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CONCEPTUAL ASSESSMENT OF RELATIONSHIP BETWEEN ALLOCATIVE EFFICIENCY AND CORPORATE PERFORMANCE OF QUOTED INSURANCE COMPANIES IN NIGERIA

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ABSTRACT: *The study is on assessment of the allocative efficiency and hence evaluating the interplay between the level at which quoted insurance companies in Nigeria economically employ and utilize available resources and the overall performance in term of profitability, turnover and return on investment. The study adopted an input orientated DEA methodology to assess the allocative efficiency of quoted insurance companies in Nigeria under the assumption of variable return to scale. Four input variables: management expenses, net premium, shareholders' fund and total assets and four output variables: investment income, net claims, and profit after tax and market share return on equity, were used for the assessment. The result revealed a high degree of input slacks of input variables in twenty-three insurance companies. This means that there was excess input that was not properly allocated to produce the necessary output. The result also revealed output fall, which occurred in twenty-three companies. This output fall would not have occurred, if the input variables had been properly allocated. It was discovered that the majority of insurance firms in Nigeria, especially small-scale ones, continue to operate inefficiently in terms of allocation and utilization of resources*

KEYWORDS: allocative efficiency; management expenses; net premium; shareholders' fund; total assets; investment income; net claims; profit after tax; market share return on equity; data-envelopment analysis; insurance companies.

INTRODUCTION

The insurance industry in Nigeria has witnessed a great deal of mismanagement and misappropriation of resources in the last few years (Agiobenebo & Ezirim, 2017; Adeeko, 2015). This shows that there are some inherent managerial issues that continue to act as obstacles to the growth and development of this sector (National Insurance Commission, 2016). As important as the insurance sector is to the growth and development of the Nigerian economy, especially with regard to the underwriting of risks inherent in the economy and the mobilization of large amount of funds through premiums for short- and long-term investments, it has been observed over time that the sector contributes insignificantly to this growth and development by way of gross domestic product. A large percentage of insurance companies in the market are still small, due to low-premium income. This is further worsened by the apathy of the people towards insurance services. According to Erhabor (2017), the insurance industry

in Nigeria covers just five percent of the nation's population that are insurable. Besides, the insurance industry in Nigeria is under-capitalized, hence most insurance companies find it very difficult to retain a reasonable proportion of large risk, which they undertake (Erhabor, 2017). Over time, this has made it possible for foreign insurance companies, which dominate high-risk businesses in oil and gas, to thrive, thus encouraging capital flight to other countries. Therefore, the majority of insurance firms in Nigeria, especially small-scale ones, continue to operate inefficiently in terms of allocation and utilization of resources (Barros & Obijiaku, 2017).

The scale and scope, under which insurance companies in Nigeria operate, are not the types that could make them allocate and utilize resources at the optimal level; hence the industry fails to attract high level of investment, unlike deposit money institutions, which attract a high level of investment interest. It is on record that the National Insurance Corporation in Nigeria (NAICOM) has, on several occasions, accused insurance companies of not actually living up to expectations in terms of delivery of insurance services and meeting up with regulations and procedures that govern their activities (NAICOM, 2015). Many of them do not attract investors funding, as their level of resource utilization and allocation is generally poor. Major marketers of insurance services, by way of commissioned agents are not adequately compensated hence their turnover rate is low. Many insurance companies operate multiple products and multiple services, which their capacity and ability cannot easily cope with and this leads to delivery of poor services (Usman, 2018). These problems have attracted the attention and interest of financial analysts, academics, researchers, stock market consultants, investors, insurance regulators and the government in the last few years. besides, interest in the scientific method of assessing insurance companies' allocative efficiency has further been heightened by the global economic and financial meltdown, which occurred during the period of 2008/2009 (Asimakopoulos, Samitas, & Papadodonas, 2019).

