

Whether Regional Disparity Affect the Efficiency of Universities in Sri Lanka?

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Abstract

In Sri Lanka annually millions of funds allocate from the Government budget to the universities in Sri Lanka to ensure quality higher education system. There are 15 universities were established and functioned under the apex body of University Grants Commission (UGC). The general concern that university's prestige depends on their teaching and research activates rather than the other facilities. However, in Sri Lanka there is an ongoing debate that efficiency of some universities are affected by regional disparity, location or size.

In this study we focus on measuring efficiency of all state universities in Sri Lanka using Data Envelopment Analysis (DEA). Further analysis focused on the degree of efficiency by regional disparity or the size of the university.

Key words; Efficiency; DEA; University

INTRODUCTION

Many researches have been conducted to measure the efficiency of universities during the last few decades all over the world (Afonso & St. Aubyn, 2006). Abbott & Doucouliagos(2003) done a research in Australia by taking the sample of Australian Universities, Agasisti & Dal Bianco(2006) done a research in Italia taking the sample of Italian universities. However, there has not been conducted any of such research for measuring the efficiency of universities in Sri Lanka. Hence, the purpose of this study is to evaluate the overall efficiency of state Universities in Sri Lanka. It is general concern that the many state universities in Sri Lanka do not function efficiently and ongoing debate that efficiency of some universities are affected by regional disparity, location or size.

This study used Data Envelopment Analysis (DEA) methodology to evaluate the efficiency. DEA evaluates the efficiency by considering many inputs and outputs and comparing all factors within the sample. The DEA technique applied to measure efficiency of universities in many countries i.e. Australia, Nigeria and United

Kingdom (Bernroider & Stix, 2006). The objective of the study is to measure efficiency of universities in Sri Lanka and further to study whether efficiency of universities are affected by regional disparity, location or size.

APPLICATION OF DEA FOR EFFICIENCY OF UNIVERSITIES

Data Envelopment Analysis (DEA) methodology has been applied by many researchers to measure efficiency of state universities. Abbott & Doucouliagos (2008) done a study for Australian and New Zealand universities using DEA, Adler, Friedman, & Sinuany-Stern (2002) used DEA technique to ranking of universities. Agasisti & Dal Bianco (2006) applied DEA to measure efficiency for Italian university system. Ahn, Arnold, Charnes, & Cooper (1989) had done a study to measure efficiency for higher education institutions in Texas. Agasisti & Salerno (2007) carried out a study for assessing cost efficiency of Italian universities. Avkiran (2001) did study for investigating technical and scale efficiencies of Australian universities through Data Envelopment Analysis. Further, Castano (2007) conducted study on Philippine State Universities and Colleges, Cyril Tomkins (1988) for Evaluating the Efficiency of UK University Departments of Accounting, Din (2005) for the efficiency analysis in a cross-university comparison, Fandel (2007) for German higher Education Institutions, Flegg, Allen, & Field, (2004) for measuring the efficiency of British universities, García & Palomares (2008) for evaluation of Spanish Universities, Glass, Mckillop, & Hyndman (1995b) for measuring efficiency of UK universities, Hanke & Leopoldseeder (1998) for comparing the efficiency of Austrian universities, Iulianaa, Adela, Radu, & Razvan (2009) for improving organizational efficiency and effectiveness in a Romanian Higher Education Institution, Johnes & Johnes (1993) for measuring the research performance of UK Economics Departments, and Johnes & Yu (2006) for measuring the research performance of Chinese higher education institutions by using DEA technique. Martin (2003) for performance assessment of the Zaragoza University Departments, Ng & Li (2000) for measuring the research performance of Chinese higher education institutions, Thanassoulis, Kortelainen, Johnes, & Johnes (2011) for cost and efficiency of higher education institutions in England, Tomkins & Green

(1988) for evaluating the efficiency of UK university departments of accounting and Fenga (2003) for measurement of the efficiency of R&D management activities in universities.

