AN APPLICATION OF COST OF LIVING INDEX NUMBERS: A COMPARATIVE ANALYSIS OF COMMODITIES BETWEEN INDIA AND USA

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ABSTRACT:
Index numbers are known as barometer of Economy of a country. It helps to measure the inflation and deflation in terms of percentage with respect to prices and quantities of certain commodities. Cost of Living index is an important tool of index numbers. It provides a protection to the daily wages and salaried group of people in an industry or a company. There are two major methods to construct the cost of living index number, which we have been used in this paper. We tried to make a comparison between India and USA with respect to certain commodities.
KEY WORDS: Cost of Living index number, Aggregate Expenditure Method, Family Budget Method, commodities, India, USA.

1. INTRODUCTION:

Index numbers are more than 150 years old. An Italian nobleman G.R. Carli who invented an index numbers as device to measure the relative change in the prices of commodities. He computed oil, wine, and grain for the period of yrs. (1500-1750) and this study was published in the year 1764.

Later, Sir George Schuckburg- Evelyn discovered the same theory of index numbers in England in the year 1798. The violent price fluctuations for the period of Napoleon wars (i.e. 1797-1821) was discussed and mentioned in classical document about political economy. Several studies have been discussed about fluctuations with respect to price, but the rise of index numbers came into existence when England and Australia made a significant increment in the production of gold. Professor Edgeworth contributed a study in the variation of monetary standards when he was holding a post of secretary for the advancement of science in British association. After several years post 1910 era the problem of cost of living index has been discovered.

It is constructed to find the relative change in the price of basket of goods with respect to base period in comparison of current year. In the change of the value of money in current period with the respect to base period is called purchasing power of money. So, the cost of living index in the base period. The cost of living indices are different for various group of peoples and it depends on their income, habits and region etc. So, the cost of living index numbers are compiled the prices of commodities consumed by different group of people.

The cost of living index number provide a protection to the lower income group on daily wages earned people as well as the high income executives salaried people. It regulates the allowances such as dearness, travelling, child education, house rent, etc., which could avail by the employee in a company or industry. The cost of living index number is also used to calculate inflation and deflation of income and value series in national account. It is also used widely in the wage contractor and wage negotiation by private and government sectors. Hence, it is defined as cost of living index number is provide the computation of real wages and tells the change in the purchasing power of the money.

2. OBJECTIVES OF THE STUDY:

The main objectives of this study are as follows:-

(1) To find a comparison between USA and India on the basis of cost of living index numbers through Aggregate Expenditure Method.

(2) To find a comparison between USA and India on the basis of cost of living index numbers through Family Budget Method.

3.METHODOLOGY:

In this paper to construction of cost of living index number, we have two major methods as follows:

(1) Aggregate Expenditure (or Weighted Aggregates) Method

(2) Family Budget (or Weighted Relatives) Method

Cost of living index numbers indicate whether the real wages are rising or falling, money wages remaining unchanged. In other words they are used for the calculation of real wages and for determining the change in the purchasing power of the money.

We have:

$$\text{Purchasing Power of Money} = 1/\text{Cost of Living Index Number}$$

$$\text{Real Wages} = (\text{Money Wages}/\text{Cost of Living Index})*100$$

Cost of living index number is constructed by the following formulae:

(i)Aggregate Expenditure(or Weighted Aggregates) Method:

In this method weights to be assigned to various commodities are provided by the quantities consumed in the base year.

Thus in the usual notations:

Cost of Living Index$=(\sum p_{ij}q_{oj}/\sum p_{oj}q_{oj})*100$

 =(Total Expenditure in current year with base year quantities as

 weights/total expenditure in base year)*100

(ii)Family Budget Method or Weighted Relatives Method

In this method, Cost of Living Index is obtained on taking the weighted average of price relatives, the weights being the values of quantities consumed in the base year.

Thus in the usual notations, if we write

Price Relative = $P_j=(p_{ij}/p_{oj})*100$

and$w_j=p_{oj}q_{oj}$; j= 1, 2,…..,n,

Cost of Living Index$=\sum w_j p_j/\sum w_j$

4. DATA ANALYSIS:

An application of cost of living Index number using aggregate expenditure method

Data for USA:

Given below are the prices of various commodities in USA in year 2010 and 2017 and quantity consumed. For this data construct the cost of living index for the year 2017 using 2010 as base year using AGGREGATE EXPENDITURE method.

