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Effects of calendar seasonality in the Indian calendar system

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Effects of calendar seasonality on economic output

Calendars have an enormous effect on economic, social, and cultural behaviors but nowhere is more profound than a country or region's economic output indicators such as industrial output, CPI, stock-market transactions, import-exports but in a globalized world, all of the economic time-series modelling is modelled around the Gregorian calendar system. In a country like India with multiple regions and festivals from multiple religion as well, a single calendar will not be sufficient to model various seasonal components. For example, during the festival month of On Diwali, the consumer consumption rate is usually higher and during the month, industrial output is generally lower.

Previous Work

There has been significant work published already to identify and remove multiple lagged seasonality from time series [delivera2011] considering technical papers published in The US Bureau of Census [shiskin1965]. There also has been significant work done to identify and remove seasonality, especially concerning religious festivals based on the Gregorian calendar by the Bank of Spain [maravall2000]. Similar work is present for lunar [lin2002] and lunisolar-based [Reingold2002] calendar systems as well. Similar work in the context of the Indian [bhattacharya2016] [sanyal2017] [kumar2017] seasonality effect is also present.

A comparative Analysis of calendar seasonality with Indian calendar system

A comparative study was performed to understand calendar seasonality creeping in which modelling seasonal decomposition on time series objects especially on econometric data sets to understand if any methodologies can be obtained to provide a better, quantitative understanding of the seasonality, India's Industrial output after the the year 2000 and modelling holiday seasonality with Diwali dates corresponding to that. To understand calendar seasonality, dates of the festival of Diwali was obtained from [seasonal] package and the dates were converted to Vedic calendar dates. Two different time series were modelled, one with Gregorian calendar dates and another with Vedic calendar dates. A corresponding time-series the object of India's industrial output from [sax2018seasonal] the package was also converted to Vedic calendar-based time series and scale. In both cases, a seasonal decomposition was observed visible along the red line and [X-13ARIMA-SEATS] was used for seasonality decomposition. Due to the change in the type of calendar, missing values were omitted to keep the frequency of the time series the same for both calendar systems. [VedicDateTime] used all date conversion and conversion of time-series objects in the comparative study.

Future Work

Since there is no comprehensive work done on understanding various the seasonal component of the Indian calendar system and its effect on economic output metrics, it would be pertinent to pursue work on identifying various monthly and quarterly seasonal components.

Moreover, the existing developed package `VedicDateTime`, needs to be updated with dates of significant festivals of the Vedic calendars which drives economic activities.