



AMIC – INFOSERIES – 1
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Pepper Update

INTRODUCTION

Pepper (*Piper nigrum*) is a native of wet tropical forests and its centre of origin is in the Western Ghats of India. It is rightly described as the “King of Spices”, and Kerala history is chequered by the lure of pepper trade by the Arabs, Portuguese, Dutch, French and the English traders. Kerala continues to be a leading producer of black pepper in India. The “spice districts” of Kerala are represented by Wynad and Idukki districts.

Remunerative and steady price for any agricultural produce plays a crucial role in increasing production of that commodity. Wide price fluctuations, on the other hand, discourage farmers from taking up large-scale investment to improve productivity. Moreover, pepper being a perennial crop, which involves high investment when compared to seasonal and annual crops, price and price stability assumes more significance. The study of price behavior assumes importance in this context. It is against this background that the update discusses the secular trend, seasonal, cyclical and irregular movements in the price of pepper in comparison with the international price.

METHODOLOGY

The study attempts to analyze the price behaviour of black pepper (ungarbled and garbled). Domestic Price at Kochi market for Malabar Ungarbled Pepper (MUG) and International Price at the US (New York) market for Garbled Pepper (MG) were considered for the analysis. Month wise modal price data were collected from the Spices Board pertaining to the two reference markets for the period from January 1996 to September 2009, covering a time span of 13 years.

A multiplicative model of the following form was used to study the components of the time series:

$$Y(P) = T * C * S * I$$

where, $Y(P)$ = Monthly average price of Pepper

T = Secular trend

C = Cyclical movement

S = Seasonal index, and

I = Irregular movement

Trend Analysis of Pepper Prices

A trend analysis was carried out with linear, quadratic, cubic, compound, growth, logarithmic, sigmoid, exponential, inverse, power and logistic functional forms. As no algebraic functions yielded a satisfactory fit in terms of R^2 values and standard errors, trend lines were fitted with single exponential smoothing as plotted in the Fig.1. This fit had a mean absolute percentage error (MAPE) value of 7 per cent. As is evident, the price of ungarbled pepper in Kochi market exhibited no specific trend. The same was the case for garbled pepper in the US market (Fig.2). This is expected for a commodity like pepper which experiences considerable price volatility, and hence may not follow any expected trend path.