There is, therefore, the need to assess the allocative efficiency and hence evaluate the level at which quoted insurance companies in Nigeria economically employ and utilize available resources. This will help to maximize output and deal with the problem of capital inadequacy and insufficient demand for optimal performance of the insurance industry, especially because of dwindling oil funds from the oil market. This is so because, when a company is sound in terms of efficiency and performance, the demand for its products and services will increase. Besides, the increased competition at the national level, especially as it relates to insurance market, has placed insurance companies in a competitive environment. As a result, quoted insurance companies in Nigeria would want to upgrade and improve their efficiency in relation to their rivals, so as to be able to compete effectively in the market place. however, to the best of the researchers' knowledge, especially from the review of the theoretical and empirical literature, it appears that, while many studies on efficiency and performance of the insurance industry have been conducted in the developed countries (Diacon, Starkey, O Brien & Odindo, 2012; 2006; Rosko, 2012; Wang & Lall, 2013; Ennsfellner, Lewis & Anderson, 2014; Cummins & Rubio-Misas, 2016 Yao & Sumiter, 2017) only quite a few have been conducted in developing countries, like Nigeria. (Barros & Obijiaku, 2017; Barros, Guglielmo & Ibiwoye,

2018; Usman, 2019). This study assesses the allocative efficiency of quoted insurance companies in Nigeria with the aid of data-envelopment analysis (DEA).

Research Objective

The main objective of this study was to assess allocative efficiency and corporate performance of quoted insurance company in Nigeria. Specifically, this study:

i. assessed the effect of allocative efficiency on production turnover of quoted insurance company in Nigeria

ii. examined the effect of allocative efficiency on profitability of quoted insurance company in Nigeria

Research Questions

The following questions are raised and to be answered in the course of this study:

i. what is the effect of allocative efficiency on production turnover of quoted insurance company in Nigeria?

ii. what is the effect of allocative efficiency on profitability of quoted insurance company in Nigeria?

Research Hypotheses

The following hypotheses are formulated and tested at 5% significant level:

H_{01}: there is no significant effect of allocative efficiency on production turnover of quoted insurance company in Nigeria;

H_{02}: there is no significant effect of allocative efficiency on profitability of quoted insurance company in Nigeria.

Justification of the Study

Economics experts assume that companies (producers) in an economy always operate efficiently, however in real terms, producers (companies) are not always fully efficient. This difference may be explained both in terms of efficiency, as well as unforeseen exogenous shocks outside the producer (companies) control. This research aims to analyse the productive (allocative) efficiency estimation through a Data-envelopment analysis (DEA) approach. Particularly, this paper focused on the analysis of the efficiency function, in order to provide a solid background for allocative efficiency estimation in respect of insurance businesses in Nigeria. The insurance sector in Nigeria has witnessed a great deal of mismanagement and misappropriation of resources in the last few years. This shows that there are some inherent managerial issues that continue to act as obstacles to the growth and development of this sector. As important as the insurance sector is to the growth and development of the Nigerian economy, especially with regard to the underwriting of risks inherent in the economy and the mobilization of large amount of funds through premiums for short- and long-term investments, it has been observed over time that the sector contributes insignificantly to this growth and development by way of gross domestic product. Hence it is significant to examine the productive efficiency of the insurance company with respect to their corporate performance.

Scope of Study

The study adopted an input orientated DEA methodology to assess the allocative efficiency of quoted twenty three insurance companies in Nigeria under the assumption of variable return to scale though there over 50 registered insurance companies in Nigeria. Four input variables: management expenses, net premium, shareholders' fund and total assets and four output variables: investment income, net claims, and profit after tax and market share return on equity, were used for the assessment out of many input and output factors in the insurance business.

LITERATURE REVIEW

Allocative efficiency implies the ability of the firm to optimize input, given a set of prices and available technology. The works of Koopmans (1951), Debreu (1951) and Farrell (1957) provide the economic theory underlying the analysis of efficiency. Fried, Lovell and Schmidt, (1994) posit that differences in the scale of operation, differences in production technology, differences in operating efficiency and differences in the business environment, in which production occurs, could be the cause of inefficiency. Leibenstein (1966) states that production process may be influenced by those economic factors internal to a firm, and other factors, that are not directly under the control of management. The assessment of allocative efficiency has been ultimately linked to the use of production-possibility frontiers or functional curves. The modern literature on efficiency in the field of finance and economics started with the study of Koopmans (1951), Debreu (1951) and Farrell (1957) decomposes the overall efficiency of a production unit into its technical and allocative components, with stochastic frontier methods. he characterizes the different ways in which productive units can be inefficient, either by obtaining less than the maximum output available from a determined group of inputs (technically inefficient) or by not purchasing the best package of inputs, given their prices and marginal productivities (allocative inefficient). Fare and Lovell (1978) point out that, under constant returns-to-scale (CRS) assumption, input-and- output-oriented measures of technical and allocative efficiency are the same Forsund and Hjalmarson (1979) and Kopp (1981) state that such an equivalence does not apply when we assume non-constant returns to scale.

