paper 8

by Handaru Jati

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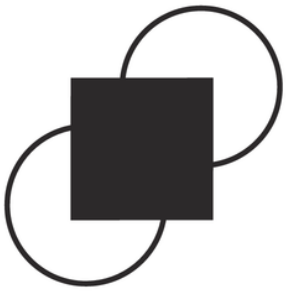

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THE PRODUCTIVITY EVALUATION OF INDONESIAN EDUCATION UNIVERSITIES BY USING MALMQUIST INDEX IN THE YEAR OF 2010-2012

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Abstract

The research presented, documentary in nature, it aims to study techniques for analyzing the productivity applicable to Indonesian education Universities. The methodology involves the collection of information, organization, critical analysis, reflection, interpretation and synthesis of recent literature. It is concluded that Malmquist index is innovative technique that focus on the assessment of the technical productivity, possible to estimate the optimal production frontier of universities. The use of these techniques allow real measures of academic processes, to determine the relationship between the variables considered and consequently optimize the academic administration at universities with innovation criteria. The results constitute an important basis for decision making by the management teams of universities, in order to optimize innovation processes information criteria

Keywords: Productivity, university, Malmquist Index.

1 INTRODUCTION

Universities and non-profit entities need to make changes in their organizational structures that make their decision centers modern and innovative. This management technique is needed to improve resource allocation and contribute effectively to the decision-making process. In order to achieve this goal, universities need a tool that is able to measures the profitability with which resources are invested, considering in these entities, the objectives are not merely economic profitability and the concept differs from that used in the business world. Productivity is an important aspect that needs to be considered when evaluating management processes in university. In this sense the academic managers require indicators that allow them to establish relationships or comparisons between the various factors that make each of the academic units. For this process to be effective, it is important to have a system of evaluation to measure the efficiency of the units considered productive. According to Viloria et al (2009) [1] to measure productivity it is necessary to quantify the maximum product/work as process efficiency and product/demand relationship as successful treatment outcomes. However, when a functional relationship process between inputs and outputs are unknown, they are limitations for evaluation. In response to the points made, what work has been done in education to measure academic productivity using quantitative measures and how could be applied in Indonesian Educaation universities? In response to these questions, it is intended in the research presented, studying techniques for analyzing the productivity applicable to Indonesian Education universities. The concept in solving this problem was first introduced by Malmquist [2] and has further been studied and developed in the non-parametric framework by Caves et al [3], Fare et al [4, 5] and Cooper et al [6].

Malmquist Methods was first developed to measure the technical changes in Total Factor Productivity (TFP) [4]. This method evolved to another field and service such as health [7], financial services and banking [8]. The Malmquist index approach to productivity measurement has many advantages. It is an index representing Total Factor Productivity (TFP) growth of a Decision Making Unit (DMU). This index reflects (1) progress or regress in efficiency along with (2) progress or regress of the frontier technology between two periods of time. It is based on multi input-output frontier representations of the production technology [9]. Malmquist index is defined using a distance function by decomposing the changes in total factor productivity into two interrelated components: changes in technical productivity and technical efficiency. In the empirical context, the results are obtained using mathematical programming techniques (DEA) that rely on minimum assumptions regarding the shape of the production frontier. Finally, the index decomposes into multiple components to give insights into the root sources of productivity change. DEA-based Malmquist productivity index measures the technical and productivity changes over time.

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2 OBJECTIVE

Methodology consists of four phases: In the first phase of field research and documentation to obtain database and concepts, theories, and background relevant to the measurement of productivity is via Index Malmquist. In the second phase the variables objects of study are chosen in response to the data. In the third phase of the data processing is done. Subsequently, in the fourth phase, analysis of the results is made and the conclusions of the investigation are made. The data used in this work are : (1) the number of student, (2) the number of academic staff, (3) the number of administration staff, (4) the amount of university funding, (5) the number of study program, (6) the number of Doctor, (7) the number research funded, (8) the number of journal and book published, (9) the number of community service, (10) the number of graduated student during one academic year (11) the number of accredited study programs, and (12) the number of patent. All of the data were taken from the Institution Accreditation Report for year 2010, 2011 and 2012 and University annual report. In this study The DEAP software has been used because this software has an output orientation and it is well known that the orientation employed affects the results in terms of returns to scale [4, 10].

3 INTERPRETATION OF RESULT

After the critical and reflective review of the literature relevant to the subject of study, it is found that an appropriate approach to analyze the productivity of the Universities is the Malmquist Index for productivity, introduced by Caves et al in 1982 [3]. This is a relevant method for studying technical productivity, and has an aim to measure the change in productivity in the same unit, between two periods of time. A ratio greater than one indicates Malmquist productivity improvements, while if a values less than unity it implies losses. Malmquist index decomposes productivity changes in technical efficiency and changes due to technological progress between two time periods. Calculation to obtain the level of productivity of the University Education in Indonesia performed using DEAP. Fig. 1 is the initial view of the DEAP software.

