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Instability in market arrivals and modal price of selected commodities in agriculture produce markets of Karnataka

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Abstract
This paper analyses the growth trend and instability in arrivals and modal prices of the commodity. The growth rate in arrivals and prices of selected commodities in APMCs of Karnataka is calculated for the period of fifteen years. The coefficient of variation and nature of instability in arrivals and modal price is examined. The samples commodities were selected based on the highest arrivals of particular commodity to the market yard. For the study thirteen different commodities in thirteen different markets of Karnataka were selected. It is observed from the analysis results modal price of all the commodities showed significant and positive growth rate with low variability and instability. In the arrivals the variability and instability was high and majority of the commodity's showed significant and positive growth rate excluding few which had negative and significant growth rate. The instability and variation were high in arrivals compared to price of the selected commodities.

Keywords: arrivals, price, growth rate, instability, variation

Introduction
Agriculture is an important part of India. It has major contribution to economic framework. India has obtained self-sufficiency in production. Now India is one among the top producers and exporter of various agricultural commodities in the World. It is the largest producer of milk, millets in the world, jute, ginger, bananas, papayas and mangoes, cotton seeds, castor oil seeds and safflower oil seeds. Second largest producer of tea, sugarcane, wheat, onion, garlic and potato. Top commodities exported from India were cotton, cereals, fish and fish and crustaceans, molluscs, other aquatic invertebrates, coffee, tea and other spices and beverages. The agriculture sector of the country provides about 49 per cent of employment and contributes around 17-18 per cent to the Indian GDP. Price is the amount of money that has to be paid to acquire a given product. It can be called as an indicator of economic growth. The market price is the price prevailing in the market. The price fluctuates in the market with the time may be within day, within a week, within a month or within a season. This price change also depends on the nature of commodity. Price of agriculture produce in the market influenced with its arrivals (supply) to the market. Indian agriculture system is characterised by its varied seasonal production of crops which lead to wider fluctuation in market arrivals. The extent of fluctuation in market arrivals largely contribute to the price variability of major crops. According to the economy theory the demand and supply are the two market forces which influence the market. Market price is also influenced by these forces. When there is more demand price tend to increase and as the supply increase the price tend to fall. But in some of the of agriculture produce this basic principle may not hold true. The market arrivals of agriculture produce not only depends on the price prevailing in the market but also other factors like production. The present study was carried out to know the market performance in arrivals and price of the commodities.

Methodology
In this paper an attempt has been made to know the performance of market in market arrivals and modal price of the commodities. For this particular study secondary data has been obtained from the selected markets for a period 15 years from 2003-04 to 2017-18. Data obtained is analysed through CAGR technique, coefficient of variation and instability index. The analysed results are presented in tabular form and graphs for better understanding of the results. For this study market have been selected based on the highest arrivals of particular commodity the market.

1. CAGR Technique

CAGR (compound annual growth rate) technique is used to calculate the growth rate of arrivals and modal price

$$Y = a\, b^{t}\, e^{ut} \ldots\ldots\ldots\ldots\ldots (1)$$

a = intercept
b = regression coefficient
t = time period
ut = Disturbance term

Compound growth rate is calculated by ordinary least square technique. Equation (1) is written in log form as below

$$\log Y = \log a + t \log b + Ut$$

Where,
b = log (1+r)
r = Compound annual growth rate
r = {Antilog (log regression coefficient) - 1} X 100

2. Coefficient of variation (CV)

The coefficient of variation was used as measure to study the variability arrivals and modal price of selected commodities in the selected markets. The coefficient of variation was computed by using below formula.

$$\text{Coefficient of variation (CV)} = \frac{\text{Standard deviation } (\sigma)}{\text{Mean } (X)} \times 100$$

3. Instability index technique

Instability index is calculated for the arrivals and modal price of selected commodities in the selected markets. Linear trend were fitted to the original data of arrivals and modal price of selected commodity for the period of 2003-04 to 2017-18. The trend coefficients were tested for significance. Whenever the trend of series found to be significant. The variation around the trend rather than the variation around mean was used as an index of instability. The formula suggested by Cuddy and Della (1978) was used to compute the degree of variation around the trend. The obtained coefficient of variation was multiplied by the square root difference between unity and coefficient of multiple determinations (r^2) in the cases where r^2 was significant to obtain the instability index.
Instability Index = CV X $\sqrt{1- r^2}$