Efficiency assessment is a very important means of evaluating corporate performance. The allocative efficiency of a firm is manifested in the form of input and output slacks. Input slack shows the deficiency in potential input consumption by a firm, showing the degree of input over usage. An input slack is a proportion by which input could be reduced and still be able to produce at the same level of output, while output slack, on the other hand, is the proportion by which output could be increased at the current level of input. It shows the deficiency in potential output yield of a firm, being the amount by which output is under-produced by the affected firm. The ultimate goal of producers is to reduce or avoid wastage and maximize output (Simone, 2008). Theoretically, an assessment of technical and allocative efficiency is necessary because it will yield a value of the relative efficiency of different productive systems, which can be compared empirically and this in the long run, enables effective economic planning. for

companies that are out to make a profit and maximize shareholders wealth, it is imperative that they know the proportion by which output could be increased by increasing efficiency without any further addition to input usage.

Empirical Literature on Data Enveloping Analysis, Corporate Performance and Allocative Efficiency of Companies.

Worthington (2001) assessed the inefficiency in Turkish educational system, using data-envelopment analysis. This methodology was preferred to regression analysis, which lacked the allowance for the trade-off in the outcomes that existed between different educational centres. The result revealed gross inefficiency in the Turkish educational system. He also assessed the performances of the firms in the textile and apparel industry of Turkey, using data-envelopment analysis, where input and the output parameters were selected differently, and concluded that the Turkish textile and apparel industry was relatively efficient. In a similar manner, Simon and Wilson (1998) adopted a bootstrap procedure, as a solution, to perform the desired inference under data-envelopment analysis methodology, using input-oriented model. Coell (1999) estimated the technical and relative efficiency of manufacturing companies in America, using a developed procedure of stochastic frontier and data-envelopment analysis. the results revealed that manufacturing companies in America were relatively inefficient.

Liu, Lin, and Lewis (2010) used data-envelopment analysis to analyze and compare the relative and allocative efficiency of manufacturing companies that operated in China and Turkey. The inputs variables were: inventory turnover, the number of workers, receivable turnover, assets/debts ratio, total cash flow, plant and equipment/total assets ratio and current ratio, whereas the output variables utilized were: earnings before interest and tax margin, sales growth, net income per share, income per worker. The canonical correlation analysis results indicates that manufacturing companies in China are more highly efficient than manufacturing firms in Turkey. Conclusively, these researches support and affirm the application of data-envelopment analysis in the assessment of firm efficiency through the undertaking of varying degrees of processes and models. However, the application of data-envelopment analysis model depends on the level, type and number of input and output. This automatically implies that there is no clear-cut test for best specification with regard to the most suitable and appropriate input and output variables for data-envelopment analysis.

Barros, Nektarios and Assaf (2010) used data- envelopment analysis to analyze the effects of deregulation on the technical and allocative efficiency of the insurance firms in Greece. The assessment was to regard the efficiency scores to examine the hypotheses that insurance was determined by different contextual variables and this was based on a procedure in two stages. They also assessed the impact of environmental factors on the efficiency of the insurance firms in Greece by adopting the double-bootstrap procedure in a regression that was truncated. The external variables used were the structure of ownership, market's share, size, stock exchange listing and capital structure. It was found that market share had a positive effect on efficiency. El-Mashaleh, Rababeh and Hyri (2010) benchmarked the safety performance of forty-five contractors in the construction industry, utilizing a developed data-envelopment analysis, with a CCR-oriented approach. The result of the research revealed that only eight contractors were

considered to be superior and therefore under the safety performance net. Tahir and Yusof (2011) estimated the technical and scale and allocative efficiency of 14 public companies, listed on the Malaysian stock Exchange by adopting the data-envelopment analysis with input-oriented assumptions. Total assets and total expenses were employed as input variables while sales revenue was employed as the output variables. At the end, it was observed that only one company was relatively efficient.

