A note on the seasonality of the Indian Stock Markets

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***Index Terms*—Trend Analysis, Quadratic Trend, Indian Stock markets, Sensex, Technical Analysis.**

***Abstract*—In this report I examine the performance of trend analysis techniques on various indices. It has been a long held belief that random walk model is the best model and anything better than this is impossible. Evidence shows that in the absence of exogenous shocks superior profits can be made in the short run using the quadratic trend analysis.**

I. Introduction

SEASONALITY is a pattern that repeats after regular time periods. In the context of a stock market it can be looked upon in two different ways. Talking of the daily data first, seasonality may be viewed as 'week-of-the-day' effect. Are the returns on Mondays worse than that on Fridays? How are Wednesdays as compared to Thursdays? These are some of the question that investors would like to know. Talking of monthly data, seasonality can be viewed as 'month-of-the-year' effect. Is pre-budget time of January regularly different from March?

As discussed in an earlier article, seasonality is just another component of the time series. I have already analyzed the trend part of the time series, now I look onto the seasonality component.

II. Seasonality on Daily Data

Here, I try to examine the 'week-of-the-day' effect on major indexes. The figure below gives the general movement of the sensex for the data under consideration.

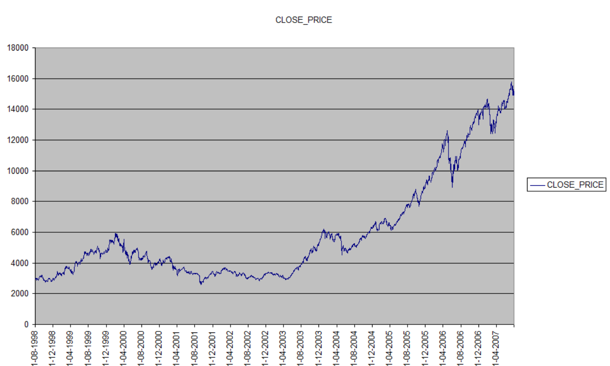

Figure 1. Movement of Sensex in the past ten years

The seasonal Indices for the various days of the week starting from tuesdays are shown next.

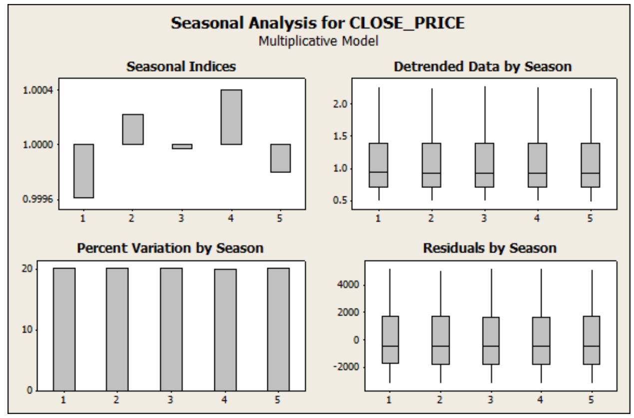

Figure 2. Seasonal Indices for daily data
1=Tuesday, 2=Wednesday, 3=Thursday, 4=Friday, 5=Monday

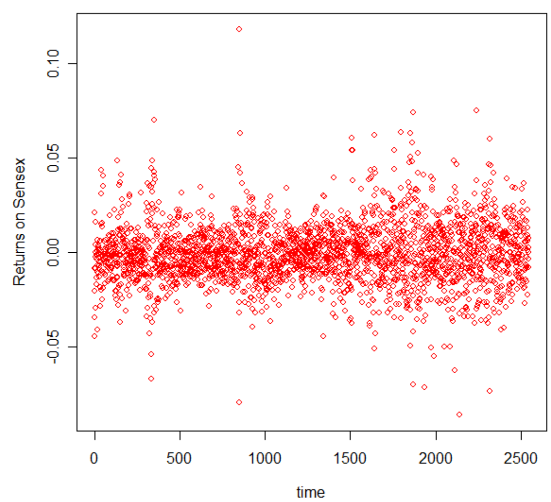

Figure 3. Returns on Sensex

The figure below gives the general direction of movement of the returns on the sensex.

It might be worthwhile to examine the seasonality of the returns.

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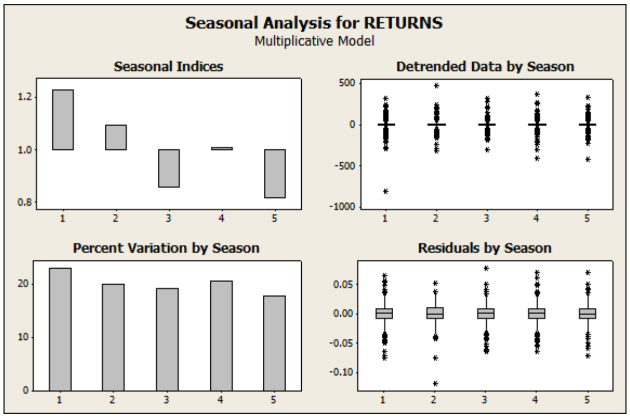