Fig.1.Single Exponential Smoothing for price of ungarbled pepper

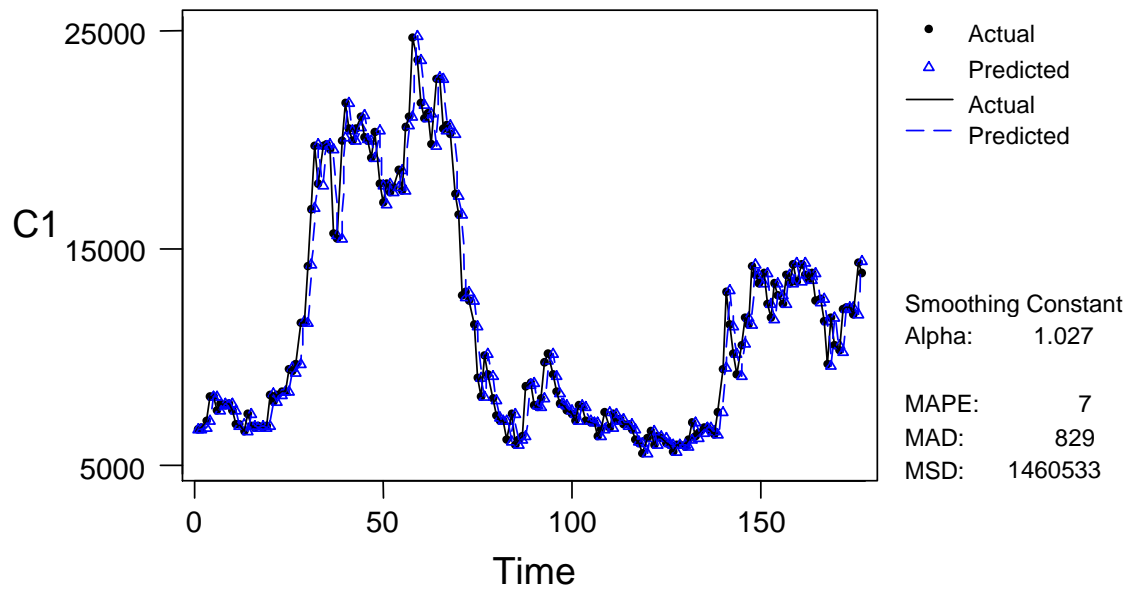
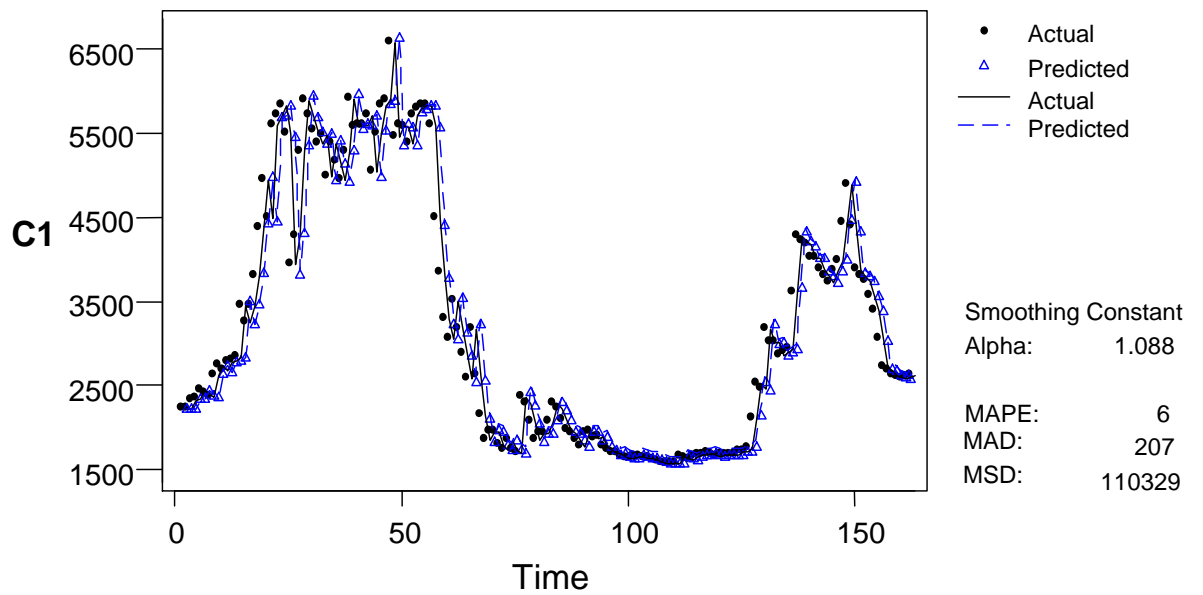