Analysis and results

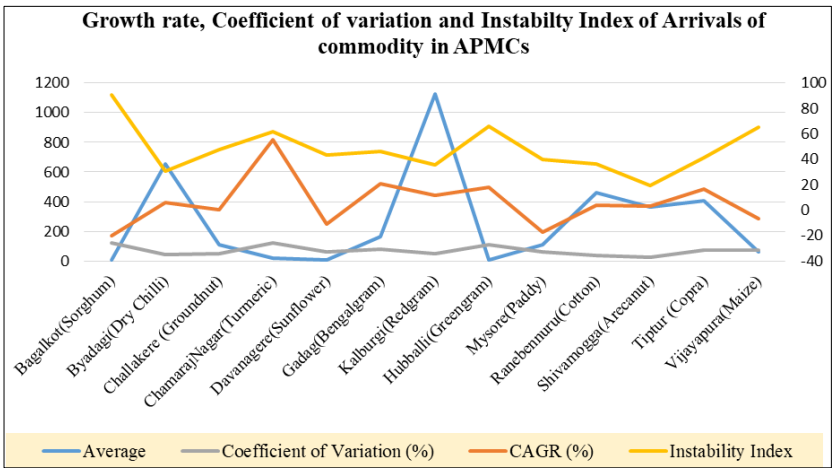
In table 1, it can be observed the growth rate of arrivals in all most all the market was significant. In the Challakere and Ranebennur market the growth rate was non-significant and positive unlike in Vijayapur where in the growth rate was negative and non-significant. The coeffiecnt of variation (CV) was wide varied in all the markets. In the Bagalkot, Chamarajnagar and Hubballi market the CV was above 100 per cent. This showed that in these markets the arrivals had more variation from mean. Except in Byadagi, Challakere, Shivamogga and Ranebennur markets the CV was above 50 per cent. Instability index of arrivals also highly varied in all the markets. In Bagalkot market the instabilty was very high and in Shivamogga market it was least.

In the table 2 growth rate, coefficient of variation and instability index of modal price is represented. In all the markets the modal price of respective commodity found to have positive and significant growth rate. In all the markets coefficient of variation was less than 50.00 % except in the Gadag (Bengalgram), Hubballi (Greengram) and Shivamogga (Arecanut) showed quite higher variation from mean. Instability index was found lesser in all the commodities. Among those Bagalkot, Gadag, Kalburgi and Shivamogga showed comparatively high instability.

Table 1: Performance of the market in the arrivals of selected commodities in selected markets.

SI. No.	Market	Commodity	Arrivals			
			Average	CAGR (%)	Coefficient of Variation (%)	Instability Index
1	Bagalkot	Sorghum	3584.07	-20.41* (0.07)	119.33	90.88
2	Byadagi	Dry Chilli	654717.00	6.31* (0.02)	40.94	30.91
3	Challakere	Groundnut	110072.60	0.22 (0.029)	47.52	47.52
4	Chamaraj Nagar	Turmeric	20671.87	55.14* (0.072)	121.87	61.78
5	Davanagere	Sunflower	9366.33	-10.86* (0.031)	62.58	43.72
6	Gadag	Bengalgram	165014.50	20.79* (0.036)	81.13	46.18
7	Kalburgi	Tur	1127712.00	11.74* (0.03)	50.75	35.38
8	Hubballi	Greengram	7092.80	17.9** (0.074)	106.47	66.35
9	Mysore	Paddy	111757.90	-17.39* (0.045)	61.05	39.62
10	Ranebennuru	Cotton	459981.70	3.59 (0.041)	37.36	36.38
11	Shivamogga	Arecanut	365568.50	3.45** (0.012)	23.91	19.05
12	Tiptur	Copra	404028.00	16.81* (0.030)	71.21	41.09
13	Vijayapura	Maize	62095.13	-6.55 (0.039)	71.98	65.02

*Significant at 1% significance level,
** Significant at 5% significance level, Figures in parenthesis indicates standard error