Tomkins & Green (1988) carried out a study for UK university departments of accounting to measure efficiency of departments using DEA and concluded that some of the universities in the UK are not efficient. Madden, Savage, & Kemp (1997) have done another study for economics departments at Australian universities applying the DEA to measure the efficiency of departments and found that 80% of the departments were efficient and the rest of the department are inefficient. This result is comparatively good as most of the departments perform well. Athanassopoulos & Shale (1997) assessed the comparative efficiency of higher education institutions in the UK by means of Data Envelopment Analysis and found that 91% of the higher education institutions in the UK comparatively efficient. They considered the financial factors and non-financial factors concluded that the universities monitor their cost structure and obtained review the progress periodically to introduce preventive measures of drawbacks.

INPUTS AND OUTPUTS

Table 1 depicts inputs and outputs selected for the study. The study has chosen eight inputs and three outputs for measuring efficiency of Government universities in Sri Lanka. Selection of inputs and outputs has been finalized based on the studies measuring efficiency of universities done by researchers as discussed in this section.

TABLE 1 INPUTS AND OUTPUTS SELECTED FOR THE STUDY

Inputs	Outputs
No. of academic staff	No. of graduates
No. of non-academic staff	No. of postgraduates
Capital expenditure	Income earned
Recurrent expenditure	
Expenditure on equipment, furniture, library, books, periodicals & vehicles	
Postgraduate enrollment	
Undergraduate enrollment	
Undergraduate admission	

ANALYSIS OF UNIVERSITIES BY GEOGRAPHICAL LOCATION

Table 2 presents the analysis by geographical location of universities in the sample district. Fifteen universities are established in ten districts within the nine administrative provinces. These districts are Colombo, Matara, Kandy, Ratnapura, Badulla, Kurunegala, Anuradhapura, Batticaloa, Ampara and Jaffna. The highest number of universities of the sample is located in Colombo district. This figure is 40% of the sample. The second highest numbers of universities are located in nine districts. Each university in Jaffna, Matara, Kandy, Ratnapura, Badulla, Batticaloa, Ampara, Kurunegala and Anuradhapura represents 6.6% of the sample.

Table 2 presents the geographical location of universities in the sample district

TABLE 2 GEOGRAPHICAL LOCATION OF UNIVERSITIES

Province	District	No. of University	Sample district	Sample selected as percent age of population
Western	Colombo	06	06	40.00
Southern	Matara	01	01	6.66
Central	Kandy	01	01	6.66
Sabaragamuwa	Ratnapura	01	01	6.66
Uva	Badulla	01	01	6.66
Wayamba	Kurunegala	01	01	6.66
North Central	Anuradhapura	01	01	6.66
Eastern	Batticaloa	01	01	6.66
	Ampara	01	01	6.66
North	Jaffna	01	01	6.66
Total		15	15	100

ANALYSIS OF UNIVERSITIES BY SIZE

As shown in the table 3 specific size categories have been determined to analyze the universities at the researcher's discretion. These size categories are employed in the analysis presented

in sections. Broadly speaking, 33% of the sample is represented by large DMUs while medium and small DMUs represent 17% and 50% respectively (based on an average of all measurements).

TABLE 3 SIZE OF UNIVERSITIES

Size metrics	N	Large	Medium	Small	Scale
Number of students	15	5	3	7	Large; More than 2000 Medium; ≤1000, ≤ 2000 Small; below 1000
Number of academic staff members	15	5	3	7	Large; More than 400 Medium; ≤ 200, ≤ 400 Small; below 200
Income	15	5	1	9	Large; More than 100,000,000 Medium; ≤50,000,000, ≤ 100,000,000 Small; below 50,000,000
Expenditure	15	5	3	7	Large; More than 1000 Million Medium; ≤500 Million, ≤ 1000 Million Small; below 500 Million
Enrolment	15	5	3	7	Large; More than 8000 Medium; ≤5000, ≤ 8000 Small; below 5000
Average	15	33 %	17 %	50 %	