Fig.2. Single Exponential smoothing for price of garbled pepper



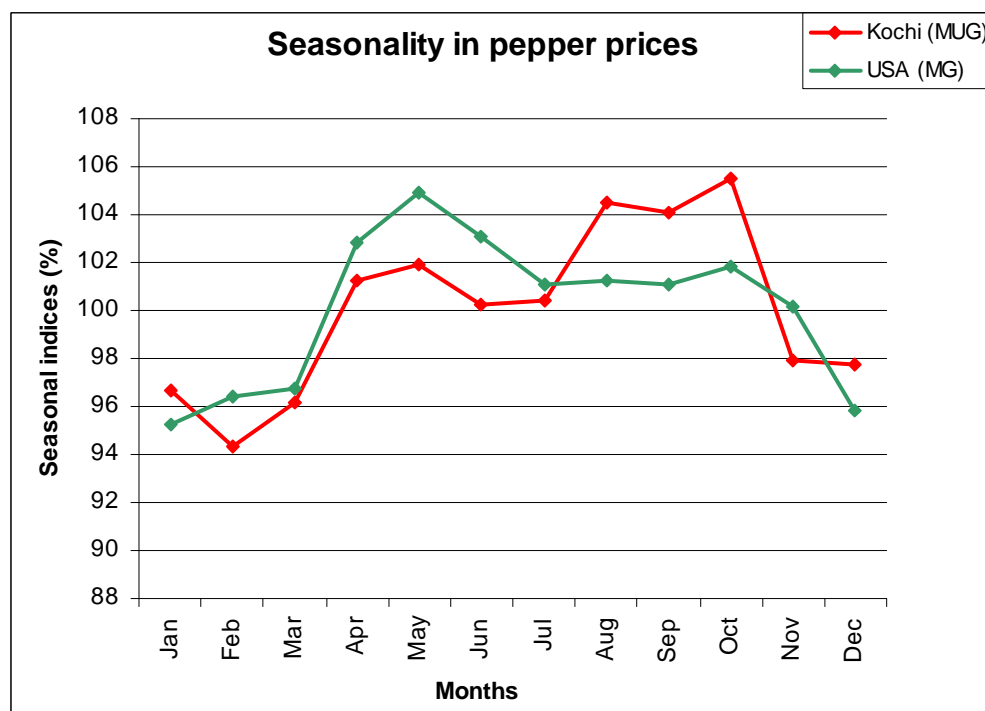
Seasonal Effect

Both the domestic and international price of pepper exhibited considerable seasonality. The buoyant phase for ungarbled pepper in Kochi market was observed during July to October, with the peak price in October, while the trough price was during February, which coincided with the peak harvest season, and higher market arrival period in Kerala. (Table1 and Fig.3). In the case of international price for garbled pepper, the price peak was found during April to May, whereas the trough was occurring in the months of December and January. This difference is partly on account of the differing commodity forms (Ungarbled pepper being a primary commodity while garbled pepper is a processed secondary commodity), partly on account of non synchronised market arrivals from major producing countries that extends from February in India to September in Brazil.

Table 1: Seasonal Index of pepper

Month	Ungarbled pepper	Garbled pepper
	Kochi	USA
April	101.26	102.84
May	101.92	104.91
June	100.28	103.10
July	100.45	101.11
August	104.52	101.24
September	104.06	101.09
October	105.48	101.81
November	97.93	100.20
December	97.72	95.87
January	96.64	95.21
February	94.30	96.44
March	96.14	96.76

Fig.3. Seasonality in International and Domestic prices of pepper



Cyclical Effect

The prices of pepper showed pronounced cyclical variations both in the domestic as well as international markets (Fig.4). It was observed that the length of the cycle lasted for about six years. The international market and the domestic market underwent similar cyclical influence of booms and depression. This is understandable for pepper, which is basically an export oriented crop.

