Evaluating the Need for FDI in Retail Based on the Retailers Performance

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ABSTRACT

The paper aims to do a benchmarking study of Indian retailers using Data envelopment Analysis (DEA). The efficiency of 18 retailers is ascertained using DEA models on the basis of the inputs that they use and the outputs that they produce. The study suggests possible potential improvements that can be made by the retailer to the inputs like cost of labor and capital employed to move towards the efficiency frontier. The study further evaluates the need for Foreign Direct Investment (FDI) in India, in light of the current level of efficiency of the Indian retailers. Implications of the study are discussed.

Keywords: Data Envelopment Analysis, Foreign Direct Investment Retailers, Efficiency, India

Introduction

India's retail growth is largely driven by increasing disposable incomes, favorable demographics, changing lifestyles, growth of middle class segment and a high potential for penetration into the urban and rural markets.

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Having realized the vast potential of the relatively untapped domestic market, large industrial conglomerates like Mahindra and Mahindra, Reliance, Tata's, Essar and Aditya Birla entered the retail market between the periods 2005 to 2010. The success of these conglomerates brought in global retailers like Metro AG, Max Retail, Shoprite, Hypercity, Carrefour, TESCO, Zara, Bharti-Wal-Mart, SPAR, Mother care and others. A study of the productivity of Indian retailers would therefore, be of great interest and would provide an outlook to understand their performance and how they would be able to survive in the coming days. The study will try to identify the retail firms, which are the most efficient, or the best practice firms and the firms, which are not. Benchmarking with the best firms in the sector will provide information, which can help the inefficient firms to move towards efficiency by making the required changes in either the scale of the firm, current level of technological investments, managerial skills or any other factor, which can affect the productivity of the firm. Finally, the need for FDI will be studied in light of the current state of efficiency of a sample of Indian retailers.

The Indian Retailing Industry

The Indian retail market is estimated to exceed US$ 750 billion by 2015, according to the India Retail report 2013 (IRIS Research). According to A T Kearneys's Global Retail Development Index (GRDI) 2012, India is the 5th most favorable destination for International retailers. The retail sales account for 33 percent of India"s GDP and supports livelihood of over 38 million people in India, which accounts for 8.5 percent of the total employed population in the country (Retailing in India, Euro monitor). Of the total Indian retail market, 8 percent constitutes the organized retail segment, which is estimated to grow at a rate of almost 30 percent by 2015. Clothing and Apparel make up almost a third of the organized retail segment, followed by Food and Grocery and Consumer Electronics.

As we embark into new era which has witnessed global slowdown and intense competition to survive, it is quite appropriate to understand the role FDI will play in enabling and supporting firms to sustain superior performance. The Government of India has taken various steps to provide the required impetus to the industry. Until 2011, the Indian central government denied FDI in multi-brand retail, forbidding foreign groups

from any ownership in supermarkets, convenience stores or other retail outlets. Even single-brand retail was limited to 51 percent ownership and a bureaucratic process. In the late 2012, the government of India passed a FDI policy, which allows foreign retailers to own up to 51 percent in multi-brand retail and 100 percent in single brand retail. It is expected that these stores will now have full access to over 200 million urban consumers in India, approximately 47 percent of which, are below the age of 30 with high levels of consumption.

Literature Review

DEA has been widely used as an efficiency measurement tool in a variety of fields like evaluating the efficiency of banks, manufacturing companies, educational institutions, etc. Many studies have applied DEA and related methodologies to Retail outlets in the USA, UK, Spain and Portuguese. Since the DEA model is well established and extensively used in the literature on general economics, its discussion is limited to the use of the model in the retail sector. Few studies are described, which have used DEA for evaluating the efficiency of retailers.

Retail productivity has been analyzed in the USA by Keh and Chu (2003), Thomas et al. (1998), Mostafa (2009), Mostafa (2010) and Malhotra et al. (2010). Mostafa (2010) used DEA to analyze the relative efficiency of 45 retailers in the USA. The results indicate that the performance of several retailers is sub-optimal, suggesting the potential for significant improvements. Thomas et al. (1998) used DEA to assess the efficiency of 552 individual stores for a multi-store, multi-market retailer.

