FOREIGN OWNERSHIP, EFFICIENCY AND SOLVENCY: ANALYSIS OF *TAKAFUL* FIRMS IN THE GCC REGION

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Abstract

The financial sector regulatory reforms undertaken by the respective governments of the GCC countries in recent years have liberalized their financial policies and encouraged the influx of foreign-owned firms participating in the Takaful *market. This development among others has created a competitive environment for continuous growth and impressive performance of the sector. This paper attempts to examine the efficiency of foreign-owned, vis-à-vis, the domestic owned,* Takaful *firms while taking into consideration the financial soundness of each* Takaful *firm. Mathematical programming non-parametric data envelopment analysis (DEA) with range adjustment measures (RAM) are utilized for analyzing 80 selected* Takaful *firms operating in the region for a 4-year period (2009-2012). Subsequent investigation is conducted using non-parametric statistical measure (Mann Whitney U rank statistics) and latent growth curve modeling to determine the statistically significant differences between the two. Result shows difference in efficiency between the foreign owned and domestically owned* Takaful *firms in years 2010 and 2012 for the models that include and exclude solvency ratio respectively. The result is actually consistent with the proposition of the global advantage hypothesis which also clearly demonstrates that solvency ratio has moderating influence on the efficiency differences.*

Keywords: Foreign, domestic, ownership, efficiency, solvency, data envelopment analysis, Gulf Cooperative Countries, *Takaful* companies.

1. Introduction

The *Takaful* sub-sector of the global Islamic financial landscape obviously offers huge potential investment opportunities. According to the 2015 A.M. Best's Special Report, the *Takaful* sector is expected to continue to witness monumental growth, and it is expected to be worth about $20 billion by 2017. As stated in the same report, three likely reasons may make such expectation realistic. Firstly the increasing Muslim population and the likely increasing demand for financial protection that aligns with the tenets of Islam. Secondly the inherent modus operandi of *Takaful* that allows for the shareholders to get dividends and the policyholders to share in the underwriting profit makes it very attractive to both Muslims and non-Muslims. Thirdly, with the exception of Malaysia, the GCC region holds a leading edge in the global *Takaful* market with a gross contribution of US$ 5.68 billion in 2010. This represents more than 62% of the global premium and accounted for 40% of the total *Takaful* business (Ernst and Young World *Takaful* Report, 2013). As such, the GCC countries, which are predominantly Muslim and very rich, have in recent times embarked on regulatory reforms to make the region a very attractive investment hub for *Takaful* (A.M. Best Special Report, 2013).

Expectedly, the regulatory reforms undertaken by the respective governments of the GCC countries have encouraged remarkable influx of foreign ownership participation in the financial services industry particularly, the *Takaful* sector. According to the Alpen Capital *Takaful* Report (2012), the financial liberalization policy has stimulated continuous growth through increased participation and competitions. This apparently offers a significant departure from the hitherto long period of low participatory rate, largely due to the legacy of strict regulations on the entry into and operations of foreign-owned financial firms in the GCC region (A.M. Best *Takaful* Review, 2013).

The entrance of foreign-owned *Takaful* service providers into the GCC *Takaful* sector has generated several debates and interest among the stakeholders in the sector. The debate is focused mainly on the competitive effect of the foreign firm's participation, vis-à-vis, those of the domestic *Takaful* firms. Interestingly, the market

perception according to the A.M. Best Special Report (2015) seems to favor the foreign-owned *Takaful* firms given that they leverage on their brand awareness and established distribution networks. Moreover, these foreign firms often possess superior skills, expertise and technology with which they improve underwriting and asset management compared to domestic firms. As a result, the expatriates who constitute a larger proportion of the work force in the GCC region prefers foreign-owned firms to the other lesser known local *Takaful* companies (Alpen Capital, 2012). It is likely, therefore, that the ownership type of the GCC *Takaful* firms may have implications for their relative efficiency.

According to the A.M. Best Special Report (2015), the solvency issue has also featured prominently on the regulatory landscape of the Islamic insurance sector in the GCC region. This may probably be the consequence of intense competition brought about by the influx of operators, including (i.e. foreign-owned) into the sector. The resultant effect has been a rise in the operation cost and deterioration in earning and performance. This raises concern for solvency and financial stability as a means of ensuring the continuous viability of *Takaful* companies.

