

While many studies have identified the importance of brand equity dimensions for individual products and services, few have tested the model with FMCG companies.

The findings of this study provide practical pointers to brand managers to manage brand equity of Indian FMCG brands for improved performance. Further, the results

also provide a model for brand equity and operational performance that can be effectively used by companies in the FMCG industry.

## IMR-DCAL SPECIAL PAPER

### A SIMPLE EXAMPLE FOR THE TEACHING OF DEMAND THEORY: AGGREGATE DEMAND ESTIMATION FOR ONIONS IN INDIA

Devlina CHATTERJEE

Empirical examples of demand estimation using real data are not often found in managerial economics textbooks. In classical papers on demand, estimation economists looked at coupled demand systems. Estimation of such demand systems requires a sophisticated understanding of economics and econometrics, which are beyond the scope of typical introductory texts. Our aim in this study was to estimate the demand curve for a single commodity, viz onions. We chose onions for this illustrative study because of the unique nature of the demand for onions in India, as described below. In estimating demand from price-volume data, one encounters the "identification

problem". It is not known whether the observed price-volume points lie on the same demand curve, or at the intersections of different pairs of supply and demand curves. Since the onion has no substitutes, is not prone to fluctuating tastes, and is not susceptible to changes in technology, one may assume that its demand curve does not shift within a short time. Thus, any changes in price and volume must occur due to shifts in the supply, and the price-volume points lie on the same demand curve. We collected daily price-volume data for onions over a short period of time from all listed mandis in India from the website <http://www.agmarknet.in>. A scatter plot of price vs volume indicates that the demand

curve had two distinct regimes. A piecewise linear fit to the data was computed and the break-point was identified at a wholesale price of about Rs 1620 per quintal. The estimated demand curve was horizontal below this price indicating inelastic demand. Above this price, the demand curve was negatively sloped with a price elasticity of  $-1$ . In other words, at low prices, the aggregate quantity of onions consumed remains roughly constant. However, at higher prices, the total expenditure on onions remains roughly constant.

## IMR-DCAL SPECIAL PAPER

### A STUDY AND ANALYSIS OF RECOMMENDATION SYSTEMS FOR LOCATION-BASED SOCIAL NETWORK (LBSN) WITH BIG DATA

Murale NARAYANAN and Aswani Kumar CHERUKURI

A recommender system suggests an item to a user that he/she may be interested in. To suggest an item of interest to a user, information from social networks is utilised to provide a suitable recommendation based on the user's location. Different databases are used to solve the location dimension problem. These databases use

small scale datasets to provide recommendation based on location, but in real time, the volume of data is large. Analysis can be performed in two ways: qualitative and quantitative. Here, we analyse Foursquare data set qualitatively to study the need for big data in recommendation systems for location-based

social networks (LBSN). A few quality parameters such as parallel processing and multimodal interface have been selected to study the need for big data in recommender systems. This paper gives a study and analysis of quality parameters of recommendation systems for LBSN with big data.

### SUDDEN BREAKS IN DRIFT-INDEPENDENT VOLATILITY ESTIMATOR BASED ON MULTIPLE PERIODS OPEN, HIGH, LOW, AND CLOSE PRICES

Dilip KUMAR

The study of volatility is of considerable interest because of its importance in portfolio allocation, risk management, derivatives pricing, futures hedging, trading strategies and asset pricing. Several studies

have highlighted the importance of volatility estimators that utilise the opening, high, low and closing prices. Among them, the Yang & Zhang (YZ) estimator proposed by [Yang & Zhang \(2000\)](#)

is unbiased regardless of the drift parameter, and incorporates opening jump in estimation. In this paper, we make use of the variance estimator that utilises high, low and closing prices proposed by Yang &