualization**. Assign the newly created measure, **Predicted Revenue**, as the field for this card visualization.

Ad Spend and Revenue



The Card now serves as a real-time output display for the prediction. For example, if the user adjusts the **Ad Spend** slider to precisely **10**, the card instantly updates, showing the **Predicted Revenue** of **19.77**.

We can verify that this prediction is accurate by performing a manual calculation using the fitted regression equation we found earlier:

$$\text{Revenue} = 8.67444 + 1.10958 * (\text{Ad Spend})$$

$$\text{Revenue} = 8.67444 + 1.10958 * (10)$$

$$\text{Revenue} = 19.77$$

Users are encouraged to interact with the slider bar, observing how changes in the **Ad Spend** input directly and immediately affect the resulting **Predicted Revenue** output, thereby demonstrating the practical predictive power of the fitted **simple linear regression** model.

Conclusion and Further Power BI Tasks

By leveraging the `LINEST` function in DAX, analysts can move beyond simple visual trends to build robust, quantitative **simple linear regression** models directly within the Power BI platform. This capability is essential for creating powerful predictive reports and driving data-informed strategic decisions across the organization.

If you are interested in exploring other advanced analytical and data manipulation techniques within the platform, the following resources provide guidance on performing additional common tasks and statistical procedures in Power BI: