Week-01-L-05

Agricultural Statistics in Practice

Index Numbers & Forecasting

Time Series Analysis

Prof. J. Ramkumar
Dept. of ME & Design
Indian Institute of Technology Kanpur

Time Series

- *A time series may be defined as a collection of reading belonging to different time periods of some economic or composite variables*

- by Ya Lun Chau

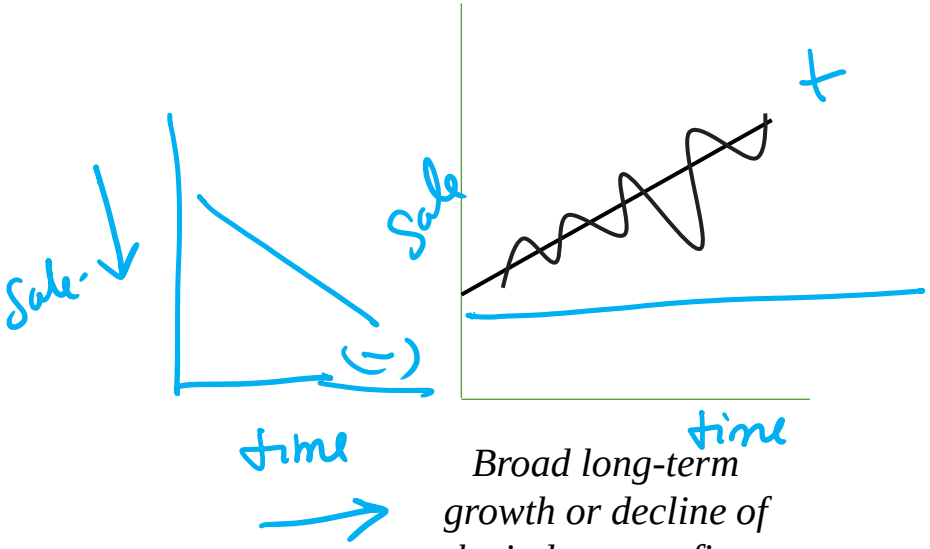
- It builds a relation between "cause" & "Effects".
- One variable is "Time" which is independent variable & and the second is "Data" which is the dependent variable.

Day	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*	*Sun*
No. of Sales of Milk Packets	*90*	*88*	*85*	*75*	*72*	*92*	*102*

Analysis

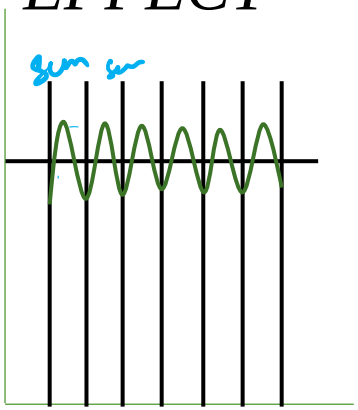
- The simplest approach to examining such data assumes that each observation comprises 4 components:

TREND



Broad long-term growth or decline of the industry or firm.

SEASONAL EFFECT

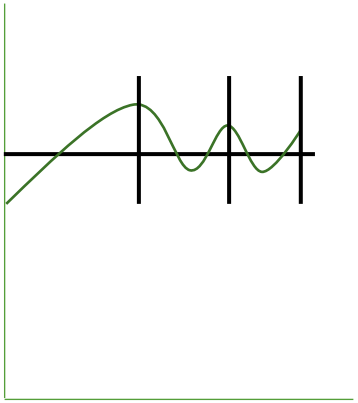


Annually recurring forces that affect sales or prices

Analysis

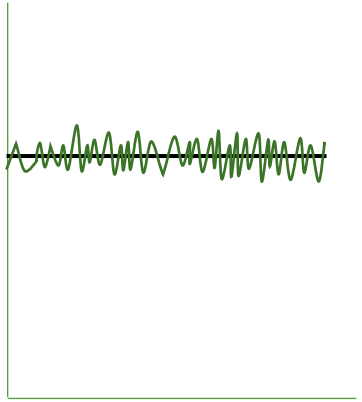
- The simplest approach to examining such data assumes that each observation comprises 4 components:

CYCLICAL EFFECT



A measure of forces that act. as broad irregular waves. Such cycles may be due to demographic changes, general business cycles, etc.