Yu and Ramanathan (2008) and Athanassopoulos (1995) conducted retail productivity studies in the UK. Yu and Ramanathan (2008) used DEA to analyze the efficiency of 41 retail companies in UK in the period 2000 to 2005. Anthanassopoulos (1995) used DEA to aid in decision making in multi-level retail organization.

There are a couple of studies conducted in Spain (Sellers-Rubio and Mas-Ruiz, 2006; Sellers-Rubio and Mas-Ruiz, 2007; Moreno and Sanz-Triguero, 2011; Moreno, 2008) and some studies are conducted in Portuguese (Barros, 2006; Barros and Alves, 2003; Vaz and Guimaraes, 2008). Barros (2006) used DEA to analyze the efficiency of sample of 22

hypermarket and supermarket retail companies in the Portuguese market. The literature review reveals that, to our knowledge, there are as yet no published studies specifically analyzing Indian retailer efficiency.

Research Objective and Methodology

The study aims to identify the efficiency level of retailers in India. Issues to be addressed in measuring individual retailers efficiency include ascertaining multiple inputs and outputs related to the retail industry, taking into consideration the many factors influencing productivity, that are likely to vary from store to store, developing a single index of store efficiency and establishing the performance capability of each retailer. For calculating the efficiencies the input and output parameters were selected based on literature review. The input parameters selected are cost of labor and capital employed and the output parameters are profit and sales. Two models of DEA were selected. The first one is input oriented constant returns to scale refereed as CCR model. The second is input oriented variable returns to scale refereed as BCC model. The reason for selecting input oriented models is the assumption that a retailer has the capacity to change the inputs, but has very limited scope to change the outputs, as the outputs are depended on market related forces, which are hardly under the complete control of the retailer. Based on the scores of CCR and BCC efficiency, scale efficiency is calculated, which is a ratio of CCR and BCC scores. The conceptual framework of the study is proposed in Figure 1.

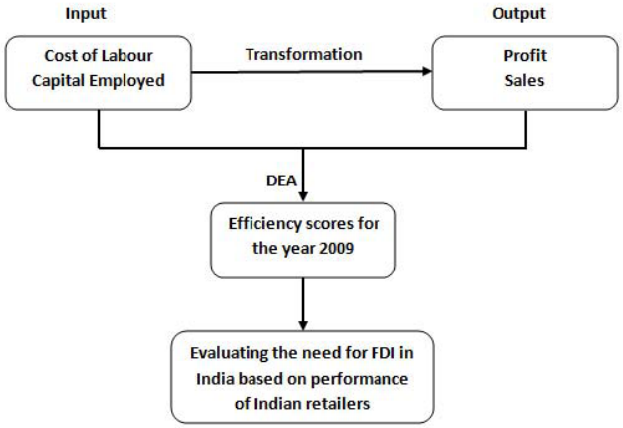

Figure 1: Conceptual Framework of the Research

Based on the efficiency scores of retailers in India, further study is conducted to ascertain, whether Indian retailers would benefit with FDI in retail.

Data Envelopment Analysis

DEA was suggested by Charnes, A. et al. (1978). It was built on the idea of Farrell (1957). DEA is a nonparametric method in operations research and economics for the estimation of production frontier. It is used to measure productive efficiency of decision making units, where the presence of multiple inputs and outputs makes comparisons difficult. The advantages of DEA are its ability to identify sources and amounts of inefficiency in each input and each output for each Decision Making Unit (DMU). It also identifies the most efficient set of DMUs and the inefficient ones. DEA optimizes at each observation in order to construct the production frontier. This frontier consists of a discrete curve formed by efficient DMUs, those that maximize outputs. The inefficient DMUs are below the production frontier, since they do not maximize the outputs at the production level.

There are different models of DEA. The CCR model was initially proposed by Charnes, Cooper and Rhodes in 1978 and therefore the abbreviation CCR (Charnes, A. et al. 1978. Later Banker, R.D., et al. (1984), suggested a model for distinguishing between technical efficiency and scale efficiency in DEA. The BCC model was proposed by Banker, Charnes and Cooper and therefore the abbreviation BCC.