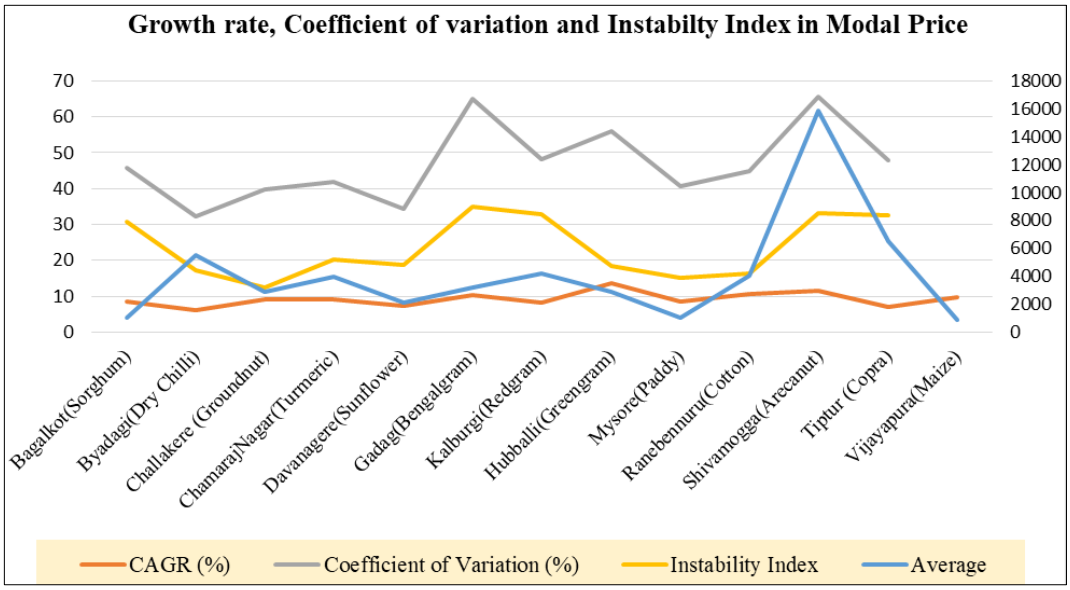
Graph 1: Growth rate, Coefficient of variation and Instability in the market arrivals of selected commodities in selected markets

Table 2: Performance of the modal price of selected commodities in selected markets during 2003-04 to 2017-18

S. No.	Market	Commodity	Modal Price			
			Average	CAGR (%)	Coefficient of Variation (%)	Instability Index
1	Bagalkot	Sorghum	1039.53 (1156.00)	8.62* (0.020)	45.87	30.77
2	Byadagi	Dry Chilli	5516.00 (9385.00)	6.27* (0.010)	32.37	17.13
3	Challakere	Groundnut	2930.13 (3603.00)	9.14* (0.008)	39.88	12.55
4	Chamaraj Nagar	Turmeric	3942.20 (6309.00)	9.16* (0.013)	41.94	20.2
5	Davanagere	Sunflower	2150.16 (3203.00)	7.27* (0.014)	34.50	18.72
6	Gadag	Bengalgram	3203.93 (3678.00)	10.42* (0.018)	65.01	35.01
7	Kalburgi	Tur	4205.67 (3842.00)	8.15* (0.020)	48.30	32.90
8	Hubballi	Greengram	2859.91 (4359.00)	13.62* (0.013)	55.89	18.37
9	Mysore	Paddy	1046.00 (1435.00)	8.55* (0.009)	40.63	15.31
10	Ranebennuru	Cotton	4018.53 (4508.00)	10.65* (0.010)	44.86	16.36
11	Shivamogga	Arecanut	15876.60 (29593.20)	11.52* (0.018)	65.61	33.26
12	Tiptur	Copra	6553.93 (10425.50)	7.12* (0.018)	47.93	32.69
13	Vijayapura	Maize	910.13 (1088.00)	9.68* (0.008)	37.48	11.73

*Significant at 1% significance level

** Significant at 5% significance level, Figures under the CAGR value in parenthesis indicates standard error, Figures under the average price value in parenthesis indicates the modal price of the commodity in the month of March 2018)



Graph 2: Growth rate, Coefficient of variation and Instability in the modal price of selected commodities in selected markets

Conclusion

The arrivals in the market showed varied growth rate compared to price of the commodity. There was higher variation and instability observed in the market arrivals. The variability and instability in the arrivals of the commodity may not be due to the active price in the market but also may be due to production, demand, storage facility and many others. Majority of the arrivals were from medium to small farmers who sell the produce immediately after the harvest since they may not have proper storage facilities and in financial need. The growth rate in price of the all the commodities showed significant growth. This significant growth in the price may be contributed by the economic development, supply and demand of the commodity at the domestic and international markets and increasing purchasing power parity of the consumers.

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