**What Is a Regression?**

Regression is a statistical method used in finance, investing, and other disciplines that attempts to determine the strength and character of the relationship between one dependent variable (usually denoted by Y) and a series of other variables (known as independent variables).

Linear regression establishes the linear relationship between two variables based on a line of best fit.

Linear regression is thus graphically depicted using a straight line with the slope defining how the change in one variable impacts a change in the other.

The y-intercept of a linear regression relationship represents the value of one variable when the value of the other is zero. Non-linear regression models also exist, but are far more complex.

Regression analysis is a powerful tool for uncovering the associations between variables observed in data, but cannot easily indicate causation.

It is used in several contexts in business, finance, and economics. For instance, it is used to help investment managers value assets and understand the relationships between factors such as commodity prices and the stocks of businesses dealing in those commodities.

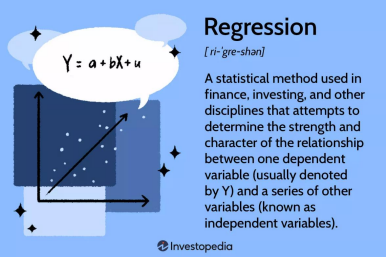
**KEY TAKEAWAYS**

• A regression is a statistical technique that relates a dependent variable to one or more independent (explanatory) variables. • A regression model is able to show whether changes observed in the dependent variable are associated with changes in one or more of the explanatory variables.

• It does this by essentially fitting a best-fit line and seeing how the data is dispersed around this line.

• Regression helps economists and financial analysts in things ranging from asset valuation to making predictions.

• In order for regression results to be properly interpreted, several assumptions about the data and the model itself must hold.



**Understanding Regression**

• Regression captures the correlation between variables observed in a data set and quantifies whether those correlations are statistically significant or not.

The two basic types of regression are **simple linear regression and multiple linear regression**, although there are non-linear regression methods for more complicated data and analysis.

Simple linear regression uses one independent variable to explain or predict the outcome of the dependent variable Y, while multiple linear regression uses two or more independent variables to predict the outcome (while holding all others constant).

Regression can help finance and investment professionals as well as professionals in other businesses.

Regression can also help predict sales for a company based on weather, previous sales, GDP growth, or other types of conditions.

The capital asset pricing model (CAPM) is an often-used regression model in finance for pricing assets and discovering the costs of capital.

**Regression and Econometrics**

Econometrics is a set of statistical techniques used to analyse data in finance and economics. An example of the application of econometrics is to study the income effect using observable data.

An economist may, for example, hypothesize that as a person increases their income their spending will also increase.

If the data show that such an association is present, a regression analysis can then be conducted to understand the strength of the relationship between income and consumption and whether or not that relationship is statistically significant—that is, it appears to be unlikely that it is due to chance alone.

Note that you can have several explanatory variables in your analysis—for example, changes to GDP and inflation in addition to unemployment in explaining stock market prices.

When more than one explanatory variable is used, it is referred to as multiple linear regression. This is the most commonly used tool in econometrics.

Econometrics is sometimes criticized for relying too heavily on the interpretation of regression output without linking it to economic theory or looking for causal mechanisms. It is crucial that the findings revealed in the data are able to be adequately explained by a theory, even if that means developing your own theory of the underlying processes.

**Calculating Regression**

Linear regression models often use a least-squares approach to determine the line of best fit. The least-squares technique is determined by minimizing the sum of squares created by a mathematical function. A square is, in turn, determined by squaring the distance between a data point and the regression line or mean value of the data set.

Once this process has been completed (usually done today with software), a regression model is constructed. The general form of each type of regression model is:

Simple linear regression:

Y=a+bX