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Efficiency Performance of GCC Insurance Sector

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Abstract

The objective of this study is to analyse the efficiency performance of *Takaful* and conventional in GCC insurance sector for the period 2015 to 2019. Data Envelopment Analysis (DEA) were used to estimate the efficiency level. Premium and investment income are taken as common output variable while labour, total fixed assets, business services, and equity capital as major input. The results show that the *Takaful* firms are equally efficient compared to the conventional firms. The *Takaful* when compared to conventional insurance is highly technical and pure technical efficient however it is moderately cost efficient and there is a large opportunity for improvement.

Keywords: Takaful, Conventional, Efficiency, Data Envelopment Analysis.

Introduction

The insurance sector plays a pivotal role in the prosperity and development of the socio-economics of the society by mitigating the risk of all economic activities (Lee, 2019). Conventional insurance has been in existence for many centuries so it is deeply rooted thus it benefits from its evolution process, reliability, technical and product range superiority whereas *Takaful* is of a recent origin with facing issues of inefficient use of technology, product range, inadequate *Re-Takaful* firms, regulations inconsistencies, different organizational structure, ineffective use of funds and ineffective management. Thus, the objective of this study is to analyse efficiency performance for *Takaful* and conventional in GCC countries. Since its introduction in 1979, *Takaful* has developed steadily in terms of both volume and demographics, with the estimated *Takaful* assets being around 33 billion USD (Rahman, 2009). According to Al-Amri (2015), Saudi Arabia and Malaysia are the dominant countries in the GCC and South East Asian markets, respectively, where the *Takaful* industry is a highly concentrated market. Therefore, the objective of THIS study is to analyze the efficiency performance of the takaful and conventional insurance companies in GCC countries.

Literature Review

The most used and common efficiency estimation techniques is Data Envelopment Analysis (DEA). Other efficiency estimation techniques are Free Disposable Hull analysis (FDH), the

Stochastic Frontier Approach (SFA), the Thick Frontier Approach (TFA), and the Distribution-Free Approach (DFA).

DEA is a non-parametric approach with linear programming to measure the relationship of produced goods and services (output) to assigned resources (input) and determine the efficiency score. Using data and the DEA methodology, the efficiency is measured for *Takaful* and conventional insurance providers in GCC countries in respect of technical efficiency(TE), scale efficiency (SE), pure technical efficiency (PTE), cost efficiency (CE) and allocative efficiency (AE).

The operating efficiency performance has been examined by many studies relating to *Takaful* and conventional insurance albeit not for the GCC countries. Kader et al., (2010) investigated the cost efficiency in respect of General Insurance companies. The efficiency of life insurance in Malaysia was examined by Saad et al. (2006). Technical efficiency basically measures how effectively the technology is being used when it comes to the inputs to arrive at a certain level of output. Allocative efficiency symbolises how skilful and effective the management chooses the mix of inputs at the given input prices. A cost frontier, however, symbolises the minimum cost required for producing any given quantity of output to reflect the characteristics of a perfectly efficient firm. In an interesting study on the efficiency for the coexistence of *Takaful* and conventional insurance, it was found that *Takaful* has lower efficiency when compared to conventional (Ismail et al., 2011). A very important and recent contribution was made by Roziana (2013) with respect to the cost efficiency. The study highlighted that there is a significant variation in cost efficiency when a comparison is made between the *Takaful* and conventional insurance industry.

Methdology

Data

An unbalanced set of 140 Takaful and conventional insurance companies was selected as the sample population over the period 2015 to 2019. The sample size represents about 90 percent of the GCC market and reflects the fact that the selected sample is the most representative of the GCC. The study is based largely on the primary data collected from the GCC insurance market. These comprises of but not limited to annual financial and audit reports, balance sheet and assets liabilities reports, and income statements of the selected companies.

Data Envelopment Analysis

DEA is a linear programming procedure based on a non-parametric piece-wise surface (frontier) over the data. Efficiency measures are then computed relative to this surface (Fare et al. 1983). The two categories of envelopment surfaces are constant returns to scale (CRS) and variable returns to scale (VRS) models. CRS suggests that if a firm experiences a surge in its inputs or resources, it will experience a proportional surge in its production or outputs. The VRS basically shows that an increase in input does not result in a proportional change. In DEA we use several Decision Making Units (DMUs). They are normally denoted as n DMUs to be assessed with a varying number of diverse inputs to the different outputs. The DEA efficiency score is acquired by taking the maximum ratio of weighted outputs to weighted input. This measurement allows multiple outputs and inputs to be reduced to single ‘virtual’ input (xi) and single ‘virtual’ output (yi) by optimal weights. The following equitation is highlighted by Battese and Coelli (1992):

$$\max (u'yi/v'xi),$$

$$s.t.u'yi/v'xi \le 1,\ j= 1,2,3\ldots, N,$$
$$u,v \ge 0 \qquad (1)$$

The xi variable indicates the number of inputs and yi indicates the number of outputs. Basically, the xi and yi represent data for all the n DMUs. The vector (u' yi / v' xi) highlights the ratio of all outputs over inputs. The efficiency for the *i*th DMU is maximized by finding the values for u and v (where u is an M × 1 vector of output weights and v is a K × 1 vector of input weights) , subject to the constraints that all efficiency measures must be less than or equal to 1.

