

Introduction to Index Numbers

Objectives:

To understand what index numbers are and why they are important in economics.

To know the different types of index numbers.

To connect index numbers with real life and the economy.

Index Numbers

Index numbers are relative statistical measures used to show the change in an economic phenomenon (prices, quantities, or values) between two time periods:

- Base Period
- Current Period

They are used when:

- Direct comparison is difficult because units are different.
- We need one simple number to summarize changes in prices or quantities.

Importance of Index Numbers in the Iraqi Labor Market

In Iraq, index numbers are used to support practical decisions, such as:

- Adjusting salaries and allowances when the cost of living changes (indexation).
- Pricing contracts and tenders and calculating price differences.
- Following asset prices: real estate, gold, and fuel.
- Re-estimating project costs over time (cost escalation).

Statistically, an index number summarizes the movement of many prices into one number compared to a base period.

Types of Index Numbers

- Single commodity index.
- Composite index (many commodities).
- Price Index.

- Quantity Index.
- Value Index.

Real-Life Link

- Consumer Price Index (CPI): measures inflation.
- Stock market indices: measure market movement.
- Wages and salaries: adjusted according to inflation.

One- Simple Price Index

1-Simple index of prices

The simple price index measures the relative change in the price of a single commodity between two periods by comparing the current price to the base period price, without applying any weighting scheme

If the price in the base period is P_0 and the price in the current period is P_1 :

$$I = (P_1/P_0) * 100$$

Interpretation:

$I = 120$ means an increase of 20% compared to the base period.

Example: Wheat price per ton

Base year: 200

Current year: 260

$$I = (260/200) * 100 = 130\%$$

Prices increased by 30%.

2- Simple Quantity Index

The quantity index is a statistical tool used to measure the amount of change in produced or consumed quantities over time or across places. Quantity index

numbers aim to measure the change in the level of production, consumption, or trade between two time periods.

$$I = (q_1/q_0) * 100$$

Second: Simple Aggregative Index Numbers (Unweighted)

It is an index number that depends on the total sum of prices or quantities without giving relative weights to each commodity.

This means that all commodities are statistically equally important.

1- Simple aggregate index for unweighted price

It measures the change in the total prices of goods as a whole compared to the base year, assuming that all goods have the same economic importance

$$I = (\sum p_1 / \sum p_0) * 100$$

2- Simple aggregate index for unweighted quantities

It measures the change in the total quantities produced or consumed for a group of goods compared to the base year, assuming that all goods are equally important

$$I = (\sum q_1 / \sum q_0) * 100$$

EX1:

Commodity	Price 2020 (P ₀)	Price 2024 (P ₁)
Rice	1.0	1.8
Oil	2.0	3.5
Sugar	1.5	2.5
Tea	1.0	1.7

$$I = \left(\frac{\sum p_1}{\sum p_0} \right) * 100 = \frac{9.5}{5.5} = 172.5\%$$

The general price level increased by 72.7% during the period.

EX2:Industrial example

Raw Material	Old Price	New Price
Iron	500	750
Plastic	300	420
Fuel	200	380

EX3:Medical example (cost of health services)

Service	Cost 2018	Cost 2024
Blood test	10	18
X-ray	20	35
Consultation	15	25