The DEA methodology measures the efficiency of each DMU as the ratio of weighted outputs to the weighted inputs. The weights are derived from the data and therefore the Linear

programming model tries to maximize the efficiency of each decision making unit (DMU). Charnes et al. (1978), calculate the efficiency measure as one that assigns the most favorable weights to each unit. Mathematically, this can be written as (Eqs. (1)):

$$\text{Efficiency ratio} = \frac{\text{Weighted sum of output}}{\text{Weighted sum of input}} \quad \ldots (1)$$

The research paper assumes that the reader has some basic understanding of the technique and the technique itself is well established and therefore the paper does not provide a detailed review of the same.

Data

The model in this paper uses data for the year 2009. The data has been taken from CMIE database. To be included in the data set used in this study, companies had to meet the condition that their financial information is available. This left 18 retailers in the final data set to be analyzed. Secondly, DEA requires that the inputs and outputs should be non negative figures. A linear scale transformation is performed on profit in order to eliminate a negative value that is the maximum loss value is added to all the data points (Dasgupta, S. et al., 1999). Table 1 reports descriptive statistics of the variables used in the study.

Table 1: Descriptive Statistics of the Variables Used in the Study Based on CMIE Database (Data in 2009)

Variables	*Minimum*	*Maximum*	*Mean*	*Std. deviation*
Outputs				
Sales	3.84	6661.42	1056.36	1662.84
Profit	1	790.40	595.27	169.09
Inputs				
Cost of Labor	1.17	276.06	80.79	91.12
Capital Employed	3.68	5099.93	872.92	1411.22

Note: Values in Rs. 10 billion.

Inputs and Outputs

DEA model requires the identification of inputs and outputs. Based on Literature survey and availability of published data, the input and the output variables have been selected. The output was measured in terms of sales and profit. The inputs were measured in terms of cost of labor and capital employed. The DEA technique ascertains how efficiently cost of labor and capital employed were used to generate higher sales and profits.

Based on the review of literature, the authors who have used similar input and output criteria are mentioned in Table 2.

Table 2: Input and Output Parameters with Supporting Literature

Input/Output Parameters	*Literature*
Output Parameters	
Sales	Yu and Ramanathan (2008), Perrigot and Barros (2008), Barros and Alves (2003), Moreno and Sanz-Triguero (2011), Sellers-Rubio and Mas-Ruiz (2006), Joo et al. (2011), Banker et al. (2009), Moreno (2008), Barros (2006), Mostafa (2008), Joo et al. (2009), Mostafa (2010), Mateo et al. (2006), Vaz and Guimaraes (2008), Moreno (2006), Moreno (2010), Sellers-Rubio and Mas-Ruiz (2006), Sellers-Rubio and Mas-Ruiz (2007), Barth (2007), Donthu and Yoo (1998), Thomas et al. (1998), Keh and Chu (2003), Athanassopoulos (1995)
Profit	Yu and Ramanathan (2008), Perrigot and Barros (2007), Barros and Alves (2003), Sellers-Rubio and Mas-Ruiz (2006), Dasgupta et al. (1999), Barros (2006), Malhotra et al. (2010), Moreno (2010), Sellers-Rubio and Mas-Ruiz (2006), Sellers-Rubio and Mas-Ruiz (2007), Thomas et al. (1998)
Input Parameters	
Labor	Yu and Ramanathan (2008), Perrigot and Barros (2007), Barros and Alves (2003), Moreno and Sanz-Triguero (2011), Sellers-Rubio and Mas-Ruiz (2006),Moreno (2008), Barros (2006), Mostafa (2008), Joo et al. (2009), Mostafa (2010), Mateo et al. (2006), Moreno (2006), Moreno (2010), Sellers-Rubio and Mas-Ruiz (2006), Sellers-Rubio and Mas-Ruiz (2007), Barth (2007), Thomas et al. (1998), Keh and Chu (2003)
Capital employed	Perrigot and Barros (2007), Sellers-Rubio and Mas-Ruiz (2006), Sellers-Rubio and Mas-Ruiz (2009), Sellers-Rubio and Mas-Ruiz (2007), Keh and Chu (2003)

The total number of input and output variables was kept to the minimum as per the DEA convention. The general rule of thumb is that the minimum number of DMU's should be greater than three times the

number of inputs plus outputs. This rule has been adhered in this paper. Number of inputs plus outputs are 4 multiplied by three is twelve. The number of DMU's used is more than twelve and therefore adhere to the rule.