Ultimately, the broad goal of solvency considerations are mostly to find a reasonable balance between the objective of protecting the policyholders and beneficiaries, in addition to avoiding excessive capital or other requirement which could unduly hamper the effective functioning of *Takaful* institutions. A large solvency margin is desirable because it gives a low probability of failure. On the other hand, a large solvency margin can create "excess capacity" that is an excessive ratio of capital (shareholders' fund) to a premium underwritten. This indicate inefficient application of the shareholders' fund as the large solvency margin can either increase the required profit margin in the premiums written or lower the dividends which can be paid to shareholders. Nonetheless, the central managerial duty is to find an optimal solvency margin which represent a compromise between protections, market pressures on premiums and the shareholders' anticipations.

This paper investigates the ownership-type invariance analysis of the efficiency and the growth trajectory with and without solvency

capital for a sample of 80 *Takaful* firms in five countries in the GCC region namely, Bahrain, Qatar, Kuwait, Saudi Arabia and United Arab Emirates, covering a four-year period from 2009-2012. The remaining part of this paper is divided into literature review, econometric model specification, data analysis, results and conclusion.

2.1 Theoretical framework

According to Lensink et al (2008) and Lee & Hsieh (2014), a foreign-owned financial institution is that with more than 50 percent of its shares owned by non-domestic residence in a particular country. From a purely practical point of view, notable reports like those of the Alpen Capital (2012), Ernst and Young (2013), and the A.M. Best Special Report (2015) have all documented the likely implication of ownership type on the relative efficiency and competitiveness of *Takaful* firms. However, from a theoretical standpoint, arguments and empirical evidence on the relation between foreign ownership and domestic firms' behavior rather remains inconclusive. Two major theoretical arguments were articulated by Berger et al, (2000). They distinguished between *the global advantage hypothesis* and *the home field advantage hypothesis.*

The global advantage hypothesis argues that foreign-owned financial institutions might be more competitive and efficient compared to the domestic-owned financial institutions due to exposure to advance technology and expertise in their home country. Depending on the level of institutional and governance framework in existence in a country studies like Claessens et al (2001), Majnoni et al (2003) and Sabi (1996) found that foreign-owned financial firms outperform their domestic counterparts. Havrylchyk (2006) corroborates their findings by suggesting that foreign-owned financial institutions exhibit higher efficiency than their domestic counterparts in developing countries with poor legal and regulatory framework. Crystal et al, (2000) acknowledged that foreign-owned financial institutions are more financially stable than their domestic counterpart because of the former's aggressive response to asset deterioration and the greater capacity to absorb losses, thus

promoting relative financial soundness and stability.

Quite a number of empirical studies, for instance, Levine (1997) suggest some positive implications of encouraging participation of foreign ownership of financial institutions as comprising the following: improvement in quality and availability of financial services and adoption of modern skill and technology, stimulation in the development of supervisory and legal framework; and enhancement of the nation's access to international capital. On the contrary, Lee & Hsieh (2014) confirm the existence of home field advantage hypothesis when considering the effect of regulatory reforms and suggest that domestic-owned financial institutions may have informational advantage relative to foreign-owned institutions.

It is not unlikely to find the opposing view on the impact of foreign ownership on the domestic business operation. Stiglitz (1999) argues that the domestic financial market open to foreign participation faces potential problems of competition and diminishing performance. This viewpoint favors the home field advantage hypothesis and also agrees with some empirical studies. For instance, Claessens et al. (2001) claim that increased presence of foreign financial institutions is associated with a reduction in profitability and margins for domestic banks. Lensink et al, (2008) demonstrate that foreign ownership negatively affects financial and institutional efficiency while Angkianand and Wihlborg (2010) indicate that foreign ownership is associated with greater risk taking.

The extant literature on the efficiency of Islamic financial institutions focuses on the effect of foreign financial institutions on a domestic peer's performance, cost efficiency and earnings volatility. However, this present study focuses on comparing purely technical efficiency of Islamic insurance companies with the modelling of a solvency capital as output variable constraint that might be imposed by regulatory agencies. This constraint could potently interfere with the firms' efficiency and may trigger different behavioral response from the *Takaful* firms to the solvency capital requirement regulation in the GCC region. As Shim (2010) argued, the solvency capital specified by the regulators constitute an investment capital that could have been used optimally to generate more returns.

