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# Takaful insurance efficiency in the GCC countries

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## Abstract

**Purpose** – The purpose of this paper is to analyze the performance of the Takaful insurance firms in the Gulf Cooperation Council (GCC) countries and do a relative analysis for its different units.

**Design/methodology/approach** – This paper analyzes the technical, pure technical, cost and allocative efficiency of Takaful firms in the GCC countries using data envelopment analysis (DEA) methodology.

**Findings** – The Takaful insurance industry in GCC is highly technical and pure technical efficient. However, it is moderately cost efficient, and there is a large opportunity for improvement. UAE and Qatar score the highest technical efficiency, while Saudi Arabia and UAE are the most cost efficient among the GCC countries.

**Originality/value** – The primary contribution of this paper is to provide the first DEA analysis of the Takaful industry in the GCC countries. To the best of the author's knowledge, this is the first study on the Takaful insurance industry that uses different types of efficiency measures, namely technical, pure technical, allocative and cost efficiency, in the GCC countries. This paper also contributes in the literature of the inputs and outputs selection for the Takaful insurance efficiency calculation.

**Keywords** Efficiency, GCC countries, DEA, Takaful insurances

**Paper type** Research paper

## 1. Introduction

The Gulf Cooperation Council (GCC) is a union involving the six Arab Gulf countries, namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE). These countries are featured by common cultural, economic and political structures. The formation of the GCC as a regional entity on May 25, 1981, was aimed to achieve coordination, integration and interconnection between its members. This essentially implies the harmonization and the gradual unification of different regulations and structures.

Though financial services are usually the main driver of any economic growth, the situation in the GCC was biased toward banking services. The traditional nature of the economic activity in the region favored the development of the financial intermediation activities leaving the other financial service activities underdeveloped. Hence, the insurance sector remained underdeveloped despite the continuous effort of the government regulators to boost it. This was worsened by the continuous debate about the compliance of such an activity with the religious rules, particularly the life insurance products. This led to the creation of non-conventional insurance activity, like in



banking, that are in conformity with the religious principles about sharing the risk rather than selling/buying the risk (Al-Amri *et al.*, 2012).

Takaful (Islamic insurance) offers an alternative way of conducting insurance that is based on co-operative risk-sharing and clear segregation between participant and operator (Alamasi, 2010). The unique structural form of Takaful firms differentiates them from conventional insurance. Takaful has developed hand-in-hand with the global expansion of Islamic banking. Islamic banks have been instrumental in the establishment of approximately one-half of the Takaful companies and in promoting this business concept (Billah, 2007). According to the World Takaful Report 2011, global Takaful contributions grew 31 per cent in 2009, and continued strong growth in the Takaful industry suggests that global contributions should reach US\$12 billion by 2011. Given the structural form and increasing growth and development of the Takaful industry, I believe it is important to assess the efficiencies of Takaful insurance companies.

In these very special market reality and conditions, a deep analysis of the overall efficiency of the sector is needed and the assessment of its performance, to my best knowledge, becomes a must to provide insights about the realities and the future trends of the sector. This study uses data envelopment analysis (DEA) to assess efficiency of the Takaful insurance market in the GCC region and analyzes its variation over the period from 2004 to 2009.

The paper is organized into seven sections. Section 2 presents the Takaful insurance sector in the GCC countries. Section 3 presents the literature review, and Section 4 presents the methodology and data description. Sample data, outputs and inputs are discussed in Section 5. DEA results are described in Section 6, and Section 7 concludes the paper.

## 2. The Takaful insurance sector in the GCC countries

There are many factors that affect the growth of insurance sector in the GCC. First, the demographic influences like an increasing population base, large workforce of foreigners and increasing life expectancy are likely to have an optimistic influence on the demand of insurance products. Second, government investments in different areas for supporting economic diversification are expected to offer new underwriting opportunities. Further, increase of salary levels and low average age of populations propose a solid tendency for obtaining private assets.

Third, carrying out obligatory health insurance programs in different cities is likely to make high growth opportunities for insurers. The increasing sales of new vehicle are expected to have a positive impact on insurance industry. Fourth, improvement in the awareness about the benefits of insurance was driven by the latest political and catastrophic events. This also makes enterprises keener to insure their properties and employees.