The efficiency for the *i*th DMU is maximized by finding the values for *u* and *v* (where *u* is an *M* □ *1* vector of output weights and *v* is a *K* □ *1* vector of input weights), subject to the constraints that all efficiency measures must be less than or equal to 1, thus, leading to an infinite number of solutions. To avoid the problem of an infinite number of solutions a constant constraint (□′x_i = *1*) is imposed on Equation 1 above.

$$\max (\mu'yi),$$
$$\mu,\phi$$
$$\phi'xi = 1$$
$$\mu'yi-\phi'xj \le 0,\quad j=1,2,3\ldots, N,$$
$$\mu,\phi \ge 0 \qquad (2)$$

The notations □ and □ indicate the transformation of *u* and *v*. The efficiency measure is then a function of the multipliers of the "virtual" input-output combination, as in Equation 2. It also indicates the multiplier form of the DEA linear programming problem. The envelopment form of the linear programming problem is shown below:

Efficiency measure	Observation	Mean (%)	Standard Deviation	Minimum	Maximum	No. of efficient firms
TE	101	82.06	25.96	25.12	100	17
PTE	101	87.36	22.4	3.27	100	17
SE	101	77	1.232	1	100	17
CE	101	61.04	32.14	9.94	100	11
AE	101	69.38	28.46	13.5	100	13

$$\min \Theta,$$
$$\Theta, \lambda$$
$$yi+Y\lambda \ge 0$$
$$\Theta xi-X\lambda \ge 0$$
$$\lambda \ge 0 \qquad (3)$$

where □ is a scalar and □ is an *N* □ *1* vector of the constant. The value of □ is the efficiency score for the *i*th DMU; it should be solved *N* times, one for each DMU.

Results and Discussion

Table 1

Average Efficiency of Takaful Firms in GCC Countries 2015 -2109

The average efficiency results measured took into consideration 101 *Takaful* firms in GCC countries performing during the period of 5 years from 2015-2019. The efficiency results are mixed. The average TE is 82.06%, which indicates that *Takaful* is efficient in general. The average PTE is on the lower side in terms of standard deviation and minimum value but greater in terms of mean. The average cost efficiency for the period from 2015-2019 is 61.04,

which highlights that *Takaful* firm's average CE is still not up to the mark and has ample room for improvement in coming years of time.

Table 2

Country	Technical efficiency (%)	Cost efficiency (%)
Bahrain	95.2	85.8
Kuwait	67	46
Qatar	91	96.6
Saudi Arabia	69	29.2
UAE	78	57
Total	83.3	67.5

Country-wise Takaful's Average Technical and Cost Efficiency Scores 2015- 2019

The average technical and cost efficiency scores reflect a variation among the GCC countries. Bahrain and Qatar scored the highest average technical efficiency scores of 95.2 and 91 percent respectively, for the period of five years from 2015 to 2019. In terms of cost efficiency, Qatar and Bahrain are considered the most cost efficient for the *Takaful* insurance firms. Although Saudi Arabia and UAE are the biggest *Takaful* market, and their technical efficiency is moderately higher. However, in terms of cost efficiency measures need to be taken.

The following table presents the average efficiency results for conventional firms in respect of TE, PTE, CE, and AE relating to the period from 2015 to 2019.

Table 3

Average Efficiency of Conventional Firms in GCC Countries 2015-2019

As far as the average efficiency taken for the 5 years from 2015 to 2019 for all the conventional firms; technical and pure technical efficiency are on the higher side showing commitment from the management to achieve their task efficiently according to the task given. Whereas CE and AE on the lower efficiency side. The mean is on the higher side whereas standard deviation is on the lower side.

Table 4

Conventional Average Technical and Cost Efficiency Scores for GCC Countries 2015- 2019

Efficiency measure	Total Observation	Mean (%)	Standard Deviation	Minimum	Maximum	No. of efficient firms
TE	93	86.5	18.7	19.5	100	17
PTE	93	89.2	55.2	30.7	100	17
SE	93	88	47	1.25	100	17
CE	93	59.6	26.7	10.6	100	10
AE	93	65.8	27.7	13.9	100	12

Table 4 presents the percentage data related to the conventional insurance firms of the GCC countries. Conventional firms are normally proactive in their approach, and have fewer limitations than the *Takaful* firms, which is why conventional are highly efficient in terms of technical and cost efficiency. The 2015 to 2019 data suggest that Qatar and Bahrain are highly efficient at 96 and 97 percent, respectively, compared to the other GCC countries. Collectively, the conventional firms in the GCC countries show great competence overall in terms of technical and cost efficiencies which are 86.48 and 68.38 percent, respectively.

Country	Technical efficiency (%)	Cost efficiency (%)
Bahrain	97	63
Kuwait	87.3	78.1
Qatar	96	85.3
Saudi Arabia	0	0
UAE	62.1	36.8
Total	86.48	68.38

Conclusions

Over the past few decades, numerous empirical studies have intensively examined the performance of insurance firms. Insurance firms, whether *Takaful* or conventional, have a similar transaction, that is, the selling of insurance protection to the consumers for a consideration. This study focuses efficiency of the conventional insurance and *Takaful* market in GCC countries.

The empirical results of this study are categorised based on the objectives. The first empirical finding is the efficiency of the GCC insurance market between *Takaful* and conventional using the Data Envelopment Analysis (DEA) approach. Firstly, the average technical efficiency (TE), pure technical efficiency (PTE), and scale efficiency (SE) for *Takaful* firms are 82%, 87% and 77%, respectively, hence, there is room for improvement. Secondly, the empirical results show that conventional firm's TE, PTE, and SE are 86%, 89% and 88%, respectively, thereby indicating that conventional firms are effectively utilising the resources through best practice and technological advancements. The efficiency level of conventional firms is slightly higher than that for *Takaful* firms because conventional firms adopt a proactive approach compared to *Takaful* firms. In terms of cost efficiency (CE) and allocative efficiency (AE), *Takaful* firms are 61% and 69%, respectively, while conventional firm's CE and AE are 59% and 65%, respectively.

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