Figure 4. Seasonal Indices for the Returns on Sensex
1=Wednesday, 2=Thursday, 3=Friday, 4=Monday, 5=Tuesday

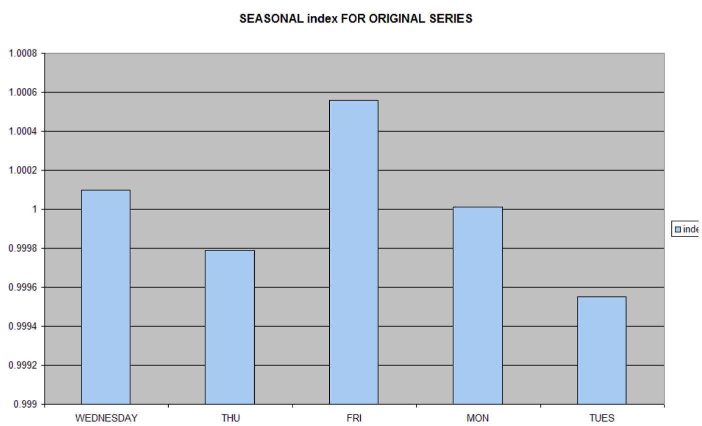

Figure 5. Seasonal Indices of Price Series

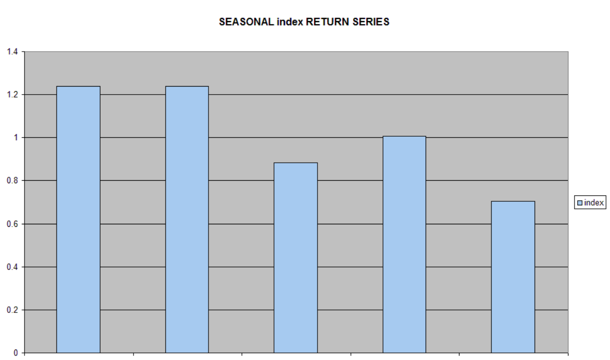

Figure 6. Seasonal Indices of Returns Series

III. Seasonality on Monthly Data

The plot below gives the monthly movement of the sensex.

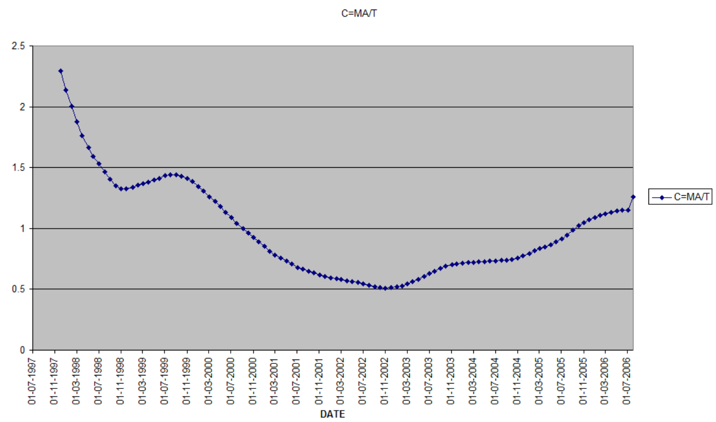

Figure 8. Cyclical Component of the sensex

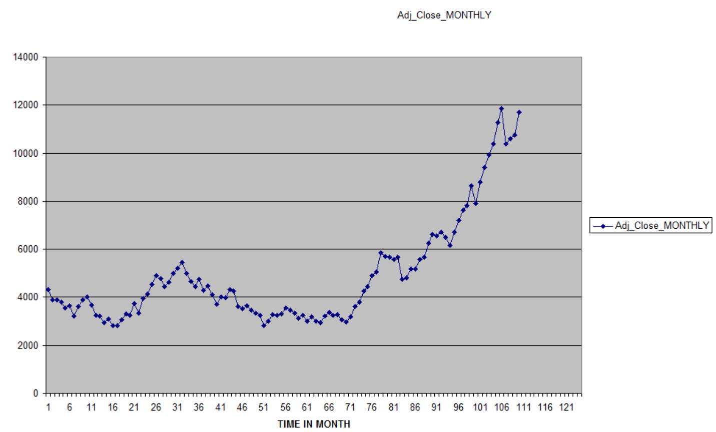

Figure 7. Movement of the sensex as plotted from monthly data

The figure below gives the cyclical component of the sensex
The figure below shows the seasonal index monthwise