Fenn, Vencappa, Diacon, Klumpes and O'Brien (2008) use stochastic frontier analysis to assess the cost efficiency and to explore variations in efficiency as it relates to firm size and market structure of insurance firms in Europe. They assess the effect of trade liberalization of the insurance market in Europe by utilizing a flexible functional form frontier for life, non-life and composite insurers, which are the three dominant insurance businesses operating in Europe. The results reveal that the inefficiency of specialist insurance firms increases with companies' size. The magnitude of the inefficiency for composite firms appears to be low and varied with company size.

Luhnen and Martin (2008) contend that there is a controversy among researchers as to whether claims or premiums are the most appropriate for value added approach when it comes to choosing output variables. This assertion was made when they found that out of the eighty-seven studies reviewed, seventy-four used the value-added approach to choose their output variables. They also discovered that forty of the researchers reviewed utilized claims as output variable, while thirty-one used premiums as output. It was observed that two of the studies used both claims and premiums as output variables, while one used neither. It was therefore concluded that there were no established criteria as to the suitability or appropriateness of proxies chosen.

Joshi and Singh (2009) used data-envelopment analysis model to assess the productive efficiency of ready-made materials in the textile industry of Ukraine. A number of stitching machines and a number of operators were used as input variables, while the numbers of garment pieces created were used to output variables. Under the assumption of constant returns to scale, the result revealed that firms in the Ukraine textile industry were inefficient. It was therefore recommended that firms should increase their outputs by twenty five percent while operating at the current level of input.

Mohammed and Samwel (2015) used the data envelopment model and the Mann-Whitney test to analyze the efficiency of life Assurance Companies in Kenya and found that the average level of efficiency had declined over time. The results from the Mann-Whitney test indicated that this decline was statistically significant. The efficiency of life insurance companies had thus deteriorated over the period of study. Specialization in life insurance and not offering composite insurance negatively affected the insurer efficiency. The regression analysis of the external factors on efficiency scores, using the boots-trapping procedure, shed some light on the possible drivers of efficiency in the life insurance sector. The study revealed that the size of the insurer and stock exchange listing positively and significantly influenced the technical and allocative efficiency of life insurance firms.

Barros, Guglielmo and Ibiwoye (2018) study the efficiency of Nigerian Insurance Companies and discovered that the Nigerian insurance companies were, on the average, relatively inefficient. They therefore, posited that there was room for their levels of efficiency to be upgraded, specifically in the case of those companies below the mean. Too much expenditure on the cost factors added to inefficiency, particularly when this expenditure was not converted into output. Usman (2013) sought to find out the scale Economies and Performance Evaluation of Insurance Market in Nigeria, using the Cobb-Douglas cost and profit functional models to investigate the performance of randomly selected insurance firms. the outcome of this study suggests that a few insurance firms I n Nigeria generally do not pay claims, thus establishing possible reasons why there is apathy for insurance services among the insuring public. Labour price is significant in this study, but shows an inverse relationship with business performance.

Osamwonyi and Imafidon (2015) studied the allocative efficiency of quoted manufacturing firms in Nigeria. The result revealed that there was an inefficient allocation of resources with the presence of high slacks for the input and output variables. They, therefore, recommendation that total assets and shareholders' equity be reduced from their current allocations and be shifted to alternative production activities.

METHODOLOGY

The population of the study consists of all insurance firms that existed and operated in Nigeria as at December 2020. it is on record that fifty-eight (58) insurance companies existed, while twenty three (23) of them were quoted on the Nigerian stock Exchange (NSE, 2018). All quoted (23) insurance companies constitute our sample for this study. Data are sourced from the annual reports and accounts of the insurance companies in the sample because they were all active during the period of investigation.