The GCC insurance market stayed conventional and was characterized by a small number of product diversifications, particularly for life insurance segment. However, the recent establishment of insurance firms complying with the Shariah (Islamic law), namely Takaful, which means “solidarity”, offering non-life insurances initiated by Islamic banks, created a new momentum in the market by generating new products largely inspired from the conventional products. These new products are often advised as alternatives to the conventional products offered elsewhere and even in the region by

international insurer. There is even a recent interest by international firms in offering similar products, imitating international banks that are engaged in Islamic banking (Al-Amri *et al.*, 2012).

Since 2000, the Islamic insurance sector has been growing more than 15 per cent per annum, yet the market is still at its tip, especially in the Middle East and Southeast Asia. The demand for Islamic insurance products has grown over the past few years, particularly within the GCC, as there is a shift toward ethical, innovative and Shariah-compliant financial solutions. This demand has also resulted in the launching of new Islamic insurance products, and these services are not only provided by Islamic countries, but also by American, European and Asian companies.

### *2.1 Future trends of Takaful insurance sector in the GCC countries*

As a result of their higher technical skills, distribution experiences, customer orientation and financial sound, the foreign insurers are anticipated to further expand their presence in the Gulf. Moreover, enterprise risk management (ERM) is still at the nascent stage in the region. Yet, insurance companies are continuously realizing the necessity of having more reliable and methodical risk management processes for the future.

The recommended unified insurance scheme for motors may generate some tuning in insurance rates across the region. It may also ease the way toward enhancing unification measures within the insurance sector. Further, the new distribution channels like Bancassurance and online policy approvals are gradually becoming common. Islamic banks are likely to arise as a key medium in the marketing and sales of family Takaful products.

The regional insurance companies have shifted their investments toward relatively low-risk investments while dropping their exposure to equities. This practice has helped them to reduce risk and volatility in investments and generate relatively stable returns. With the expending of business operations and construction work in the Gulf, captive insurance is expecting to witness a strong potential growth.

Low level of insurance penetration, even with strong primary growth factors, remains to offer considerable opportunities to insurers in the GCC. The region's insurance sector is also anticipated to structurally advance going forward, consistent with optimistic regulatory reforms and efforts by some companies toward achieving better operational scale and efficiency.

### **3. Literature review of Takaful**

Unlike conventional insurance literature, the Takaful insurance literature is very limited, as it has been in the market for not a long time and because of few experts in this special type of insurance.

Most of the studies in the Takaful have been focused on the concepts and the framework of the Takaful companies, as many people have little or no information about Takaful insurance both in Islamic countries and western countries. The concepts papers try to explain how the Takaful works and the differences between the conventional insurance and Takaful insurance, and the different types or model of Takaful (Wahab *et al.*, 2007; Alamas, 2010; Taylor, 2004; Maysami and Kwon, 1999; Kwon, 2007; Yazid *et al.*, 2012). There are a few studies that focus on *microtakaful* (Altuntas *et al.*, 2011; Kwon, 2010).

Altuntas *et al.* (2011) try to provide an answer to the question whether Takaful insurance companies can be profit-maximizing firms. They compare a Takaful operator with a clear business objective and a Takaful operator which focuses on a non-business-related objective (i.e. to support the needy) in an environment that makes it difficult to generate profits: the Indonesian microinsurance market. The study shows that Takaful insurance can indeed be successfully offered on a for-profit basis. They conclude that growing Muslim population in the USA represents an interesting business opportunity for the US insurers in their home country.

Another line of research in Takaful is efficiency studies and its applications in corporate governance and organizational form. Kader *et al.* (2010) examine the cost efficiency of non-life Takaful insurance firms. They find that non-executive directors and separating the Chief Executive Officer's and Chairman's functions do not improve cost efficiency. However, board size, firm size and product specialization have positive effects on the cost efficiency of Takaful insurers. Saad *et al.* (2006) investigate efficiency of the life insurance industry in Malaysia. Both conventional insurances and Takaful companies are comparatively analyzed. Overall, Takaful National has been found to be below average in TFP but slightly above average for technical change (TECch). However, in the case of efficiency and pure efficiency change, Takaful National was below average. Ismail *et al.* (2011) conduct an efficiency analysis for the coexistence of family Takaful and conventional insurance. They found that Takaful has lower technical efficiency (TE) than conventional insurance. Yakob *et al.* (2012) identify factors that affect the solvency of the insurers/Takaful operators in Malaysia. It is determined that investment income, total benefit paid to capital and surplus ratio, financial leverage and liquidity are significantly related to solvency, in which the investment income has a positive relationship, while the other three have a negative relationship.