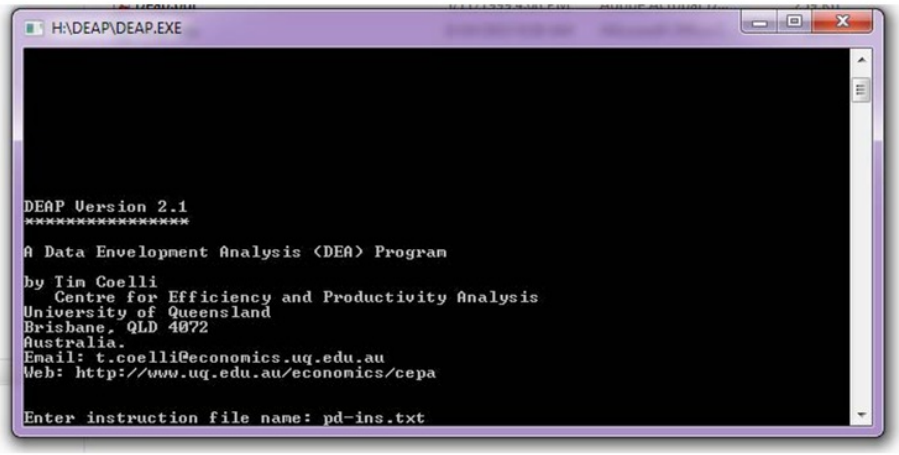

Figure 1. Open Source DEAP

The twelve variables are bases for the calculations, and those are the number of student, the number of academic staff, the number of administration staff, the amount of university funding, the number of study program, the number of Doctor as an input, and the output for this work are the number research funded, the number of journal and book published, the number of community service, (10) the number of graduated student during one academic year the number of accredited study programs, and the number of patent. The result of productivity index showed in fig. 2.

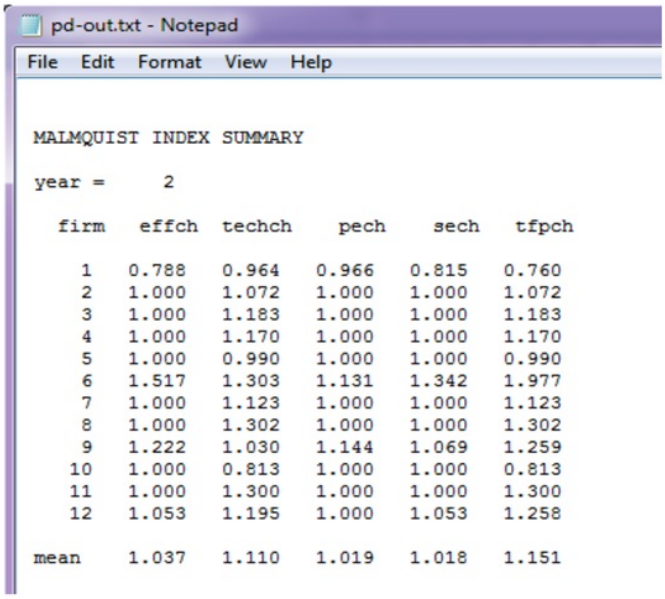

Figure 2. Results of productivity calculation Process with the DEAP

Table 1 shows the changes of TFP relative to the input for the product and for the the year of 2010-2011, 2011-2012. It is noted that for the bienniums, the five universities with greater Malmquist Index to one were UNDHIKSA, UNIMED, UNJ, UM, and UNNES. University with the lowest Malmquist index was UNP, and the highest was UM in 2011-2012.

Table 1. Values of productivities for 2010-2010 and 2011-2012

Number	University	TFP 2010-2011	TFP 2011-2012	TFP average
1	UNIMA MANADO	0.76	1.171	0.9655
2	UNDHIKSA SINGARAJA	1.072	1.22	1.146
3	UNIMED MEDAN	1.183	1.048	1.1155
4	UNG GORONTALO	1.17	0.935	1.0525
5	UNM MAKASAR	0.99	1.062	1.026
6	UNESA SURABAYA	1.977	0.992	1.4845
7	UNJ JAKARTA	1.123	1.344	1.2335
8	UM MALANG	1.302	1.406	1.354
9	UNNES SEMARANG	1.259	1.115	1.187
10	UNY YOGYAKARTA	0.813	1.049	0.931
11	UPI BANDUNG	1.3	0.936	1.118
12	UNP PADANG	1.258	0.873	1.0655

The full of this study showed the followings: the universities that were technically productive, UNDHIKSA, UNJ, and UM increased productivity during the two periods, while UNIMED and UNNES, another productive units, productivity had decreased in 2011-2012. All other units had a difficulties to achieved the productivity or maintain their productivity in standard.

4 CONCLUSIONS

In this paper a study of techniques for analyzing the productivity applicable to Indonesian Education Universities in the 2010-2011 and 2011-2012. The database used consists of six inputs and six outputs from University accreditation report and academic year report. It was found that Malmquist Productivity Index is appropriate and innovative technique that can be used in the performance evaluation between universities, applicable to Indonesian universities. Their strengths are the ability to provide useful information to improve the productivity of the organization, providing academic managers tools that allow managers to establish the productivity variation measurement in a single unit between two periods, and keeping fixed the reference technology; that is, that unity which is used as reference optimum. Finally it is concluded that the use of these techniques allow real measures of academic processes, to determine the relationship between the variables considered and consequently optimize the academic administration at universities with innovation criteria.

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