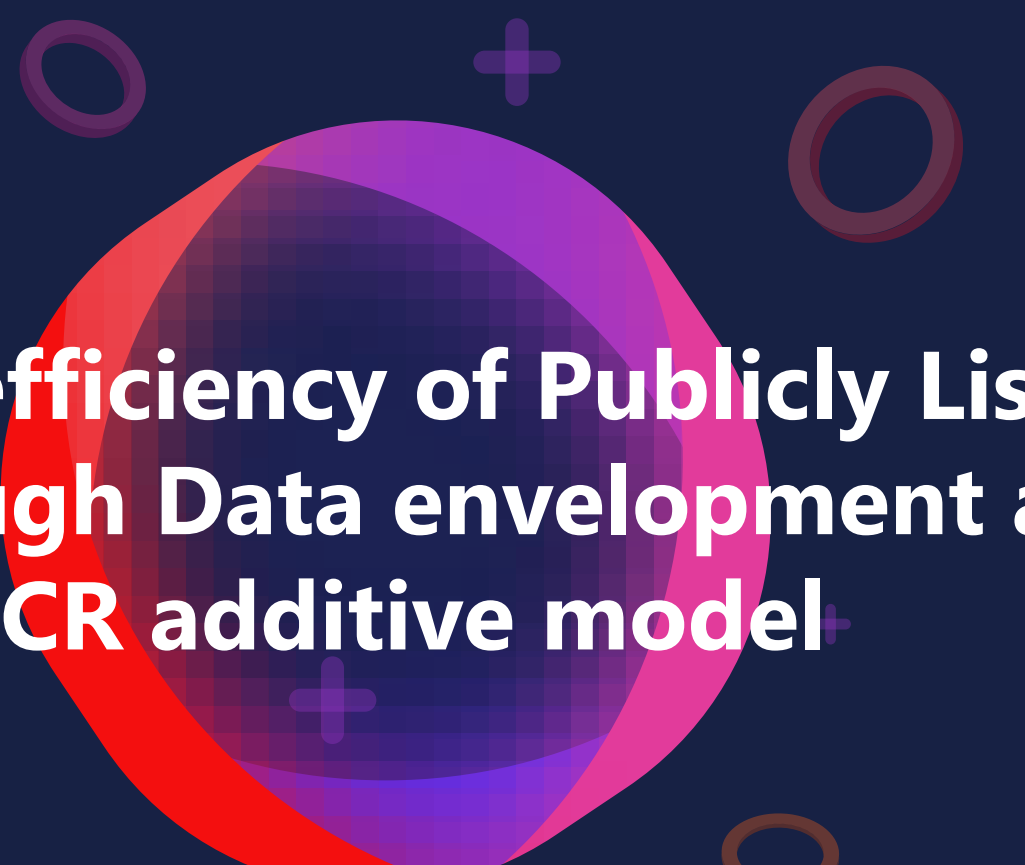




Measuring the efficiency of Publicly Listed Indian hospitals through Data envelopment analysis – CCR additive model

Abstract

Purpose .

The purpose of this paper is to ascertain the efficiency of publicly listed Indian hospitals in terms of utilizing its resources in generating revenue and make projections on reaching the efficiency frontier

Approach t

This study uses data envelopment analysis (DEA- additive model), to measure the efficiency of publicly listed Indian hospitals using two input variables and three output variables

Findings L

DEA analysis has shown that 3 out of 5 hospitals to be efficient under the CCR output model of DEA. Efficiency scores of Narayan health and Aster DM Health care are 0.3499 and 0.6952 respectively, which are inefficient

Findings e

Projected need of improvement in output variables varies from 44% increase in PAT to 830% increase in ROCE to reach the efficiency frontier.

Research limitations u

This study has a limitation with reference to the less decision making units due to unavailability of data on the input and output parameters of the model

It becomes imperative for organizations to mindfully utilize their resources and bring the best out of what is available. Although this saying holds true in every setting, the validity of it can be multiplied with a weight factor, when applied to healthcare settings. This study aims to calculate the efficiency of the hospitals in terms of utilizing its resources in producing the revenue by the application of Data Envelopment Analysis.