#### 4. Methodology

For a given Takaful insurer, an overall cost-efficiency score reflects both "technical" and "allocative" efficiency. Technical efficiency measures how efficiently technology is used in the use of inputs to achieve a given level of output. Allocative efficiency refers to how efficiently management chooses the mix of inputs at given input prices. A cost frontier shows the minimum cost of producing any given quantity of output for a perfectly efficient firm. Takaful insurance firms may fail to reach the production and cost frontiers because of technical and/or allocative inefficiencies – that is, because they fail to get the best out of their inputs and/or they fail to use the cost-minimizing combination of inputs.

Technical efficiency can be further subdivided into "pure technical efficiency" and scale efficiency. PTE measures how far a Takaful insurer is away from the production or cost frontier under conditions of variable returns to scale, while scale efficiency measures the relative production loss (or cost increase) caused by a deviation from a constant returns to scale frontier. Thus, scale inefficiency may be associated with either increasing returns to scale (economies of scale) or decreasing returns to scale (diseconomies of scale).

Cost efficiency for a given firm is defined as the ratio of the costs of a fully efficient firm (a firm operating on the efficient cost frontier) with the same output quantities and input prices to the given firm's actual costs. Firms achieve cost efficiency by adopting

the best practice technology (becoming technically efficient) and choosing the optimal mix of inputs (becoming allocatively efficient) (Banker and Maindiratta, 1988). Cost efficiency is the product of pure technical, scale and allocative efficiency:  $CE = PTE \times SE \times AE$ .

In applying DEA, I assume that Takaful insurers attempt to minimize the cost of using various inputs to produce outputs, which are sold to policyholders in an attempt to maximize profits. The minimum cost function or cost frontier is defined using the distance function approach (Cooper *et al.*, 2004). Let  $x_j = (x_{1j}, x_{2j}, \dots, x_{mj})^T \in \mathfrak{R}_+^m$  denote the input vector from Takaful firm  $j$ ,  $y_j = (y_{1j}, y_{2j}, \dots, y_{nj})^T \in \mathfrak{R}_+^n$  denote the output vector from firm  $j$  and  $w_j = (w_{1j}, w_{2j}, \dots, w_{mj})^T \in \mathfrak{R}_+^m$  denote the input price vector from Takaful firm  $j$ . Then, the cost frontier is:  $C(y_j, w_j) = \text{Min}_{x_j} \{w_j^T x_j; x_j \in V(y_j)\}$ .

Where  $C(y_j, w_j)$  = the cost frontier of Takaful firm  $j$  with output-input vector  $(y_j, x_j)$ . The optimal vector  $x_j^*$  minimizes the costs of producing  $y_j$  given the input prices  $w_j$ . Cost efficiency from Takaful firm  $j$  is calculated as  $\eta_j = w_j^T x_j^* / w_j^T x_j$ , where  $x_j$  represents actual input usage and  $0 < \eta_j \leq 1$ .

## 5. Sample data, outputs and inputs

This section describes the data and discusses the measurement of outputs, inputs and prices used in estimating efficiency. The section concludes by presenting summary statistics. To conduct the analysis, I use an unbalanced panel data set of 115 firm-year observations for the period 2004-2009, including Takaful insurance companies of varying size, ownership structure and product mix in each year. Financial data for these sample firms are reported in the World Islamic Insurance Directory 2008, which covers 2004-2006, and World Islamic Insurance Directory (2011), which covers 2007-2009. The analysis is based on “best practice” efficient frontiers estimated for sample insurance companies over the period 2004-2009. To allow standardization of the financial data, all monetary amounts were converted to US dollars at the end-of-year exchange rates reported by the World Bank and deflated by the consumer price index (CPI) to year 2005.

I assume that Takaful insurers use inputs to produce outputs in the form of insurance policies. Because these outputs are intangible, they are difficult to measure. One approach is to identify the services that Takaful insurance companies provide and then derive proxies that are likely to be closely correlated with these services. Takaful insurance companies, like their Western counterparts, are involved in risk-pooling and risk-bearing by selling insurance products in various lines of business, such as motor and property insurance.

I assume Takaful insurance firms produce six major risk-pooling and risk-bearing outputs proxied by premium income: (a) motor vehicle insurance premium; (b) property (fire) insurance premium; (c) accident insurance premium; (d) marine and aviation insurance premium; (e) family (life insurance) premium; and (f) other insurance premium. In addition to considering risk-pooling/risk-bearing services, I also account for the intermediation function of borrowing from policyholders and investing the funds in marketable securities. Investments, representing intermediation services, are used here as another output.