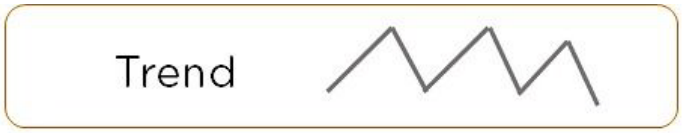
IRREGULAR EFFECT/ ERROR TERM



An error term and represents variations that can not be attributed to trend, season, or cycle

Components

- ***Trend:*** Trend in a time series refers to the increase or decrease in its movements, which can be influenced by factors such as population growth, technological progress, and shifts in consumer demands.
- Examples of upward trend in a time series include population growth, price increases, and increased production of goods.



- ***Seasonal Variation:*** Seasonal variation in a time series refers to short-term fluctuations that occur periodically in a year and repeat annually.
- Examples are increased sales of woolen clothes in winter, ice creams in summer, and department store sales during festive seasons.

Components

- ***Cyclical Variations:***

Recurring upward or downward movements that extend beyond a year, but are not as regular as seasonal variations.

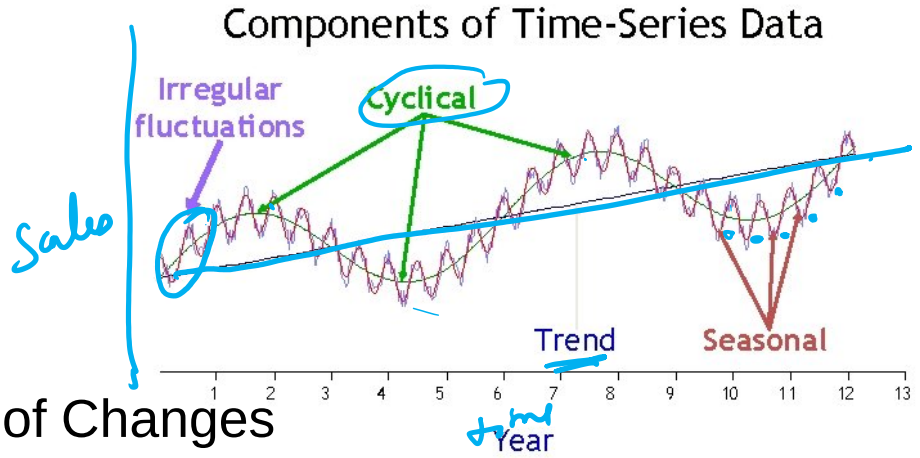
- Examples A business cycle consists of four phases that it passes through in a specific order: prosperity, recession, depression, and recovery.

- ***Irregular Variations:***

Irregular variations in a time series are short-lived, unpredictable fluctuations that do not follow any pattern and are also known as residual variations. These fluctuations arise due to unforeseen events such as floods, earthquakes, wars, and famines, and represent what is left in a time series after accounting for trend, cyclical, and seasonal variations.

Importance of Time Analysis

1. Profit of experience
2. Safety from future
3. Utility Studies
4. Sales Forecasting
5. Stock Market Analysis
6. Process & Quality Control
7. Inventory Studies
8. Risk Analysis & Evaluation of Changes
9. Census Analysis
10. Budgetary Analysis
11. Yield Projections



Predicting long term trends without smoothing?
What could go wrong?
Where do you commence your prediction from the bottom of a variation going up or the peak of a variation going down.....

Source: ibsindia.org

Thank You

ideas to products
IMAGINEERING
LAB | IIT KANPUR

MedTech
IIT KANPUR