Introduction

Resources are scarce, human wants are unlimited and means to achieve them are very limited



Measure of the performance is productivity



Concept of performance is relative



Least amount of inputs to achieve the highest amount of output



Literature Review

Literature Review

(Nguyen et al., 2012)

Existing literature shows a trend to examine hospital efficiency with one widely used method called the data envelopment analysis. The ultimate goals of such studies are to find whether the hospitals are producing maximum outputs with the used inputs and to figure out the determinants of the hospital performance

(Thore et al., 1994)

Productivity can have two dimensions: a shift of the frontier itself, and an improvement of the performance of the corporation relative to the frontier. Any recorded improvement in productivity can then be broken into two parts: improvements due to shifts of the frontier, and improved intra-period inefficiency ratings

(Yazar A, 1996)

On average, hospitals with efficient DEA scores of 1.00 had sound profitable positions, while poor performing hospitals with low DEA scores incurred net losses or earned minimal profits

(Mahate & Hamidi, 2015)

The result of the study was about 41% to 52% of the production factors are wasted during the service delivery process in the hospitals. Using the existing amount of resources, the amount of delivered outputs can be doubled, which can significantly impact patient outcomes

(Sendek et al., 2015)

The implementation of e-health tools contributed to the cost containment and better efficiency scores. It also stated that with the implantation of basic e-health tools smaller hospitals showed better efficiency scores in all models than larger university hospitals

Literature Review

(Staat, 2006)

Segmented hospitals to reduce the bias in the efficiency scores by controlling the variation in the size of the hospitals. The study segmented the hospitals into "hospitals that have one internal medicine and one surgery department, none of the hospitals provides tertiary care. The results estimated suggest "an average bias-corrected efficiency of around 80%

(Smith, 1990)

One of the fundamental limitations of traditional univariate ratio analysis i.e. only two dimensions of activity, represented by numerator and denominator, can be examined in any one indicator. Yet the complexity of firms' means that inputs and outputs, both physical and financial, are multidimensional, this yields a single scalar measure of performance

(Smith, 1990)

Traditional ratios either examine only a part of the enterprise's activity, or collapse these multiple dimensions into a single unsatisfactory accounting number. It says Ratio analysis has been a tool of analysts for as long as financial statements have been prepared



Methodology

E

Inclusion criteria

Hospitals listed on (NSE) and (BSE)

Exclusion criteria

Hospitals which have not disclosed their information in public

Input

No . of beds & Doctors

Output

PAT, ROCE, ARPOB

Model

CCR-additive

Data sources

Fiscal and annual reports of the publically listed hospitals

Software and tools

Microsoft excel with DEA solver plugin

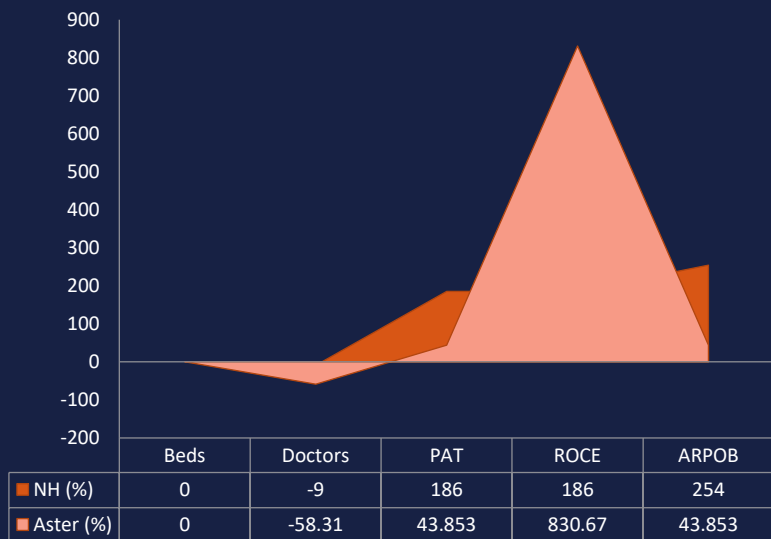
To measure and compare the efficiencies of the publicly listed hospitals
To make projection on required output level to reach the efficiency frontier



Results

Results

Projections



DMU



01

No. of Efficient Hospitals

Shalby, HCG, Apollo hospitals are efficient
Narayana Health and aster DM health care are inefficient