Given the limited availability of data, I use “gross contributions” (i.e. gross premiums) to proxy the risk-pooling and risk-bearing outputs because these are available in the data. I recognize that premium income as an output indicator is a measure of revenue (i.e. price multiplied by quantity). “Incurred benefits” as a proxy for expected claims or losses has also been used in the academic literature on the efficiency

of insurance companies. Unfortunately, incurred benefits are not included in our data. However, I can rationalize the use of premiums as an output proxy as premiums are likely to be highly correlated with a company's expected losses. Table I summarizes the inputs and the outputs used for efficiency calculation.

## 6. Results

The DEA results are based on the output maximization model, known as the output-oriented approach. In this approach, the output is determined while holding input constant. The DEA model was run twice, once under the constant returns to scale assumption and then under the variable returns to scale assumption. Constant returns to scale assumes that there is no significant relationship between the scale of operations and efficiency; thus, small insurance firms can be as efficient as large insurance firms in converting the specified inputs into the specified outputs. DEA under a VRS assumption is run to check for scale inefficiency.

Inputs	Proxy				
<i>Panel A: definition of inputs, input prices and outputs</i>					
Labor	Number of employees				
Debt capital	Technical provision				
Equity capital	Shareholders' equity				
<i>Input prices</i>					
Price of labor	Operating expenses/number of employee				
Price of debt capital	Rate of return on debt				
Price of equity capital	Long-term average stock market return indices				
<i>Outputs</i>					
Losses incurred	Premium income: motor, fire, accident, marine and aviation, family and other				
Investments	Total investment				
Variable	Unit	Mean	SD	Minimum	Maximum
<i>Panel B: summary statistics for variables used</i>					
Labor	Quantity	132.59	218.92	7	1,168
Debt capital	Million \$	388.45	25.78	42.32	22,000
Equity capital	Million \$	3,967	2,426	1,253	19,000
Price of labor	\$	175.78	44.66	13.09	229.24
Price of debt capital	%	8.37	1.35	5.64	11.6
Price of equity capital	%	14.81	2.93	5.06	16.91
Motor	Thousand \$	49.81	32.32	0	3,100
Fire	Thousand \$	11.31	51.81	0	478.57
Accident	Thousand \$	59.60	43.33	0	465.87
Marine and aviation	Thousand \$	75.73	57.74	0	5,500
Family	Thousand \$	89.31	71.91	0	771.60
Other premium	Thousand \$	66.78	21.73	0	1,500
Investments	Million \$	503.29	32.13	187.47	25,000

**Note:** The values are winsorized at the 5% and 95% level

**Table I.**  
Inputs and outputs

Using the preceding DEA methodology and data for the insurance firms, technical efficiency (TE), pure technical efficiency (PTE), cost efficiency (CE) and scale efficiency (SE) annual scores are calculated for the period from 2004 to 2009. A summary of thee are presented in [Table II](#) below; the average efficiency scores for each year in the sample period are included in the table.

Efficiency measure	Observation	Mean (%)	SD (%)	Minimum (%)	Maximum (%)	No. of efficient firms
<i>2004</i>						
TE	19	97.78	5.22	82.53	100	14
PTE	19	99.93	0.26	98.84	100	17
CE	19	93.80	12.77	55.78	100	13
AE	19	81.92	17.41	52.54	100	6
<i>2005</i>						
TE	17	95.39	10.77	67.77	100	14
PTE	17	96.45	10.01	69.67	100	15
CE	17	95.69	12.16	62.84	100	15
AE	17	90.52	15.83	56.26	100	11
<i>2006</i>						
TE	22	93.64	12.13	57.81	100	14
PTE	22	94.87	11.56	59.30	100	17
CE	22	79.82	27.12	1.02	100	10
AE	22	72.72	27.25	0.31	100	7
<i>2007</i>						
TE	22	89.07	16.74	49.34	100	13
PTE	22	95.05	10.45	64.62	100	16
CE	22	71.67	30.88	0.35	100	9
AE	22	63.21	27.16	0.15	100	5
<i>2008</i>						
TE	19	79.01	28.38	21.35	100	10
PTE	19	92.70	14.27	49.97	100	13
CE	19	55.24	37.60	10.80	100	7
AE	19	33.06	31.24	4.86	100	2
<i>2009</i>						
TE	16	73.03	30.90	8.47	100	5
PTE	16	89.71	18.42	45.93	100	9
CE	16	55.96	37.64	9.18	100	5
AE	16	38.60	30.96	3.83	100	2
<i>Average (2004-2009)</i>						
TE	115	88.43	20.67	8.47	100	12
PTE	115	94.90	12.03	45.93	100	15
CE	115	75.53	31.82	0.35	100	10
AE	115	63.76	32.55	0.15	100	6