Commodities	Quantity (kg)	Price (in $)	
		Base Price (2010)	Current Price (2017)
Millets	1.5	0.85	1.25
Quinoa	2	1.95	2.35
Barley	3.5	0.65	1.15
Buckwheat	1	0.95	1.35
Multi grain foods	2.5	1.95	3.625
Pulses	1	2.675	4.85
Bulgur	3	0.75	1.35
Oatmeal	1.25	1.35	2.15
Brown Rice	5	6.35	7.25
Rice	3.5	2.375	3.15
Wheat	4	0.725	1.35

Calculations:

Commodities	Quantity (kg)[q_o]	Price (in $)		Aggregate Expenditure	
		Base Price (2010)[p_o]	Current Price (2017)[p_i]	Base Year (2010)[$p_o q_o$]	Current Year (2017)[$p_i q_o$]
Millets	1.5	0.85	1.25	1.275	1.875
Quinoa	2	1.95	2.35	3.9	4.7
Barley	3.5	0.65	1.15	2.275	4.025
Buckwheat	1	0.95	1.35	0.95	1.35
Multi grain foods	2.5	1.95	3.625	4.875	9.0625
Pulses	1	2.675	4.85	2.675	4.85
Bulgur	3	0.75	1.35	2.25	4.05
Oatmeal	1.25	1.35	2.15	1.6875	2.6875
Brown Rice	5	6.35	7.25	31.75	36.25
Rice	3.5	2.375	3.15	8.3125	11.025
Wheat	4	0.725	1.35	2.9	5.4
Total				62.85	85.275

Cost of living index number=$(\sum p_i q_o / \sum p_o q_o)*100 = (85.275/62.85)*100 = 135.68$

Data for India:

Given below are the prices of various commodities in India in year 2010 and 2017 and quantity consumed.For this data construct the cost of living index for the year 2017 using 2010 as base year using AGGREGATE EXPENDITURE method.

Commodities	Quantity (kg)[q_o]	Price (in Rs.)	
		Base Price (2010)[p_o]	Current Price (2017)[p_i]
Millets	2	54	65
Quinoa	1	98	113.75
Barley	2.5	62	74
Buckwheat	0.5	70.5	82
Multi grain foods	2	78	95
Pulses	3	107.5	128
Bulgur	4.5	94	106
Oatmeal	1.5	38.75	43.5
Brown Rice	2	49	51.25
Rice	7	65.5	68
Wheat	5	104.5	107

Calculations:

| Commodities	Quantity (kg)[q_o]	Price (in Rs.)		Aggregate Expenditure	
		Base Price (2010)[p_o]	Current Price (2017)[p_i]	Base Year (2010) [p_oq_o]	Current Year (2017)[p_oq_i]
Millets	2	54	65	108	130
Quinoa	1	98	113.75	98	113.75
Barley	2.5	62	74	155	185
Buckwheat	0.5	70.5	82	35.25	41
Multi grain foods	2	78	95	156	190
Pulses	3	107.5	128	322.5	384
Bulgur	4.5	94	106	423	477
Oatmeal	1.5	38.75	43.5	58.125	65.25
Brown Rice	2	49	51.25	98	102.5
Rice	7	65.5	68	458.5	476
Wheat	5	104.5	107	522.5	535
Total				2434.875	2699.5

Cost of living index number=$(\sum p_i q_o / \sum p_o q_o)*100 = (2699.5/2434.875)*100 = 110.87$

Results:

