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MARKET INTEGRATION – CONCEPTUAL AND APPLICATION ISSUES @

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Abstract

Key Words and Phrases : Market Integration, Organically linked markets, “pure error”, significant integration, Detrend, Deseasonalise, Decycle, primary and terminal markets.

Correlation is a measure of market integration. Correlation Coefficients of Prices, which include trend, seasonal and cyclical effects are not adequate to precisely measure the degree of market integration. Integration of “pure errors” (pure errors means error series free from autocorrelation effects) of several time series enables us to determine the significance or otherwise integration of markets.

Introduction

Studies in marketing range from pricing, operational and performance efficiencies. These studies are product-commodity oriented and they make efforts to capture efficiency levels in the form of degree of motivation between markets over a time period lagged or otherwise. Further, correlations of new prices are examined over time while selection of a price variable is a problem in its own right, (in terms of which price-wholesale price, retail price, farm price etc.,) the “rawness” of data which include several other “effects” is a matter to examine. The time trend variable is another dimensional issue to count at for correct interpretation

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of results. Some of the studies reviewed suggest that correlation (of prices), as a measure of market integration and hence efficiency, is not an adequate measure because of several reasons. First a new price concedes in itself, trend, reasonability and cycles. Secondly, temporal prices between several markets contain the component of autocorrelation. Thirdly, along with prices, interrelated spatial demand and supply factors, market practices and regulatory measures may influence the levels of integration or otherwise. Fourthly, we expect integration between organically linked markets (in terms of physical products) irrespective of whether they are strong or weak. The real issue is to get at a measure which reflects real state of integration and hence efficiency.

The Conceptual Framework

The higher the degree of correlation, the higher is the integration. Since higher correlation is relative in its sense it is essential to develop a new concept. Given any two temporal data sets of prices of a product, it is vital to detrend, deseasonalise and decycle the series. This would give us series of error, which are not free from autocorrelation. Develop a lagged autocorrelated model and test it on the series to deautocorrelate. Then the series is left with "pure errors". Correlate these "pure error" series to get at the degree of integration. Test the significance or otherwise of correlation of "pure errors". The significance or otherwise of "r" gives an assessment of market integration. A low value of "r" may be significant. This is a measure different from the one used by Delgado (wherein two way ANOVA is used), as well as Gupta and Muller approach based on Granger causality test and price information base.

Method

The time series of prices for a product "c" is a function of time. That is

$$P_t = F(t) \dots\dots\dots (1)$$

Since for a product base the series have to be tested for their degree of association equation 1 becomes

$$P_{cti} = f_c(t_i) \dots\dots\dots(2) \text{ wherein } i = 1,2,\dots,n \text{ for } n \text{ markets.}$$

The equation 2 is assumed to be a multiplicative model, that is,

$$P_{cti} = T_{cti} \times C_{cti} \times S_{cti} \times I_{cti} \dots\dots\dots(3)$$

Detrend, Deseasonalise and Decycle the series in equation 3, then equation 3 becomes

$$P^*_{cti} = I^*_{cti} \dots\dots\dots(4)$$

Test equation 4 for the presence of autocorrelation by fitting in an appropriate model. The appropriateness of the model is reflected by R^2_m or R^2 . The D-W statistic would enable us to get at the presence or otherwise of autocorrelation. The order of equation 4 would determine the order of the autocorrelation. The equation 4 then becomes

$$I^*cti = a + b I^*cti - k + e cti \dots\dots(5)$$

Wherein k is the appropriate time lag.

Now correlate the equation 5 over "n" markets. This correlation of "pure errors" (pure means free from autocorrelation effects) gives the degree of random walks across markets for a commodity base. Moreover, degree of association is at different levels of significance.

Interpretation

Whenever correlation coefficients are significant at "L%" level of significance, it means the markets are significantly integrated. This in its logic should indicate that the markets are organically integrated. Otherwise, the conceptual scepticism would arise. Also, non-significant correlation coefficient must indicate no organic integration between markets.

Application

This concept was tested for a commodity marketing system of conventional, commercial and economic importance. That is "arecanut". Five markets, of which three are primary and two terminal, were selected. Comparable varieties of the product in the terminal and primary markets - three each - have been considered for the study. The time series, fifteen in number, is between 1960-1989.

The D-W statistics were found to be statistically highly significant at 1% level indicating the presence of autocorrelation of first order. The correlation analysis has revealed that 87 out of 105 correlation coefficients are statistically significant between 10% and 1% levels of significance. Further penetration revealed that, as many as 65, 10, 6, 4 and 2 correlation coefficients are statistically significant at 0.1%, 1%, 2%, 10% and 5% levels of significance respectively. This reveals presence of sub systems within the marketing system. The arecanut markets are subsystem-wise integrated.

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