

[ECONOMY](#) > [ECONOMICS](#)

What Assumptions Are Made When Conducting a T-Test?

By [J.B. MAVERICK](#) | Reviewed by [MICHAEL J BOYLE](#) | Updated Jun 9, 2021

TABLE OF CONTENTS

The T-Test

[EXPAND +](#)

T-tests are commonly used in statistics and econometrics to establish that the values of two outcomes or variables are different from one another.

Advertisement

The common assumptions made with t-tests include those regarding the scale of measurement, random sampling, normality, and equality of variance in standard deviation.

ide those regarding the scale of measurement, adequacy of sample size, and equality of variance in standard deviation.

Advertisement

KEY TAKEAWAYS

- A t-test is a statistic method used to determine if there is a significant difference between the means of two groups based on a sample of data.
- The test relies on a set of assumptions for it to be interpreted properly and with validity.
- Among these assumptions, the data must be randomly sampled from the population of interest and the data variables must follow a normal distribution.

The T-Test

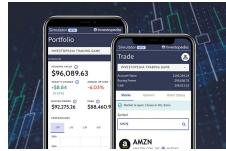
The [t-test](#) was developed by a chemist working for the Guinness brewing company as a simple way to measure the consistent quality of stout.^[1] It was further developed and

A t-test is an analysis of two population means through the use of statistical examination; a t-test with two samples is commonly used with small sample sizes, testing the difference between the samples when the variances of two normal distributions are not known.

Advertisement

Investopedia Essentials

Sponsored



Try the Investopedia Stock Simulator

New to investing? Learn how to trade in real time on our virtual stock simulator. Our platform helps teach you the right strategies for building and maintaining wealth.

[LEARN MORE](#)

[T-distribution](#) is basically any continuous probability distribution that arises from an estimation of the mean of a normally distributed population using a small sample size and an unknown standard deviation for the population. The [null hypothesis](#) is the default assumption that no relationship exists between two different measured phenomena.

T-Test Assumptions

1. The first assumption made regarding t-tests concerns the scale of measurement. The assumption for a t-test is that the scale of measurement applied to the data collected follows a continuous or ordinal scale, such as the scores for an IQ test.
2. The second assumption made is that of a [simple random sample](#), that the data is collected from a representative, randomly selected portion of the total population.
3. The third assumption is the data, when plotted, results in a normal distribution, bell-shaped distribution curve. When a normal distribution is assumed, one can specify a level of probability (alpha level, level of significance, p) as a criterion for acceptance. In most cases, a 5% value can be assumed.
4. The fourth assumption is a reasonably large sample size is used. A larger sample size means the distribution of results should approach a normal bell-shaped curve.
5. The final assumption is homogeneity of [variance](#). Homogeneous, or equal, variance exists when the standard deviations of samples are approximately equal.

Compete Risk Free with \$100,000 in Virtual Cash

Put your trading skills to the test with our [FREE Stock Simulator](#). Compete with thousands of

ready to enter the real market, you've had the practice you need. [Try our Stock Simulator today >>](#)

ARTICLE SOURCES ▾

Related Articles



TRADING BASIC EDUCATION

Hypothesis Testing in Finance: Concept and Examples



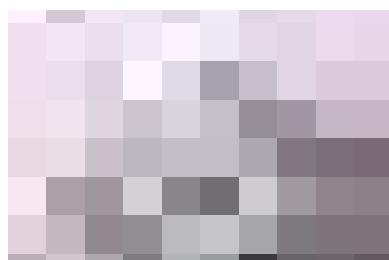
MATH & STATISTICS

Systematic Sampling vs. Cluster Sampling: What's the Difference?



FINANCIAL ANALYSIS

Standard Error of the Mean vs. Standard Deviation: The Difference



RISK MANAGEMENT

The Uses And Limits of Volatility



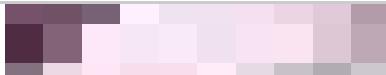
TOOLS FOR FUNDAMENTAL ANALYSIS

Using Common Stock Probability Distribution Methods



PORTFOLIO MANAGEMENT

Bet Smarter With the Monte Carlo Simulation



Partner Links

Related Terms

Z-Test Definition

Z-test is a statistical test used to determine whether two population means are different when the variances are known and the sample size is large. [more](#)

Goodness-Of-Fit

A goodness-of-fit test helps you see if your sample data is accurate or somehow skewed. Discover how the popular chi-square goodness-of-fit test works. [more](#)

What Is the Central Limit Theorem (CLT)?

The central limit theorem states that the distribution of sample means approximates a normal distribution as the sample size gets larger. [more](#)

How Hypothesis Testing Works

Hypothesis testing is the process that an analyst uses to test a statistical hypothesis. The methodology employed by the analyst depends on the nature of the data used and the reason for the analysis. [more](#)

Statistics Definition

Statistics is the collection, description, analysis, and inference of conclusions from quantitative data.

Test Definition

A test is when a stock's price approaches an established support or resistance level set by the market.
[more](#)



[About Us](#)

[Terms of Use](#)

[Dictionary](#)

[Editorial Policy](#)

[Advertise](#)

[News](#)

[Privacy Policy](#)

[Contact Us](#)

[Careers](#)

[California Privacy Notice](#)



Investopedia is part of the [Dotdash](#) publishing family.