Cost of living index number of India=110.87
Cost of living index number of USA=135.68
Hence, cost of living index of USA is more than cost of living index number of India.
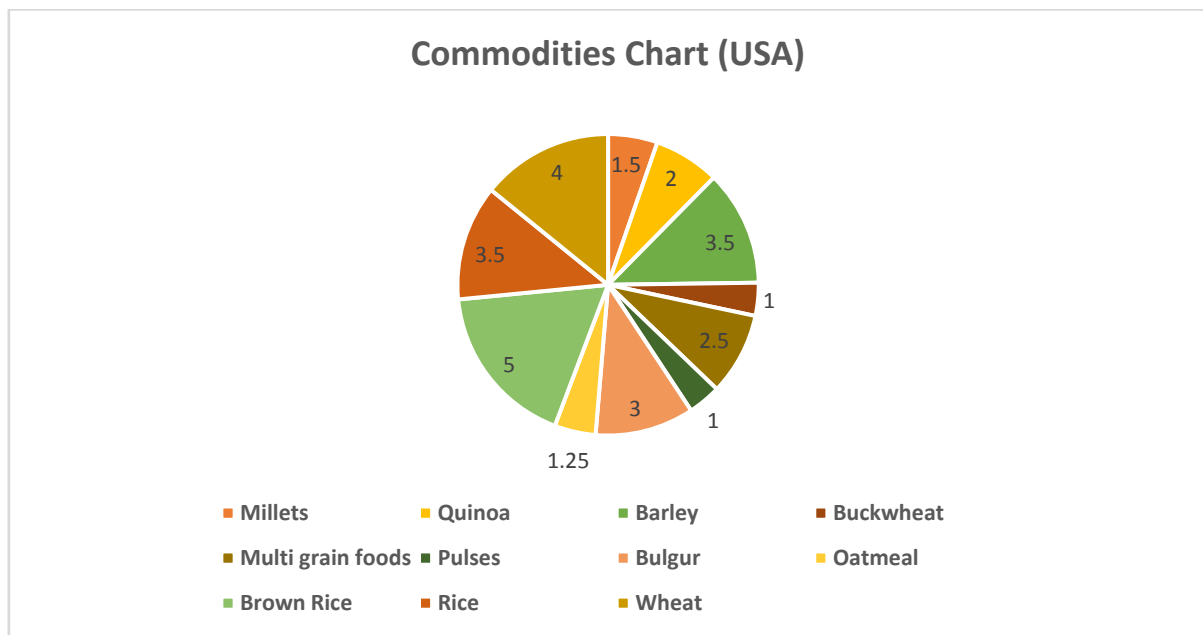
An application of cost of living index using family budget method

Data for USA:

Given below are the prices of various commodities in USA in year 2010 and 2017.For this data construct the cost of living index for the year 2017 using 2010 as base year using WEIGHTED PRICE RELATIVES method.

Commodities	Price (in $)		Weights
	Base Price (2010)	Current Price (2017)	
Millets	0.85	1.25	8%
Quinoa	1.95	2.35	7%
Barley	0.65	1.15	5%
Buckwheat	0.95	1.35	4%
Multi grain foods	1.95	3.625	9%
Pulses	2.675	4.85	5%
Bulgur	0.75	1.35	8%
Oatmeal	1.35	2.15	5%
Brown Rice	6.35	7.25	16%
Rice	2.375	3.15	15%
Wheat	0.725	1.35	18%

Calculations:

Commodities	Price (in $)		Price Relatives(Base 2010=100) $P=(p_i/p_o)*100$	Weight[w]	Pw
	Base Price (2010)[p_o]	Current Price (2017)[p_i]			
Millets	0.85	1.25	147.0588235	8	1176.471
Quinoa	1.95	2.35	120.5128205	7	843.5897
Barley	0.65	1.15	176.9230769	5	884.6154
Buckwheat	0.95	1.35	142.1052632	4	568.4211
Multi grain foods	1.95	3.625	185.8974359	9	1673.077
Pulses	2.675	4.85	181.3084112	5	906.5421
Bulgur	0.75	1.35	180	8	1440
Oatmeal	1.35	2.15	159.2592593	5	796.2963
Brown Rice	6.35	7.25	114.1732283	16	1826.772
Rice	2.375	3.15	132.6315789	15	1989.474
Wheat	0.725	1.35	186.2068966	18	3351.724
Total				100	15456.98

Cost of living index=∑Pw/∑w=15456.98/100=154.57.

Data for India:

Given below are the prices of various commodities in India in year 2010 and 2017.For this
data construct the cost of living index for the year 2017 using 2010 as base year using
WEIGHTED PRICE RELATIVES method.