2.2. Relationship between Solvency and Efficiency

Safeguarding the solvency position and continuous viability of an insurance firm over a long time horizon is one of the central roles of insurance management. *Takaful* firms hold equity capital to provide greater assurance to the policyholders that the insurance firm has the capacity to absorb all loss payments, even if it is more than expected. Hence, the value of its promises depends on the amount of capital in its possession. *Takaful* firms are required to own sufficient capital to maintain firm default-value at an acceptable level. However holding capital is costly due to agency and information cost (de Haan & Kakes, 2010; Smith, 2011). In offering an underwriting product, *Takaful* firms leverage on shareholders' (equity) capital to pool risk funds from policyholders. An important role of the shareholders' capital, underwritings surplus and investment income lies in building of buffer in case losses that exceed the net premiums received between period of premium receipt and payment of claims. The greater the capital the more confidence there will be that the policyholders will receive their claims. Maintenance of sound and healthy insurance operation requires that product prices be set at levels adequate to pay policyholders' claims and also to provide a competitive return to the owners as compensation for their role as residual risk bearers, and more importantly, to attract additional capital from external investors. The establishment of a premium rate, therefore, lies at the heart of solvency management (Zanjani, 2001).

The insurance sector has been subject to close monitoring and inspection by regulatory authorities' the world over, particularly on the solvency status borne out of the sector's economic and social significance. Rejda (1989) describe two primary reasons for regulators concern with insurance insolvency. First, the production cycle of the insurance firms is inverted, in which case they receive premiums prior to any probable future indemnity to policyholders. Next, the insurance contract exposes the policyholders, as well as beneficiaries, to economic hardship in the event of insurance insolvency. As a consequence, the authorities have enacted regulations that tend to focus on measures that guarantee the solvency of insurance firms (Buckham, et al., 2010).

Takaful operators are confronted with three main goals: First, to

maintain the solvency requirement as specified by the supervisory authorities and generally for continuous viability of the company. Second, to honor claim payment obligations to the policyholders as at when due, and third, to achieve the shareholders' expectations by providing competitive returns. Safeguarding of solvency of *Takaful* companies is by no means an important managerial goal. Therefore, it may be to the shareholders' interest for *Takaful* operators to operate at a minimum solvency position, since operating at this level will increase the ratio of insurance profit value to the capital employed (return on equity).

Solvency consideration involve analyzing the current position, future prospects, competition and market situation, as well as a company's own resources, to meet their possible future strategic goals in addition to the evaluation of the risk involved. Solvency as a probabilistic concept depends on how the future outlook is viewed. An insurance firm is solvent if it has sufficient assets to meet its liabilities. Although, this basic definition is applicable to many enterprises, what makes insurance unique is that as risk underwriters, its liabilities is partially known and may extend into the future before it is extinguished. One of the uncertainties and allowance of time to react to changes, insurance institutions are required to maintain assets sufficiently enough to cover their liabilities. The excess of assets over and above liabilities is referred to as a solvency margin.

Researchers, as well as insurance industry analysts, have spent a great deal of resources in recent years to develop a mathematical approach to management practices. This is necessary because in such a rapidly changing business environment, shareholders and managers need accurate and reliable information about the value generated by their businesses. In light of this, most insurance companies, as well as *Takaful* firms, have adopted modern management techniques such as shareholders value management or valued-based management (Abdul Kadir, Adam and Hardwick, 2010).

Typical studies on the performance of the Islamic insurance industry have in recent years been subjected to rigorous statistical and econometric estimation (El Gamal and Inanoglu, 2004; Omar, 2005). Several studies have also applied various frontier techniques to estimate the efficiency and performance of *Takaful* firms. For

example, Ismail, Othman and Bacha (2011) conduct a comparative study of cost efficiency and investment performance of conventional life insurance and family *Takaful* companies in Malaysia using the non-parametric data envelopment analysis (DEA) to analyze 18 firms that comprised 11 conventional and 7 *Takaful* firms. The finding indicates that *Takaful* firms had a lower significant efficiency compared to their conventional insurance peers.

