Time Series

Time Series

- sequence of data points
- at specific time intervals

Frequency of Time Series Data

- Hourly
- Daily
- Weekly
- Monthly
- Quarterly
- Yearly

Components of a Time Series

Components of Time Series

- Trend
- Seasonality
- Cyclic
- Irregular

Trend

- long-term movement
- direction

Seasonality

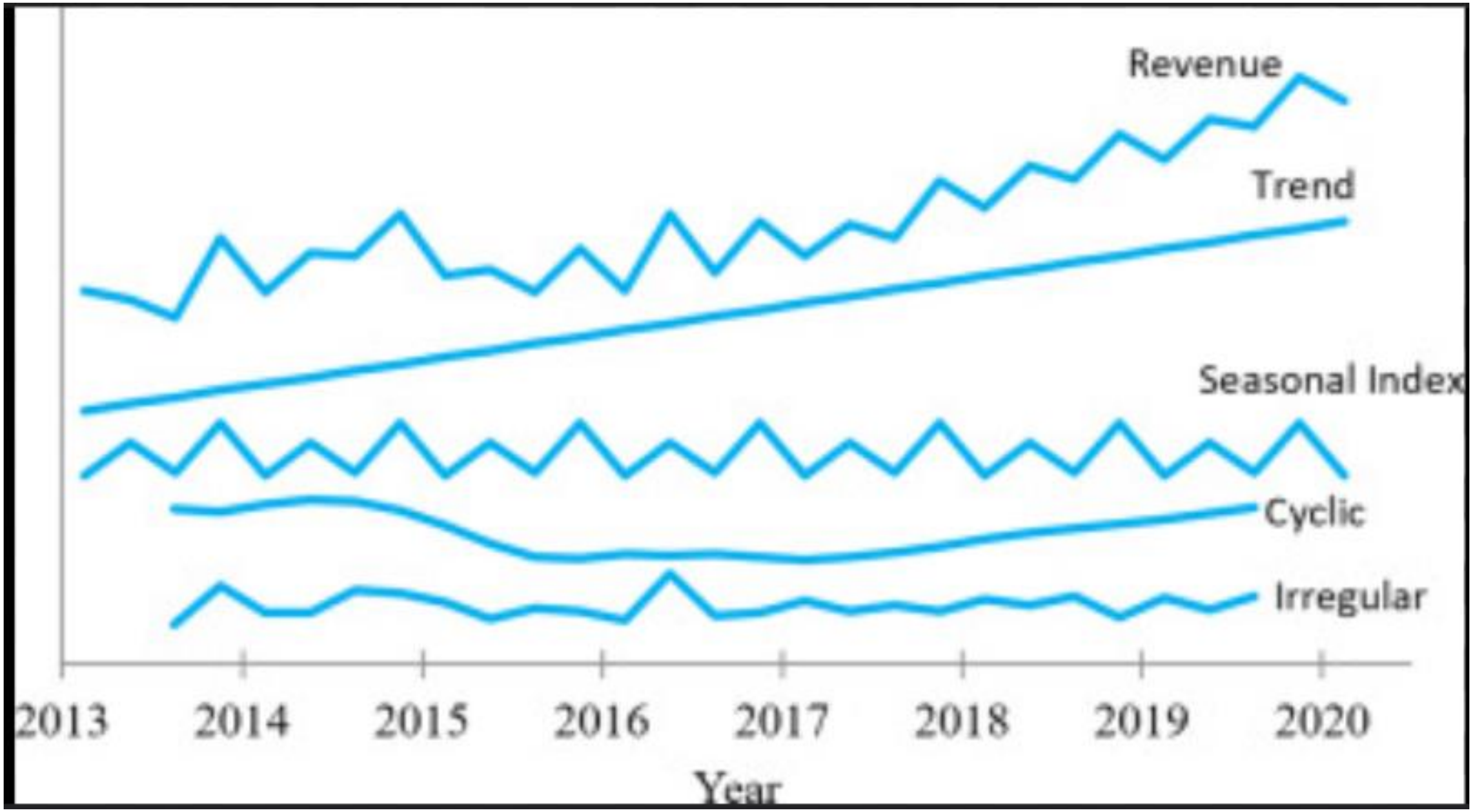
- fluctuations
- Within a year

Cyclic

- fluctuations
- More than 2 years

Irregular

- Random variation
- No pattern


Revenue
Trend
Seasonal Index
Cyclic
Irregular
2013
2014
2015
2016
2017
2018
2019
2020
Year