DEA Results

The DEA results were calculated by using the software, which came with the book 'Data Envelopment Analysis', by Cooper et al. (2007). The relative efficiency scores of 18 Indian retailers in the year 2009 are presented in Table 3.

Table 3: The Efficiency Scores of the Indian Retailers (Data in 2009)

Name of Retail Company	*CCR*	*BCC*	*Scale Efficiency*
Pantaloon Retail India Ltd.	0.77	1	0.77
Shoppers Stop Ltd.	0.71	0.84	0.85
Trent Ltd.	0.40	0.45	0.88
Infiniti Retail Ltd.	1	1	1
Titan Industries Ltd.	1	1	1
Spencer's Retail Ltd.	1	1	1
Reliance Retail Ltd.	0.13	0.13	1
Aditya Birla Retail Ltd	0.09	0.09	1
Madura Fashion & Lifestyle Ltd.	0.06	0.06	1
Avenues Supermarts Pvt. Ltd.	1	1	1
Store One Retail India Ltd.	0.40	0.40	1
Bata India Ltd.	0.57	0.85	0.67
Archies Ltd.	0.37	0.42	0.88
Baid Global Ventures Ltd.	1	1	1
Style Spa Furniture's Ltd.	1	1	1
Provogue (India) Ltd.	0.47	0.51	0.92
Koutons Retail India Ltd.	1	1	1
Globus Stores Pvt. Ltd.	0.54	0.54	1

It can be observed that under the CCR model (CRS), the most efficient Indian retail firms which are on the efficient frontier are Infiniti Retail Ltd. (1.00); Spencer's Retail Ltd. (1.00); Avenues Supermarts Pvt. Ltd. (1.00); Baid Global Ventures Ltd. (1.00); Koutons Retail India Ltd. (1.00), Titan Industries Ltd. (1.00) and Style Spa Furniture's Ltd. (1.00). It implies that these firms have produced the maximum outputs (Sales and Profit) for the given level of inputs (Cost of Labor and Capital Employed). The average efficiency score under CCR is 63.9 percent with a standard deviation of 34, which implies that on an average the Indian retail firms could use 36 percent less inputs to produce the same level of output.

With regard to BCC model (VRS), the most efficient Indian retail firms which are on the efficient frontier are Pantaloon Retail India Ltd. (1.00); Infiniti Retail Ltd. (1.00); Titan Industries Ltd. (1.00); Spencer's Retail Ltd. (1.00); Avenues Supermarts Pvt. Ltd. (1.00); Baid Global Ventures Ltd. (1.00); Style Spa Furniture's Ltd. (1.00) and Koutons Retail India Ltd. (1.00). The average efficiency score under BCC is 68 percent with a standard deviation of 35. Retail firms like Pantaloon Retail India Ltd. is showing less than 100 percent efficiency on CCR as compared to 100 percent efficiency on BCC. This implies that this firm does not operate at their most productive scale of operations.

Scale efficiency is the ratio of CCR and BCC efficiency. Indian retail firms which have higher scale efficiency near to 1.00 are Infiniti Retail Ltd. (1.00); Titan Industries Ltd. (1.00); Spencer's Retail Ltd. (1.00); Avenues Supermarts Pvt. Ltd. (1.00); Baid Global Ventures Ltd. (1.00); Koutons Retail India Ltd. (1.00); Reliance Retail Ltd. (1.00); Aditya Birla Retail Ltd. (1.00); Provogue (India) Ltd. (1.00); Madhura Fashions & Lifestyle Ltd. (1.00); Store One retail India Ltd. (1.00) and Style Spa Furniture's Ltd. (1.00)

Evaluating the Need for FDI in Retail Based on the Performance of Indian Retailers

The Indian organized retail sector is in its nascent stage and therefore the industry faces a lot of problems. Poor infrastructure like roads, communications, and power makes logistics and transportation in India extremely difficult. Further, internal operations of retailers, such as

warehouse processes and distribution, are usually fairly inefficient. Retailers are keen to outsource this activity but unfortunately, there is an absence of mature third party logistics service performing at high service level at competitive prices.