Similar studies were conducted by Saad (2012), Abu Hussain (2013), using DEA to analyze a panel data of 28 companies comprising both conventional general and *Takaful* companies in Malaysia over the periods of 2007–2009 and 2009-2011 respectively. Abdul Kadir, Adam and Hardwick (2010) examined the cost efficiency of non-life *Takaful* insurance firm operating in 10 Islamic countries. A two-stage procedural analysis was performed. First, non-parametric data envelopment analysis was used to compute cost efficiency score, and a second–stage logit transformation regression model was estimated to test the influence of corporate characteristics on these efficiency scores. In the same way, Yusop, Random, Ismail and Yakob (2011) investigated the efficiency of risk management of life insurance and *Takaful* undertakings in a competitive insurance industry in Malaysia. The study used data envelopment analysis (DEA) and model-range adjustment measure (RAM) to evaluate the efficiency score of risk management practices of each firm.

The application of frontier efficiency methodology in measuring performance and viability of insurance institutions in general has grown remarkably in recent times, and still increasingly attracts much research interest. This is demonstrated by the growth in the number of studies published on the subject as reported by Berger and Humphrey (1997), Cummin and Weiss (2000) and Grace and Luhen (2010). Previous studies on efficiency analysis among insurance firms had measured technical, allocative, scale, cost and revenue, and profit-efficiencies. The findings provided useful information for management to identify operations that need improvement relative to other firms with “best practices”.

Recent studies have applied frontier techniques and methodology to address new topics such as market structure, risk management, etc. and extended geographical coverage from a

previously U.S. and Europe-centric base to a broader set of countries around the world such as those in Asia, Latin America and Africa. In summary, some of the studies that connect frontiers efficiency measurement with solvency and other issues affecting insurance industry include Berger and Humphrey (1997), which study the relation between efficiency and solvency and Brockett et al (2004), which evaluate solvency and efficiency in relation to multiple organizational forms to failure. Leverty & Grace (2010) show empirical evidence to indicate that the majority of the firms that failed did so because they are inefficient; hence a reliable measure of efficiency should be able to identify those firms that show abysmal performance.

3. Econometric Model Specification (DEA RAM model)

The mathematical programming method, Data Envelopment Analysis (DEA) based on the range adjustment measure (RAM) is chosen for data analysis primarily because of its appropriateness. DEA is best described as 'data-oriented' in that it effects evaluation and draws inferences directly from observed data (Cooper & Tone, 1997). It truly envelopes the entire data set thereby airing no chance for random noise outside the control of the firm. The model is a variant of the additive "DEA" model with a new measure of efficiency developed by Charnes et al. (1985) and later by (Cooper, Park & Pastor (1999). It presents desirable properties compared to other DEA models; notably, the additive models often accorded a central position. The entities evaluated are referred to as DMUs (Decision Making Units) which engage in activities that use multiple inputs to produce multiple outputs with no easily identified 'bottom line'.

The RAM model has a desirable property given that the measure is well-defined and the values obtained do not depend on the units in which any inputs or outputs are measured. This assist in dealing with certain outputs and inputs which are unwanted and undesirable such as "net losses" as contrasted with "positive profit" as outputs. The mathematical representation is provided below:

$$\text{Max} = \frac{\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+}{m+s}$$

Subject to

$$x_{i0} = \sum_{j=1}^{n} \mathrm{x_{ij}}\lambda_{\mathrm{j}} - s_i^- \qquad i = 1 \ldots . m.$$

$$y_{r0} = \sum_{j=1}^{n} \mathrm{y_{rj}}\lambda_{\mathrm{j}} + s_r^+ \qquad \mathrm{i} = 1 \ldots \mathrm{s}$$

$$1 = \sum_{j=1}^{n} \lambda_j$$

$$0 \leq \lambda_j \quad s_i^-, s_r^+ \qquad j = 1 \ldots n \qquad (1)$$

j =1…n indexes the entities evaluated for efficiency determination. DMU_J will be fully efficient if and only if all the slacks are zero at an optimum.

$x_{ij} = amount\ of\ input\ i = 1 \ldots . , m\ used\ by\ DMU_j$

$y_{ij} = amount\ of\ output\ r = 1 \ldots , s\ yielded\ by\ DMU_j \quad (1a)$

Whereas x_{i0}, y_{i0} represent the corresponding input and output values for $\mathrm{DMU}_{0,}$ the DMU whose efficiency is evaluated. The optimization in (1) is over the variables $0 \leq \lambda_j , s_i^- , s_r^+,$