**Table II.** Summary statistics of annual averages scores of technical efficiency, pure technical, cost efficiency and allocative efficiency

**Notes:** TE = technical efficiency; PTE = pure technical efficiency; CE = cost efficiency; AE = allocative efficiency

The constant returns to scale efficiency score of each insurance firm measures its technical efficiency, which takes into account the input/output configuration and the size of operations. On the other hand, the VRS efficiency score represents pure technical efficiency; that is it is the measure of efficiency after eliminating the scale inefficiency. Therefore, the scale efficiency score is calculated by dividing the technical efficiency score by the pure technical efficiency score ( $SE = TE/PTE$ ).

The Takaful firm's efficiency scores are presented in Table II. I first discuss the results for technical and pure technical efficiency and then the cost efficiency results. Next, I discuss the efficiency results for each of the GCC countries. For the sake of brevity, I restrict the discussion to some selected results.

The average technical efficiency for the period from 2004 to 2009 of 88.43 per cent suggests that Takaful insurers in the GCC are highly efficient overall. Moreover, the Takaful insurance firms in the GCC countries present a low dispersion in terms of efficiency. The pure technical efficiency, as expected, is slightly higher. It is worth to notice the downward trend of technical and pure technical efficiency from 2006 to 2009. This might be because of the economic crisis that happens during this period.

The average cost efficiency score for the period from 2004 to 2009 of 75.53 per cent suggests that Takaful insurers are moderately cost efficient overall, but there is room for improvement. The low numbers of fully efficient insurance firms confirm the perception that the Takaful insurance industry still at its beginning has a long way to go. The average cost efficiency of all Takaful insurance firms in the GCC for 2005 was 95.69 per cent with a minimum score of 62.84 per cent efficiency. However, this average decreased in 2008 to only 55.24 per cent with a minimum score of 10.80 per cent raising the standard deviation to 37.60 per cent from 12.16 per cent in 2005. The efficiency scores for 2009 show that the high standard deviation indicates the high dispersion of efficiency score among the insurance companies.

Table III presents the average scores for technical and cost efficiency for each of the GCC countries. There are variations among the GCC countries in terms of technical and cost efficiency scores. UAE and Qatar scores are the highest average technical scores of 98 per cent and 96 per cent, respectively, for the years 2004-2009. In terms of cost efficiency, Saudi Arabia and UAE are considered the most cost efficient, for Takaful insurance firms scored 84 per cent and 79 per cent, respectively. Saudi Arabia and UAE are among the first GCC countries that stated Islamic finance in general and Takaful insurance in particular. In addition, Saudi Arabia and UAE are the biggest financial markets in the GCC countries.

Country	Technical efficiency (%)	Cost efficiency (%)
Bahrain	63	31
Kuwait	87	77
Qatar	98	76
Saudi Arabia	91	84
UAE	96	79
Total	88	76

**Table III.**  
The average  
technical and cost  
efficiency scores for  
GCC countries for the  
period from 2004 to  
2009

## 7. Conclusion

This paper studies technical, pure technical, cost and allocative efficiency for an unbalanced sample of 115 firm-year observation of Takaful insurance companies operating in the GCC countries from 2004 to 2009. The research design calls for the assessment of the relative efficiencies (technical, pure technical, cost and allocative) of each firm considered in the sample, and the identification of the main sources of inefficiency.

The results show that the average of technical efficiency scores for 6 years is 88.43 per cent. The average cost efficiency and allocative are 75.53 per cent and 63.76 per cent, respectively, suggesting that the Takaful insurance in the GCC is moderately efficient and there is a large room for improvement. The results also show the efficiency for each country. UAE and Qatar score the highest technical efficiency, while Saudi Arabia and UAE are the most cost efficient among the GCC countries.

The implication of this study will promote understanding of Takaful insurance and its efficiency. Managers in the Takaful insurance industry should focus on enhancing the efficiency of their firms. Also, this study shows the operating status of the GCC Takaful industry in terms of efficiency. Hence, it would be useful for managers and regulators in taking steps to improve the overall insurance industry market. For example, Takaful insurers can be ranked by their efficiency to determine the most efficient suppliers of insurers. Managers of insurers with low efficiency rankings can use this knowledge to develop ways to improve performance.

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