The percentage of shrinkage in Indian retail sales is the highest in the world, especially in the fresh fruit and vegetables segment due to lack of refrigerated containers to transport the goods and refrigerated warehouses to store the perishable items. Supply chain inefficiency breeds wastage of food produce. CRISIL Research estimates that about 27 percent of India's annual production of fruits and vegetables, worth Rs 700 billion, is wasted due to poor cold storage and transport facilities. About 50 percent of this wastage can be prevented if retailers develop an efficient supply chain. Investing in the back-end supply chain to reduce the wastage will be necessary to ensure reasonable margins in the Food and Grocery segment, which is highly competitive and price sensitive. An efficient supply chain will enable direct sourcing of fruits and vegetables, which will boost farmer realizations by 10-15 percent and still bring down retail prices by 15-20 percent (CRISIL report). Existing supply chain especially food and grocery has too many intermediaries, which increases the cost to the consumer and results in a lot of wastage and shrinkage on its way to the retail store. Going forward, technology is likely to be a key differentiator to bring about efficiencies, save on costs and offer better services to the consumers. Though most of the retailers have deployed some or other technology, most of it does not integrate to provide a seamless, completely integrated environment. All the elements within the retail industry right from data warehouses, logistics, supply chain, store management, point of sale, etc., are likely to get impacted positively with the usage of technology.

Understanding the various problems that the retail industry faces, it is important to ascertain, whether FDI in Retail would be able to play a key role in enhancing the efficiency and performance of the industry. FDI in general, has an important beneficial effect on the economy as it brings more resources, facilitates technological and managerial knowledge transfer. It also helps in developing international import and export, creates humongous job opportunities and provides economic growth (Kinda, 2010). A study conducted by Fu et al. (2012) in the UK retail market suggest, that on an average, foreign owned retail firms achieve higher

management capability scores and are more productive than the local firms. This indicates that FDI plays an important role in developing the sector and making it more competitive to the advantage of the consumers.

Our study therefore tries to ascertain, whether the Indian Retail sector would benefit with FDI or not? To accomplish this objective, the efficiency level of Indian retailers is ascertained. The results of the DEA show that, 7 firms out of 18 firms are on the efficient frontier as per CCR model and 8 firms out of 18 are efficient as per BCC model. The minimum efficiency level of some of the retail firms is as low as 6 percent, which indicates, that there is humongous opportunity for improvement. The overall results indicate that the Indian retailers are relatively less efficient and that most of the firms have still not crossed their gestation period of reaping benefits out of the investments made. The mean efficiency levels of the Indian retailers for the year 2009 based on CCR model and BCC model is 63.9 percent and 68 percent respectively. These figures are quite low as compared to the studies undertaken in the Europe or the US.

With the current study, it is evident that Indian retailers would require funds, technology, efficient supply chain and managerial inputs, which could come through the foreign capital route. In 2011-12, organized retail accounted for 7 percent of the Indian retail industry. The food and grocery segment which accounts for two-third of the Indian retail market has organized retail sales of only 2 percent, the lowest among the retail verticals. This highly price sensitive segment will benefit the most from the scale, technology and investments in the back-end that could accompany foreign capital.

Conclusion and Discussion of Managerial Implications

This study is very important for the Indian retailers to compare their individual productivity with the most efficient firms in the industry. Benchmarking efficiency is a good way managers can use to compare their performance with the best in the industry and globally, and accordingly making the required changes. It is therefore hoped that managers analyze their organizational practices with their peer groups in India and abroad and accordingly try to improve their future efficiencies. FDI in retail will enable the retailers to infuse money in the business, which is required to make the appropriate changes in the way the business is run to move

towards efficiency. FDI would not only bring money in the business, but also know - how, technology and best supply chain practices. FDI in retail is a welcome reform the part of the government and hopefully the supply chains will become more efficient, farmers will earn more money for their produce, agricultural wastage will reduce considerably and new technology infusion will make the processes more efficient. Finally the consumers should benefit in the form of reduced cost.

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