Measuring Allocative Efficiency: Inputs and Outputs Variables

By reviewing the earlier researches, this study identified the input and output variables which were common among all insurance companies. Specifically, the inputs data collected in this study are operating/management expenses (labour business services and materials in the form of management expenses plus commissions), net premiums earned (total premium earned less reinsurance ceded), total assets (non-current and current assets) and shareholders fund (capital and surplus represented by shareholders fund on the annual reports) while the output variables are investment income (portfolio of invested assets, premiums, reinsurance and other assets), net incurred claims (total incurred claims less transaction costs/expenses), total market share(percentage of the total market for insurance that is being controlled by individual companies) and profit after tax (total profit earned after tax deductions).

Data-envelopment analysis (DEA)

Data-envelopment analysis (DEA) is used for assessing the productive efficiency of Decision-making units (DMUs), measuring their relative efficiency, comparing them to each other and determining the most efficient ones. It is a fractional quantitative programming technique that

was developed and introduced by Charnes, Cooper and Rhodes in 1978. This analysis determines the productivities of decision-making units. Therefore, mathematically, it is specified as the ratio of the weighted sum of outputs to the weighted sum of inputs. Annual data of twenty three (23) insurance companies for the period 2000-2020 were considered. We could not go further because data were not readily available for subsequent years. Therefore, the choice of input and output variables is in harmony with the DEA principle that the total number of decision-making units (DMUs) must be greater than the number of inputs and outputs variables multiplied by three. The multi-stage DEA input-oriented VRS (variable returns to scale) approach was used to assess the allocative efficiency of quoted insurance companies in Nigeria.

The finding of the study by Brien and Odindo (2012) that the efficiency of the twenty-three companies is attributable to the underutilization of some of the inputs, which means that these companies are getting less output per unit of input for these resources. This finding also confirms that of the study by Hardwick (1997), which revealed allocative inefficiency as leading to under utilization of resources and high cost of production. On the other hand, the output fall (slack) mean are: 112,671,987 of investment income, 129,883.188 of net claims, 137,499.095 of profit after tax and 162,667.393 of market share. The output fall occurs in twenty-three companies, while eleven companies, which operated on the efficient frontier, did not experience any output fall. This output fall would not have occurred, if the input variables had been properly allocated.

The study adopted an input orientated DEA methodology to assess the allocative efficiency of quoted insurance companies in Nigeria under the assumption of variable return to scale. Four input variables: management expenses, net premium, shareholders' fund and total assets and four output variables: investment income, net claims, and profit after tax and market share return on equity, were used for the assessment. The result revealed a high degree of input slacks of input variables in twenty-three insurance companies. This means that there was excess input that was not properly allocated to produce the necessary output. The result also revealed output fall, which occurred in twenty-three companies. This output fall would not have occurred, if the input variables had been properly allocated. This may be the reason why the operations of quoted insurance companies do not any significant impact on the Nigerian economy. This study, therefore, provides an opportunity for insurance companies to realize that their current operations lead to wastage of resources in the insurance sector and the economy at large. In an economy characterized by recession, as in Nigeria, the insurance companies cannot afford to have these input resources wasted. Therefore, more deliberate attempts should be made by managers of quoted insurance companies to avoid these wastages and improve their efficiency relative to their rivals, so that they can attain and remain on the production possibility frontiers.

Summary of Findings

In summary, in Data-envelopment analysis (DEA), it is acknowledged that the estimation of production turnover functions must respect the fact that actual production cannot exceed maximum possible production given input factors. There is an extensive body of literature on factors influencing productivity and profitability growth. In this research, it is observed that

insurance companies are homogeneous producing units and, they are not all operating at the same level of allocative efficiency. Our findings revealed that producers (insurance companies) are more efficient than others. Analyses shown that productivity level considerably differ. While some insurance companies operate at the technological frontier and earn high profits, others lag considerably behind. As a management tool, Data-envelopment analysis (DEA), analysis focuses on allocative efficiency analysing variables under decision-makers' control. These factors are neither inputs to the production process nor outputs of it but nonetheless exert an influence on producer performance.