DATA ANALYSIS

Government universities operate efficiently in Sri Lanka 2007-2011 is tested using the results of 'DEA-solver software V6'. An overall efficiency measure of the universities was 0.853 in 2007. This efficiency measure has been increased to 0.936 in 2008. In 2009, the efficiency measure was reached the maximum (0.949). However, it has declined to 0.887 in 2010. The efficiency measure has further been collapsed to 0.858 in 2011. In conclusion, the overall efficiency measure for all universities started rising from 2007 until 2009. Thereafter, it has declined. According to the Data Envelopment Analysis, if efficiency measure becomes 1, it indicates that particular DMU is efficient. If the efficiency measure between 0 and 1 (below 1), it indicates that particular DMU is inefficient. According to these results, overall efficiency of universities from 2007 to 2011 has been below 1. Even though, the efficiency measure has

reached 0.949 in 2009 (the highest), it is below 1. As such, Government universities have not efficiently been operated from 2007 to 2011. Whether Location affects the efficiency of Government universities in Sri Lanka is tested using results of 'DEA-solver software V6' software along with the Kruskal Wallis test (K.W test). The result of Kruskal Wallies test on location is depicted in table 4 and 5. Table 4 of ranks shows the mean rank of universities by the geographical location. Table 5 test statistics presents the Chi-square value (Kruskal-Wallis H), the degrees of freedom and the significance level.

TABLE 4 RANKS (LOCATION)

	Location	N	Mean Rank
Efficiency	Colombo	30	46.37
	Kandy	5	48.50
	Jaffna	5	16.30
	Matara	5	41.80
	Anuradhapura	5	24.80
	Ratnapura	5	48.50
	Badulla	5	48.50
	Kurunegala	5	9.60
	Batticaloa	5	26.90
	Ampara	5	18.27
	Total	75	

TABLE 5 TEST STATISTICS -A,B (LOCATION)

	Efficiency
Chi-Square	41.367
df	9
Asymp. Sig.	.000

a Kruskal Wallis Test
 b Grouping Variable: location

Decision rule of the test is, if $p < 0.05$ the test is significant (Zimmerman, 1998). According to table 5, $p = 0.000$ with a mean rank of 46.37 for Colombo, 48.50 for Kandy, 16.30 for Jaffna, 41.80 for Matara, 24.80 for Anuradhapura, 48.50 for Ratnapura, 48.50 for Badulla, 9.60 for Kurunegala, 26.90 for Batticaloa, and 18.27 for Ampara. As, p value is less than 0.05 ($0.000 < 0.05$), the test is significant at 0.05. Therefore, this confirms that location affects the efficiency of Government universities in Sri Lanka. In other words, the efficiency of Government universities in Sri Lanka is affected by location.

Whether Size affects the efficiency of Government universities in Sri Lanka has been tested using results of 'DEA-solver software V6' software with along with

the Kruskal Wallis test (K.W test). The result of Kruskal Wallies test on size is depicted in table 6 and 7. Table 6 of ranks shows the mean rank of the size of universities. Table 7 test statistics presents the Chi-square value (Kruskal-Wallis H), the degrees of freedom and the significance level.

TABLE 0RANKS (SIZE)

	Size	N	Mean Rank
Efficiency score	Large	25	49.04
	Medium	11	23.50
	Small	38	33.96
	Total	74	

TABLE 7 TEST STATISTICS –A,B (SIZE)

	Efficiency score
Chi-Square	14.449
df	2
Asymp. Sig.	.001

a Kruskal Wallis Test
 b Grouping Variable: size

Decision rule of the test is, if $\rho < 0.05$ the test is significant (Zimmerman, 1998). According to table 7, $\rho = 0.001$ with a mean rank of 49.04 for large, 23.50 for medium, and 33.96 for small. As, ρ value is less than 0.05 ($0.001 < 0.05$), the test is significant at 0.05. Therefore, size affects the efficiency of Government universities in Sri Lanka. In other words, the efficiency of Government universities in Sri Lanka is affected by size.

CONCLUSION

The study has found that the efficiency of DMUs was 47% and inefficient DMUs were 53% during the period from 2007 to 2011. It has been further revealed that the efficiency of Government universities in Sri Lanka is affected by location and size. Hence this study concludes that regional disparity has an impact on efficiency of universities in Sri Lanka. Research findings opened avenue for reformulating policies on higher education for enhancing efficiency of universities and provides room for further studies.

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