

## **IOE 551 – Benchmarking and Productivity Analysis**

### ***Assignment 4: Revenue Sharing in the National Bossaball League in Tinland***

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**To:** Commissioner Derrick Reynolds, NBL of Tinland

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**Sub:** Revenue sharing from the escrow fund, Data Envelopment Analysis

## **Background**

The National Bossaball League of Tinland consists of 12 teams, each representing the 12 states of Tinland. Although the League, as an entity is turning in record profits year after year, the revenue is not distributed uniformly across the twelve teams, in accordance with the ‘opportunity’ for success available to each team. In other words, some teams have an advantage over the others in terms of having bigger fan bases and huge media deals. In order to better fund teams which are putting in an effort, but have limited resources available, the NBL is intent on analyzing the efficiency of each team, considering the resources available to them. These resources include the average state population and the average household income in the state. The output metrics used to identify the efficiencies are revenue from ticket sales and revenue from media contracts.

## **DEA Models used**

A Data Envelopment Analysis has been made using the available data to identify the efficiency levels of each team. Two models BCC – O and Categorical Variables have been used to make the analysis and the justifications for the same are as follows. The dataset is variable returns to scale and the objective of the analysis is to maximize outputs. The number of inputs and the number of outputs in the dataset are two. Therefore the BCC-O model was chosen. Furthermore, the analysis was also made using Categorical Variables, as there are two categories in the dataset – the states who are not charged luxury tax (named category 1) and those that are charged luxury tax (category 2). In this analysis, the states in the category 1 are compared within themselves and the states in category 2 are compared with states in both categories. However, one assumption that is being made is that the predetermined revenue for levying a luxury tax is appropriately determined, so that such a categorical variable analysis makes sense and places the

states on an unbiased platform for investigation. The results are presented below and discussed. Also, a methodology for revenue sharing among the states has been proposed.

## Results of DEA

*Table 1 – Efficiencies of teams (ranked) BCC-O-V model*

Rank	DMU	Score
1	<b>Myland</b>	1
1	Multitoad	1
1	Alsing	1
1	<b>Queenston</b>	1
1	Balto	1
6	<b>Hamland</b>	0.974192
7	United	0.81109
8	St. Goof	0.790182
9	Red Lake	0.684751
10	<b>Chamberson</b>	0.583967
11	Shoutville	0.49503
12	Acie	0.343825

*Table 2 – Efficiencies of teams (ranked) CAT-O-V model*

Rank	DMU	Score	Category
1	Multitoad	1	1
1	Shoutville	1	1
1	<b>Queenston</b>	1	2
1	St. Goof	1	1
1	Balto	1	1
1	United	1	1
1	Alsing	1	1
1	<b>Myland</b>	1	2
9	<b>Hamland</b>	0.974192	2
10	Red Lake	0.874567	1
11	<b>Chamberson</b>	0.583967	2
12	Acie	0.445397	1

The teams whose names are presented in bold are the teams that pay luxury tax. The revenue from the escrow fund has to be distributed among the teams which do not pay the luxury

tax, in other words, enjoy lesser revenues (with their player salaries being lesser than the predetermined value).

### Revenue sharing

The CAT-O-V model indicates more teams to be efficient and has been used to develop a revenue sharing model for the states of NBL which do not pay a luxury tax. The model is based on the fact that teams with higher efficiencies (who maximize outputs with limited resources available) should be given larger portions of the escrow fund. The fraction of the escrow fund that should go to a team is calculated by dividing the efficiency of the team by the sum of all the efficiencies. Assuming the escrow fund is approximately \$150,000 for this year, the amount that should be given to each team has also been calculated.

Rank	DMU	Score	Fraction = Score/Total	Fraction of a \$150,000 escrow fund
1	Multitoad	1	0.136613	\$20,492
1	Shoutville	1	0.136613	\$20,492
1	St. Goof	1	0.136613	\$20,492
1	Balto	1	0.136613	\$20,492
1	United	1	0.136613	\$20,492
1	Alsing	1	0.136613	\$20,492
10	Red Lake	0.874567	0.119477	\$17,922
12	Acie	0.445397	0.060847	\$9,127
	Total	7.319964		\$150,000

### Conclusion

A Data Envelopment Analysis has been made for the given dataset using two models, the BCC-O-V and the CAT-O-V. The results of the CAT model have been used to recommend revenue sharing among states that do not pay a luxury tax, from the escrow fund. It is recommended that the teams which are more efficient, according to the analysis, be awarded greater portions from the escrow fund.