03

Weights assignment

Major weights given to beds in input variable and PAT in output variable

02

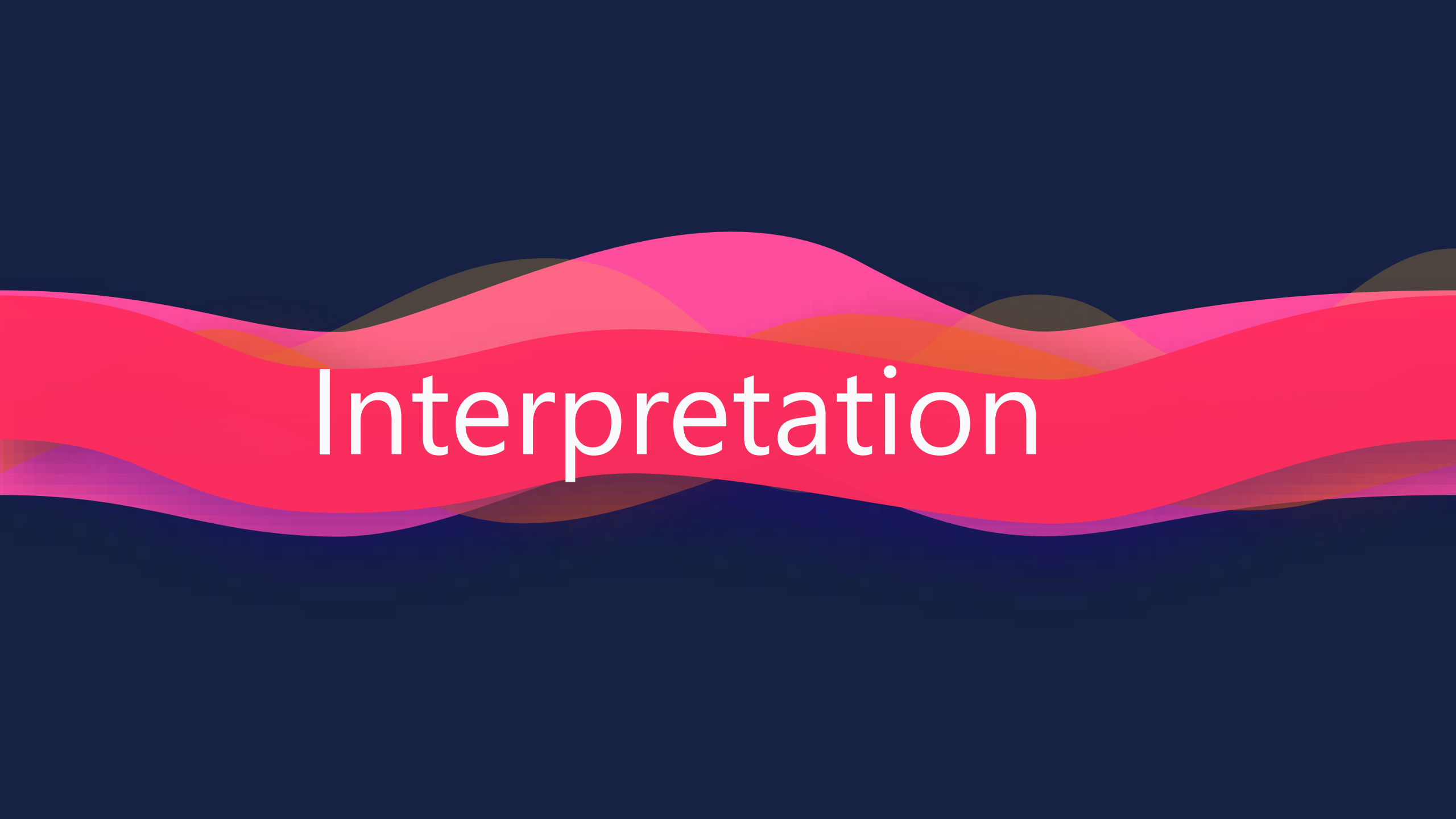
Slack

Major slack is seen in doctor utilization in inputs and in generating ARPOB in outputs

04

Projections to reach frontier

An increase by 186% in PAT & ROCE outputs of Narayana Health
An increase by 831% in ROCE output of aster DM healthcare



Interpretation

Great title in here

With smooth animations to enhance your story

e

For the inefficient DMUs' to improve, their emphasis should be more on number of beds

Aster DM Healthcare

Ironical Results

Narayana Health

Narayana Health is the least efficient DMU amongst the 5 hospitals under this study, when seen under the purview of financial ratios as outputs. This could be attributed to the fact that the ARPOB of the Narayana Health was the least amongst the five hospitals

In spite of the aster DM healthcare generating the highest ARPOB amongst the four hospitals it still not on the efficient frontier which could be because of its least performing output i.e. ROCE

d

Either increasing their utilization rate or decreasing the number of beds.



Thank you