TIME SERIES ANALYSIS
PRACTICAL – 6

Submitted By: Ridam Singhal(5040)

AIM: To compute seasonal indices by link relatives' method.

The data given in the following table represents the monthly consumption of milk (in '000 lts.) by ice-crèam industries from Jan. 2000 to Dec. 2005. Compute Seasonal indices by the method of link relatives.

Consumption of Milk (in '000 lts.)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	29.7	44.6	74.4	178.4	237.9	282.5	252.8	237.9	208.2	148.7	104.1	44.6
2001	37.2	59.5	119.0	208.2	267.7	297.4	252.8	208.2	178.4	104.1	101.1	86.2
2002	59.5	74.4	148.7	230.5	297.4	327.1	267.7	223.1	208.2	119.0	119.0	89.2
2003	116.0	138.8	185.9	282.5	371.8	416.4	297.4	208.2	233.5	148.7	178.4	119.0
2004	188.8	148.7	208.2	297.4	416.4	446.1	327.1	193.3	267.7	208.2	160.6	178.4
2005	83.3	119.0	203.0	258.0	420.0	356.9	282.5	267.7	223.1	133.8	136.8	74.4

EXPERIMENT:

THEORY:

Link relative method, also known as Pearson's method is based on averaging the link relatives. Link relative is the value of one season expressed as a percentage of the value of the preceding season (season refers to time period. For e.g. month for monthly data, quarter for quarterly data, etc.). Thus, for monthly data, we have:

Link relative for any month (L.R.) = (Current Month's Value/Previous Month's Value)*100

i. Calculate the link relatives (L.R.) from the original data using formula given above, and calculate the average link relatives for each month.

ii. Calculate chain relatives (C.R.) by the formula:

(L.R. of that season) * (C.R. of preceding season)/100.

Take the C.R. of first season as 100.

iii. Now calculate new C.R. for the first season(month) by the formula:

(L.R. of first month) * (C.R. of last month)/100

iv. Correction Factor (d) = (New C.R. for first month – 100)/n

n=12 for monthly data, and n=4 for quarterly data.

v. Now calculate adjusted C.R. (we have to adjust chain relatives for the trend because New C.R. is not 100).

The adjusted chain relative of i^{th} month = chain relative of i^{th} month - (i-1) * c

vi. Now finally, calculate the adjusted seasonal indices by:

Adjusted Seasonal indices for i^{th} month =

(Adjusted C.R. for ith month/Average of adjusted C.R.)*100

CALCULATIONS:

Table 6.1

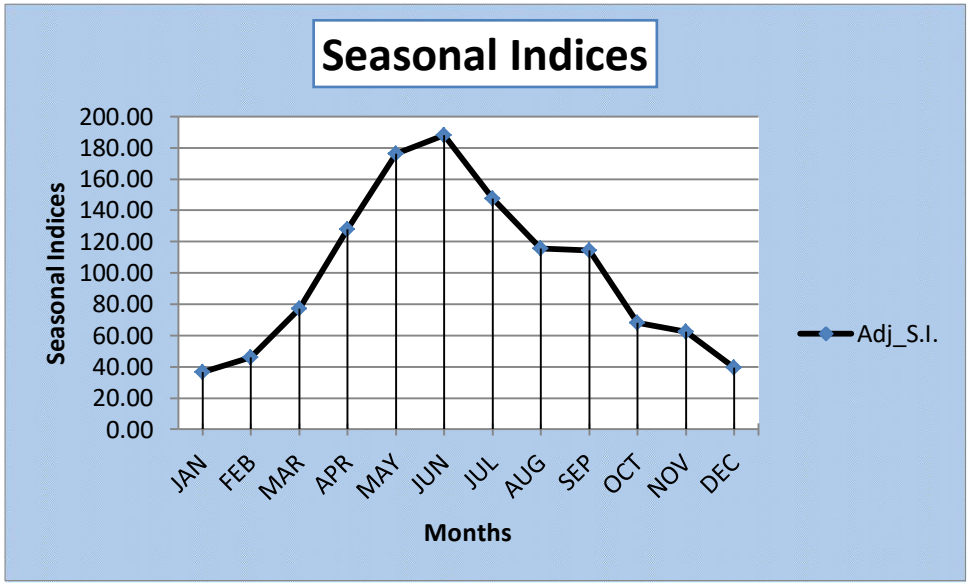
CONSUMPTION OF MILK (in '000 ltrs)												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	29.7	44.6	74.4	178.4	237.9	282.5	252.8	237.9	208.2	148.7	104.1	44.6
2001	37.2	59.5	119	208.2	267.7	297.4	252.8	208.2	178.4	104.1	101.1	86.2
2002	59.5	74.4	148.7	230.5	297.4	327.1	267.7	223.1	208.2	119	119	89.2
2003	116	138.8	185.9	282.5	371.8	416.4	297.4	208.2	233.5	148.7	178.4	119
2004	188.8	148.7	208.2	297.4	416.4	446.1	327.1	193.3	267.7	208.2	160.6	178.4
2005	83.3	119	203	258	420	356.9	282.5	267.7	223.1	133.8	136.8	74.4

Table
6.2

LINK RELATIVES (L.R.)												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000		150.17	166.82	239.78	133.35	118.75	89.49	94.11	87.52	71.42	70.01	42.84
2001	83.41	159.95	200.00	174.96	128.58	111.09	85.00	82.36	85.69	58.35	97.12	85.26
2002	69.03	125.04	199.87	155.01	129.02	109.99	81.84	83.34	93.32	57.16	100.00	74.96
2003	130.04	119.66	133.93	151.96	131.61	112.00	71.42	70.01	112.15	63.68	119.97	66.70
2004	158.66	78.76	140.01	142.84	140.01	107.13	73.32	59.10	138.49	77.77	77.14	111.08
2005	46.69	142.86	170.59	127.09	162.79	84.98	79.15	94.76	83.34	59.97	102.24	54.39
Avg. L.R.	97.57	129.40	168.54	165.28	137.56	107.32	80.04	80.61	100.08	64.73	94.41	72.54
C.R.	100	129.40	218.09	360.46	495.85	532.16	425.93	343.35	343.63	222.42	210.00	152.33
Adj_C.R.	100	125.35	209.99	348.30	479.64	511.90	401.62	314.98	311.22	185.96	169.48	107.76
Adj_S.I.	36.74	46.05	77.15	127.97	176.22	188.07	147.55	115.72	114.34	68.32	62.27	39.59

C.R.-> Chain Relatives
New C.R. for January
= 148.6215
d= 4.051792
Avg. of adjusted C.R.= 272.1834

Graph 6.1



RESULT:

- Seasonal adjusted indices have been calculated in table 6.2, and plotted in graph 6.1
- Correction factor (d) is coming out to be 4.051792

CONCLUSION:

- It can be concluded from the given graph 6.1, that the highest consumption of milk is observed in the month of June, and least consumption is in the month of January.