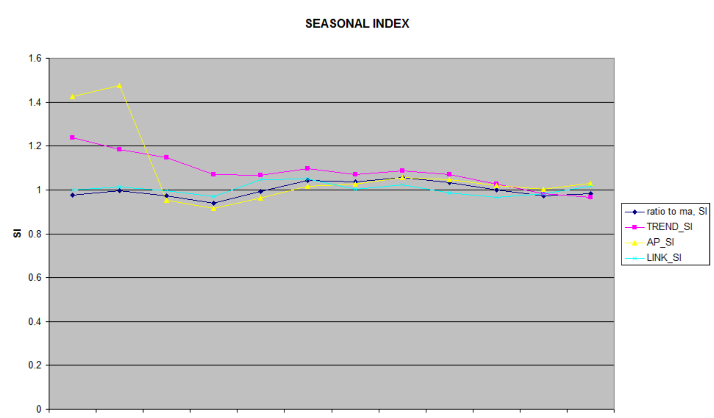

Figure 9. Seasoanlity in monthly sensex data

IV. Forecasting the Sensex using Various Components

The figure below shows the performance of monthly forecasts using decomposition techniques

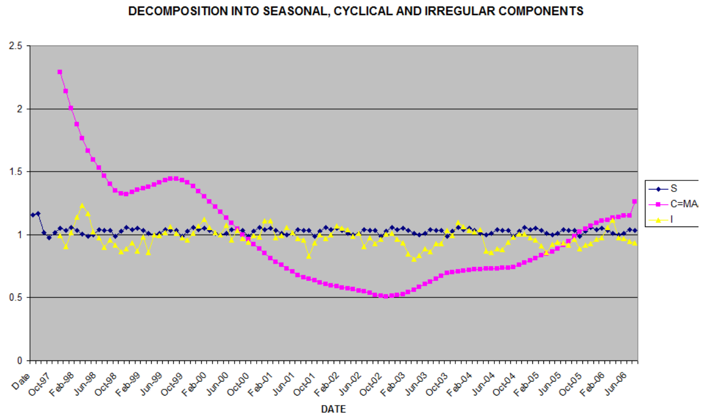

Figure 10. Various components of the sensex time series

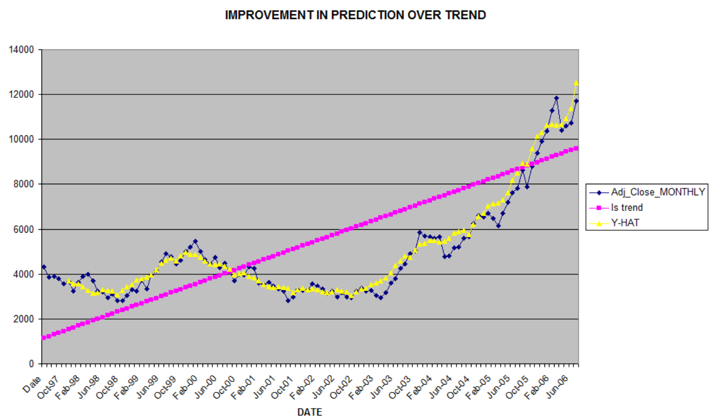

Figure 12. Improvements in forecasting due to decomposition

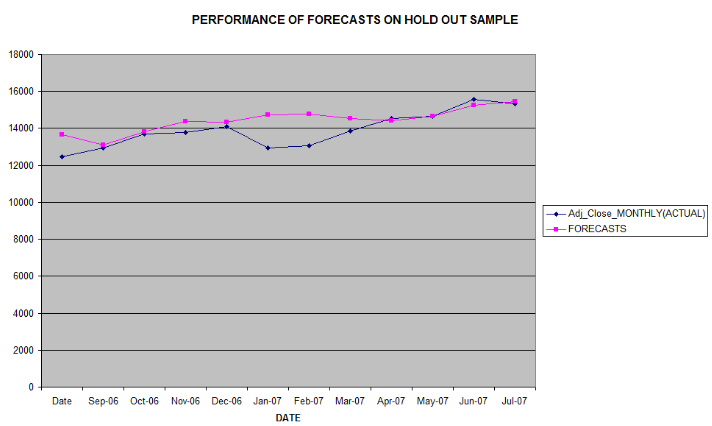

Figure 11. Performance of forecasts using decomposition techniques

Let us now see the amount of improvement due to decomposition over the simple trend analysis.

The figure below shows the results of application of similar decomposition techniques on the returns series

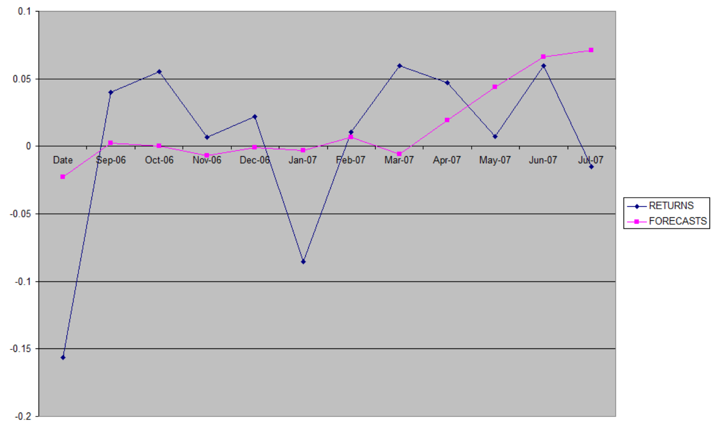

Figure 13. Performance of decomposition on return series

V. CONCLUSION