Decomposition of Time Series

- breaking down the time series into its components

Two methods of Decomposition

- **Additive**
- **Multiplicative**

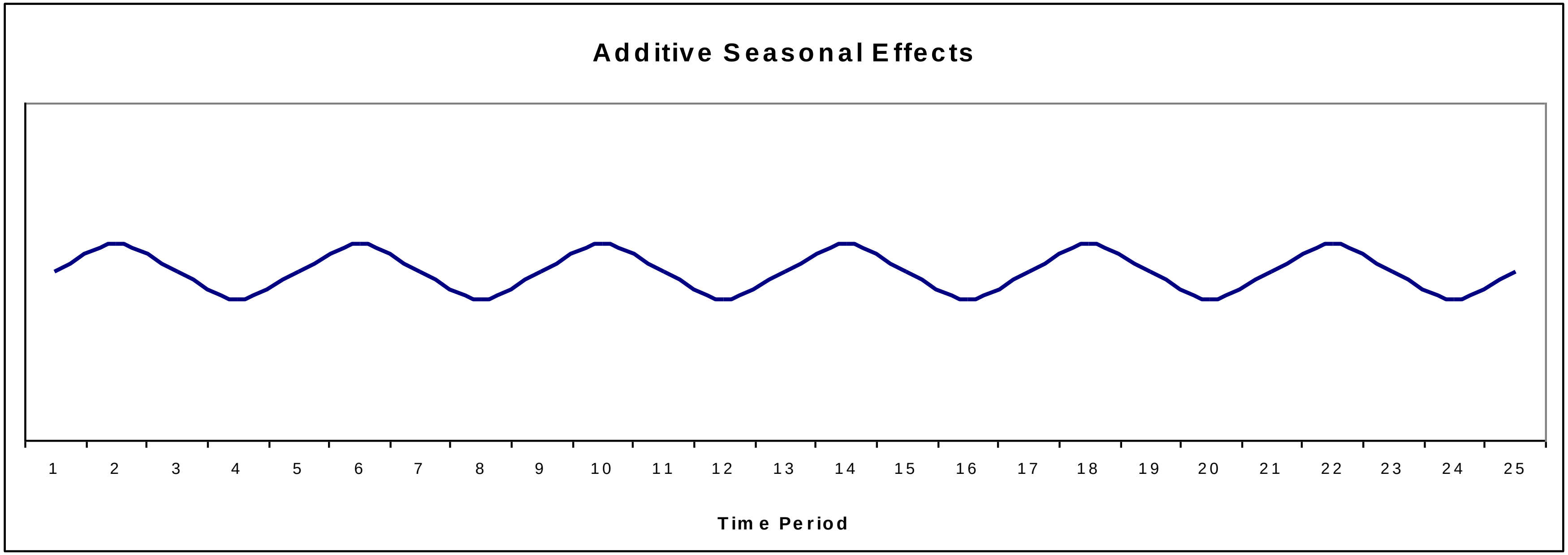
Additive

- data is the sum of the time series components

  T + S + C + I

- If the data do not contain one of the components, the value for that missing component is zero

Additive


Additive Seasonal Effects
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Time Period

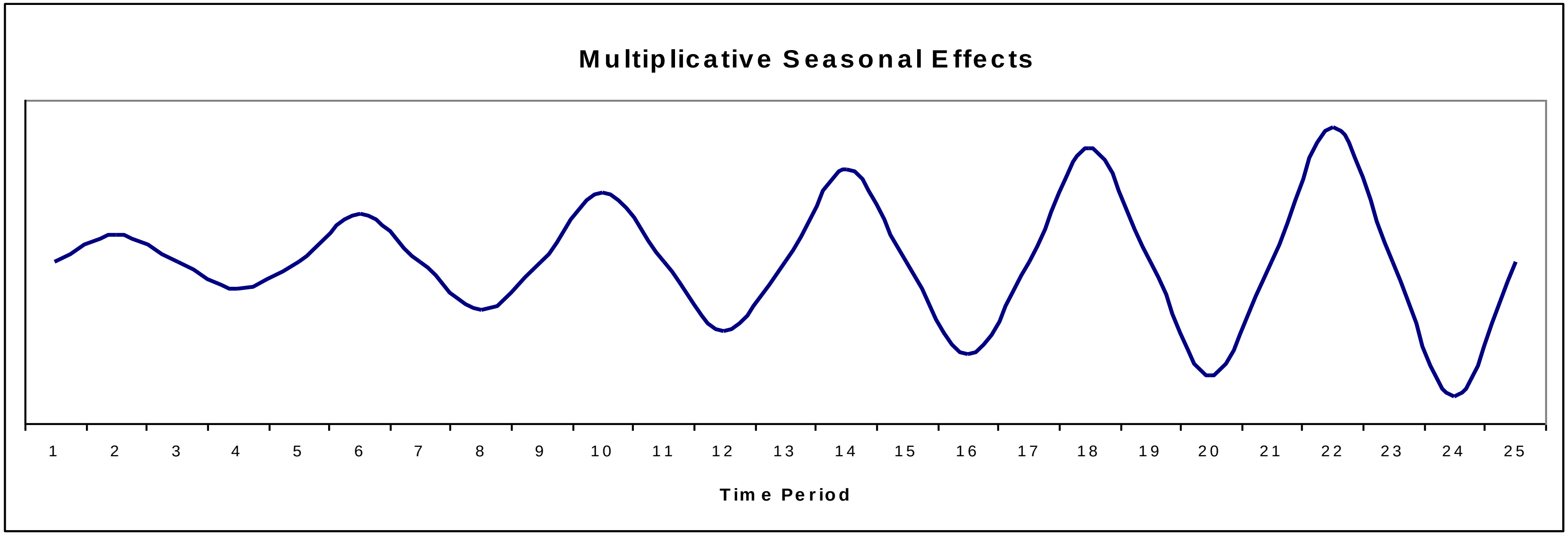
Multiplicative

- data is the product of the time series components

  T * S * C * I

- If the data do not contain one of the components, the value for that missing component is 1

Multiplicative



Stationary in Time Series

- constant mean,
- constant variance,

over time

Check Stationary in Time Series

- **Augmented Dickey-Fuller (ADF)** test
- Stationary if the result p-value < 0.05