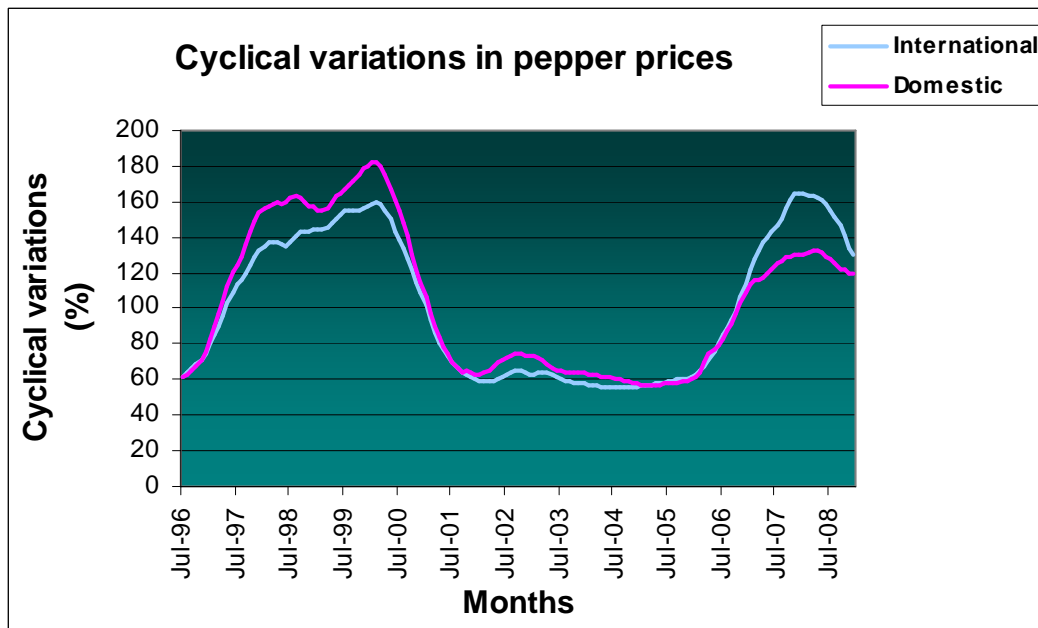


Fig. 4. Cyclical fluctuations in International and Domestic prices of pepper

Random Effect

The random effect is the residual effect left after the trend, seasonal, and cyclical effects have been removed from the original observations. The indices of irregular variations have been worked out to capture the random effect (Fig 5). It showed that pepper prices were subjected to high irregular variations during the period under consideration. Though the random variations differed considerably among different markets trading in the two different forms of commodity forms, the pattern of random shocks is found to be strikingly similar.

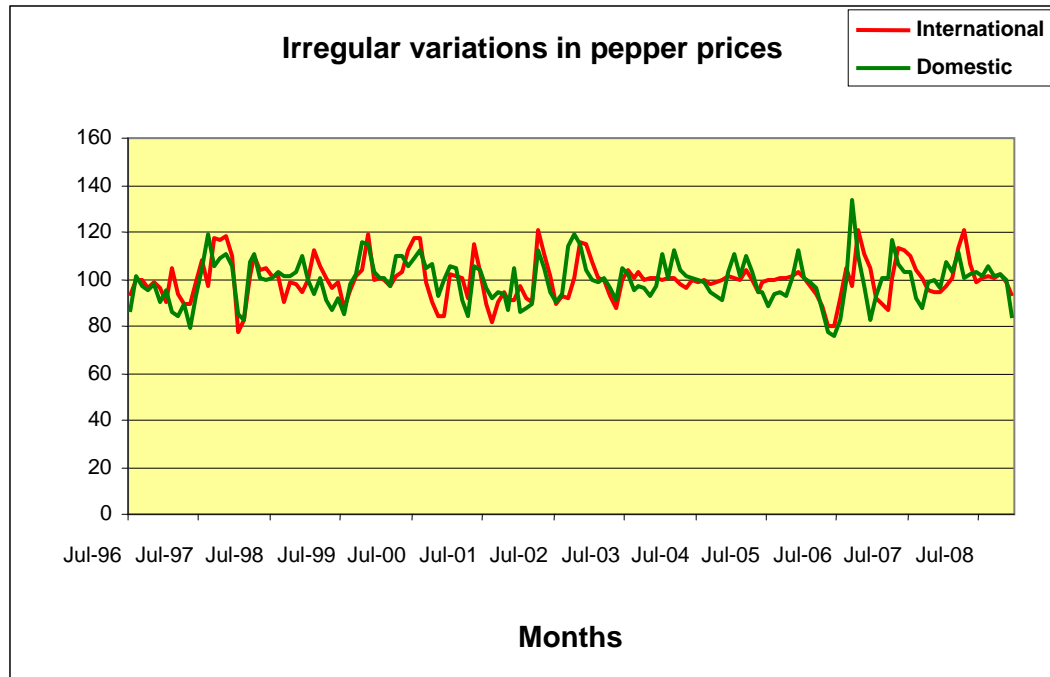


Fig.5. Irregular variations in pepper prices at International and Domestic markets

CONCLUDING REMARKS

The foregoing analyses revealed that all the four classical components of time series, viz., the secular trend, seasonal variation, cyclical variation and irregular variations were present in the price of both ungarbled and garbled pepper, and in the domestic and international market prices. The price of pepper in the domestic and international markets were highly integrated in terms cyclical and random variations, but differed in the occurrence of seasonal peaks and troughs. This information is of immense value to exporters in planning and executing their contract phasing as well as outsourcing operations.

