

BUSINESS STATISTICS & ANALYTICS

Unit 2

MBA/BBA/B.com /B.Tech /UGC Net

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Index Numbers:- Meaning

- A number used to indicate change in magnitude (as of cost or price) as compared with the magnitude at some specified time usually taken as 100.

Types of index numbers,

- 1. Price Index Number:** It measures the general changes in prices of goods. It compares the level of prices between two different time periods.
- 2. Quantity Index Number:** It measures changes in the level of output or physical volume of production in economy. E.g.: changes in agricultural and industrial production etc. over time. It is also called volume index number.
- 3. Value Index Number:** The value of a commodity is the product of its price and quantity ($p \times q$). Value index number measures changes in the value of a variable in terms of rupee. It is more informative index as it combines both, changes in the price as well as quantity.
- 4. Special Purpose Index Number:** They are constructed with some specific purpose. E.g.: importexport index numbers, labour productivity index numbers, share price index numbers etc.

Uses of index numbers

- An index number is the measure of change in a variable (or group of variables) over time. It is typically used in economics **to measure trends in a wide variety of areas including: stock market prices, cost of living, industrial or agricultural production, and imports**

Construction of Price, Quantity and Volume indices:- Fixed base and Chain base methods.

- The index for base period is always taken as 100. In fixed base method the year selected for construction of index numbers remains constant for all times and the base shall remain fixed. While in chain base method the base year is changed every year generally preceding year and not fixed year.

Time series analysis: Concept

Time series analysis is a specific way of analyzing a sequence of data points collected over an interval of time. In time series analysis, analysts record data points at consistent intervals over a set period of time rather than just recording the data points intermittently or randomly.

Components of time series

- An observed time series can be decomposed into three components: **the trend (long term direction), the seasonal (systematic, calendar related movements) and the irregular (unsystematic, short term fluctuations).**

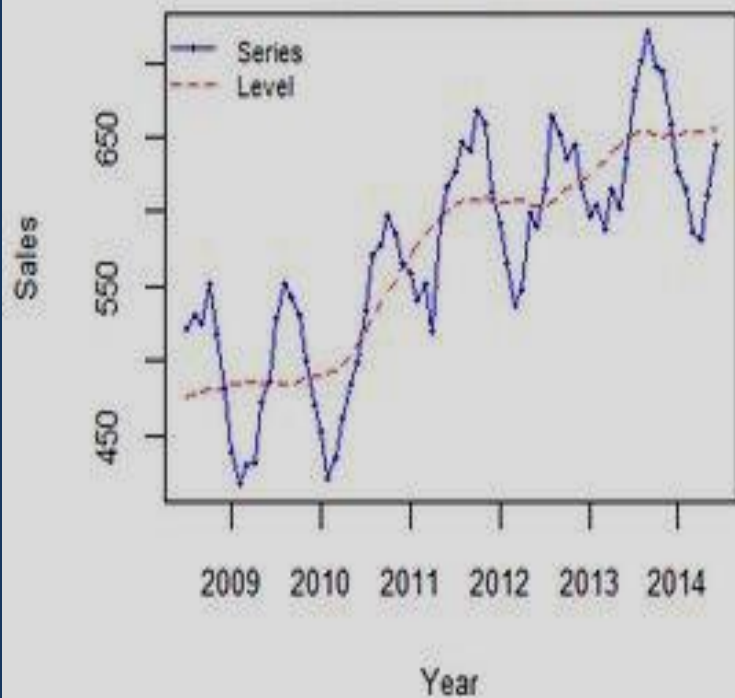
Time Series Additive

- Additive models analysis is a **new method that treats time-series modeling as a curve-fitting problem with respect to time.** In contrast, exponential smoothing and ARIMA try model the dependencies of the current data with the past(inclusive of expected values and errors)

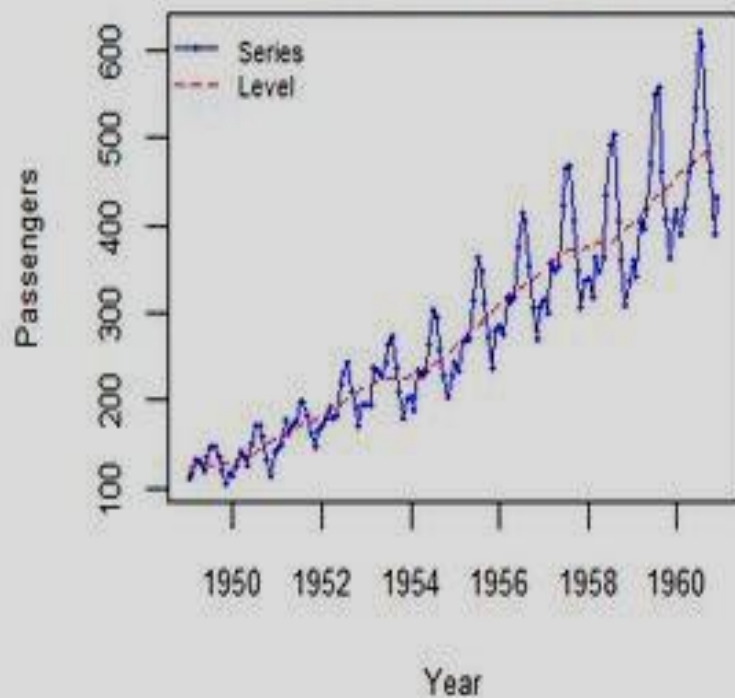
Multiplicative models

a description of the effect of two or more predictor variables on an outcome variable that allows for interaction effects among the predictors. This is in contrast to an additive model, which sums the individual effects of several predictors on an outcome.

Additive Seasonality



Multiplicative Seasonality



Trend analysis: Least Square method

- Least Square is the **method for finding the best fit of a set of data points**. It minimizes the sum of the residuals of points from the plotted curve. It gives the trend line of best fit to a time series data. This method is most widely used in time series analysis.

Linear and Non-Linear equations, Applications in business decision-making

Business managers use linear equations in order to find cost, profit, revenue, loss and breakeven points in their businesses. The breakeven points in linear equations is where the equations intersect. cost is the amount you pay for an item, profit is the amount of money made after the breakeven point.