CONCLUSION

The study adopted an input orientated DEA methodology to assess the allocative efficiency of quoted insurance companies in Nigeria under the assumption of variable return to scale. The study is of crucial importance as it applied data envelopment analysis and accounting indicators to measure allocative (production) efficiency and financial (corporate) performance of the insurance companies. Four input variables: management expenses, net premium, shareholders' fund and total assets and four output variables: investment income, net claims, and profit after tax and market share return on equity, were used for the assessment. The result revealed a high degree of input slacks of input variables in twenty-three insurance companies. This means that there was excess input that was not properly allocated to produce the necessary output. The result also revealed output fall, which occurred in twenty-three companies. This output fall would not have occurred, if the input variables had been properly allocated. Based on the results, major portion of the tested insurance companies showed production efficiencies and profitability positions below the industry average. This may be the reason why the operations of quoted insurance companies do not any significant impact on the Nigerian economy. This study, therefore, provides an opportunity for insurance companies to realize that their current operations lead to wastage of resources in the insurance sector and the economy at large.

Recommendation

In the light of the foregoing findings of this study, the following recommendations are proffered:

a. The inputs slacks for management expenses, profit after tax, shareholders fund and total assets show that the inefficiency of quoted insurance companies Nigeria is attributable to under-utilization of input factors. This leads to wastage of resources in the insurance sector and the economy at large. In an economy characterized by recession, as in Nigeria, the insurance companies cannot afford to have these input resources wasted.

b. The utilization of total assets and shareholders' fund should be improved upon because they recorded the highest input slack scores. This should be done through the formulation of policy guidelines for the effective use of total assets and shareholders' equity by stakeholders in the insurance sector. More conscious efforts should be made to increase firms' total market share and profit after tax for efficiency purposes, since they recorded the highest output slacks. this is possible, if quoted insurance companies improve their creation of awareness by engaging in aggressive advertizing, since proper and effective promotional tools. These may include

electronic marketing, media advertisement, exhibitions, publicity, sales promotion with appropriate incentives and effective personal door-to-door selling, so as to enhance feedbacks.

c. These will encourage increase insurance patronage, which will, in the long run, lead to improved market share and profit after tax.

d. Quoted insurance companies should, therefore, rationalize their input resources, like management expenses, by engaging in staff rationalization or rightsizing. This is necessary to reduce the expenses and costs of the companies. Disengaged staff of the companies can be deployed to their subsidiaries to generate additional revenues.

e. The reference ratio workers' input to output should be established to address the problem of over-staffing. If a member of staff has to be disengaged, the companies should be ready to fund the outstanding gratuities and pension of the staff concerned.

f. Quoted insurance companies should also engage in the rationalization of resources by reallocating some of the resources to other areas of their operations, which are more profitable. Those operating in the region of increasing return to scale should embark on outsourcing of resources to other firms. This will reduce wastage and increase profit in the long run.

g. In an economy characterized by recession, as in Nigeria, the insurance companies cannot afford to have these input resources wasted. Therefore, more deliberate attempts should be made by managers of quoted insurance companies to avoid these wastages and improve their efficiency relative to their rivals, so that they can attain and remain on the production possibility frontiers.

h.

i. Finally, insurance standards and information banks should be created for the availability and use of resource inputs at all stages of insurance operations in Nigeria. These standards should include the quantity and quality of resource inputs as well as those of outputs in the midst of scarce resources inherent in a recessive economy.

Limitation to the study

In this study, we observed that both internal and external factors influences the efficiency of a insurance companies, there are factors that are not traditional inputs and are not under the control of management. In other words, some exogenous variables may influence the productive efficiency with which inputs are converted into outputs. In particular, to exhaustively investigate the determinants of the productive efficiency further study need to distinguish between firm / industry -specific and external factors. External factors are not under direct control of the firm, at least in the short-run, as industry affiliation and firm location. Firm-specific factors, on the other hand, refer to characteristics that can be influenced by the firm in the short-run, as firm size, R&D intensity and degree of outsourcing. These factors may express social aspects, geographical or climatic conditions, as well as regulatory and institutional constraints.

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