Commodities	Price (inRs.)		Weights
	Base Price (2010)	Current Price (2017)	
Millets	54	65	8%
Quinoa	98	113.75	7%
Barley	62	74	5%
Buckwheat	70.5	82	4%
Multi grain foods	78	95	9%
Pulses	107.5	128	5%
Bulgur	94	106	8%
Oatmeal	38.75	43.5	5%
Brown Rice	49	51.25	16%
Rice	65.5	68	15%
Wheat	104.5	107	18%

Calculations:

Commodities	Price (inRs.)		Price Relatives(Base 2010=100) $P=(p_i/p_o)*100$	Weight[w]	Pw
	Base Price (2010)[p_o]	Current Price (2017)[p_i]			
Millets	54	65	120.3703704	8	962.963
Quinoa	98	113.75	116.0714286	7	812.5
Barley	62	74	119.3548387	5	596.7742
Buckwheat	70.5	82	116.3120567	4	465.2482
Multi grain foods	78	95	121.7948718	9	1096.154
Pulses	107.5	128	119.0697674	5	595.3488
Bulgur	94	106	112.7659574	8	902.1277
Oatmeal	38.75	43.5	112.2580645	5	561.2903
Brown Rice	49	51.25	104.5918367	16	1673.469
Rice	65.5	68	103.8167939	15	1557.252
Wheat	104.5	107	102.3923445	18	1843.062
Total				100	11066.19

Cost of living index=∑Pw/∑w=11066.19/100=110.66.

Results:

Cost of living index number of India=110.66

Cost of living index number of USA=154.57

Commodities Chart (India)
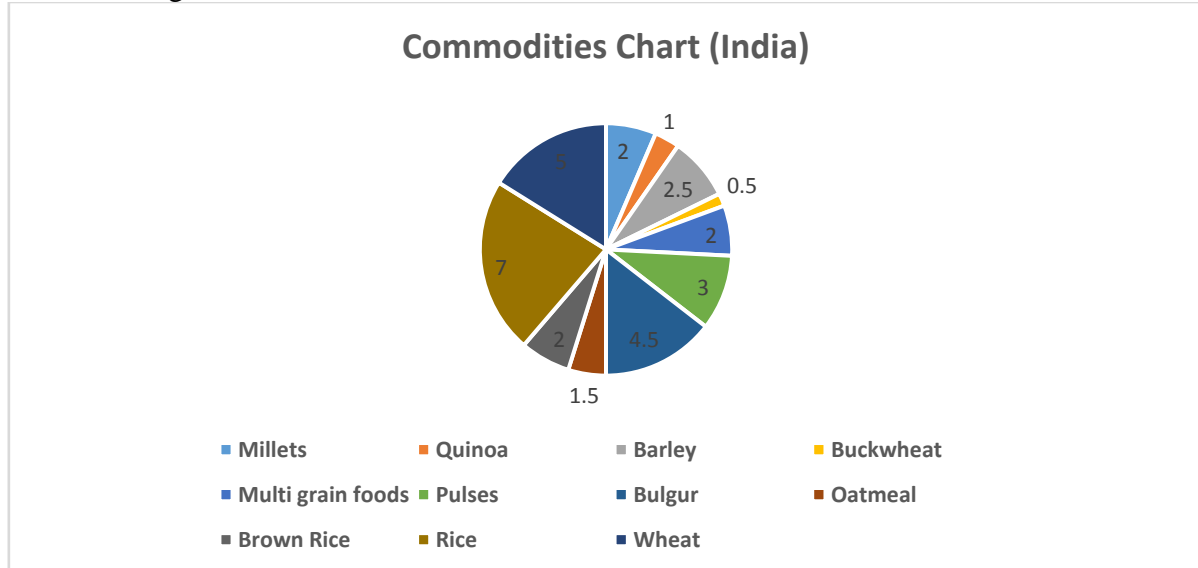
5. CONCLUSION:

We may concluded the outputs of the study as:-

From the results of the study cost of living index of USA is more than cost of living index number of India and it may interpret as below.

According to Aggregate Expenditure Method, an increase of 10.87 % has been observed in cost of living index numbers of India in the current year 2017 with respect to base year 2010. Whereas an increase of 35.68 % has been observed in the cost of living index numbers of USA in the current year 2017 with respect to base year 2010.

According to Family Budget Method, an increase of 10.66 % has been observed in cost of living index numbers of India in the current year 2017 with respect to base year 2010. Whereas an increase of 54.57 % has been observed in the cost of living index numbers of USA in the current year 2017 with respect to base year 2010.

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