We understand that a given choice of x that result in

$x_{i0} > \sum_{j=1}^{n} x_{ij}\ \lambda_j$ is interpreted to mean that the empirical evidence shows that with some (convex) combination of inputs other DMUs could have improved this input in amount $s_i^- = x_{i0} - \sum_{j=1}^{n} x_{ij}\ \lambda_j > 0$ without worsening any other input or output. Here, the DMU is identified as having used an excessive amount of this input. Likewise, $s_r^+ = \sum_{j=1}^{n} x_{ij}\,\lambda_j > 0$ identifies a shortfall in output characteristics *r*, in amount s_r^+ by reference to the outputs recorded for this same convex combination of other DMU_js. In each case, these non-zero "slack" variable values provide an estimate of the input excesses and the output shortfalls that could be improved without worsening any other input or output, and the non-zero λ_js express which other DMUs, and what amounts should be used to produce more output for the given input levels.

Equation (1) uses simple linear function to represent the objective which is to maximize the slack values that ensure that all such inefficiencies are identified. Hence, efficiency is defined as: DMU_0 is fully efficient if and only if all the slacks are zero at an optimum in (1). This shows that for this DMU_0 no other DMU (or combination of DMU_S) can produce the same output with smaller amounts of inputs or can use the same set of inputs to produce more output.

A "dimensionless" measure of inefficiency can be obtained because each slack variable is divided by the range of the slack variable R_I^- or R_r^+,

$$R_i^- = \overline{x_{ıJ}} - \underline{x_{ij}} \quad i = 1 \ldots. m$$

$$R_r^+ = \overline{y_{rı}} - \underline{y_{rj}} \quad r = 1 \ldots. s \qquad (1b)$$

where $\overline{x_ı}$, x_j and $\overline{y_r}$,$\underline{y_r}$ represent maximal and minimal observed values taken over the $j = 1, \ldots, n$ DMUs for each of the inputs and outputs in question. Since $\sum_{j=1}^{n} \lambda_j = 1$, as given in (1), it can be shown that

$$0 \leq \frac{\sum_{i=1}^{m}(\frac{s_i^-}{R_I^-}) + \sum_{r=1}^{S}(\frac{s_r^+}{R_r^+})}{m+s} \leq 1 \qquad (2)$$

This formulation can be used to measure the inefficiency for DMU_0 (in the numerator) relative to the range of possible inefficiencies (in the denominator) for each input and output. That is, R_I^- and R_r^+ represent the maximum possible inefficiency over j = 1,…, n for each i and r . Hence, equation (2) represents an average of the maximum possible inefficiency proportion exhibited by DMU_0 in each input and output. The result will be unity if and only if equality is attained for every term in equation (2). If the result is zero, full efficiency would be achieved, if and only if all slacks are zero in accordance with the definition given in equation (1a). It is possible also to orient our measure toward efficiency, rather than inefficiency, by replacing equation (2) with a complimentary value as given in the following expression.

$$0 \leq \Gamma = 1 - \frac{\sum_{i=1}^{m}\left(\frac{s_i^-}{R_i^-}\right) + \sum_{r=1}^{s}(\frac{s_r^+}{R_r^+})}{m+s} \leq 1 \qquad (3)$$

Hence, we have bound our measure of efficiency to lie between zero and one with assurance that the resulting real valued scalar comprehends all of both the purely technical and mix inefficiencies identified in the solutions for any DMU_0. Cooper, Park, and Pastor (1999) refer to this expression as the RAM of efficiency. It is also strongly monotonic and not dependent on the units in which inputs and outputs are measured. This invariance to linear transformation allows us to deal with the possibility of negative values in the DEA model without losing contact with results from prior research in the DEA that generally assumed an absence of negative values in the observation. The RAM model has other desirable properties beside those earlier mentioned. For instance, it exhibits “scaling properties that makes it possible to deal with large disparities in the inputs and outputs”. Moreover, subdivision of (1) may be used as may be desired to separately measure input and output inefficiencies.

4. Data and Variable Selection

The study covers 80 *Takaful* firms in the GCC region which comprises Saudi Arabia (30), Kuwait (7), United Arab Emirates (UAE) (26), Qatar (6), and Bahrain (11). Oman is excluded due to non-availability of data. The data are obtained from DataStream's database and other sources such as published annual reports and financial statements from the website of companies from year 2009 to year 2012. These are the relevant years to which the *Takaful* Company's data reflects response to regulatory requirements.

In terms of variable selection, this study adopts the viewpoint of Brockett et al. (2004) which treat insurance firms as financial intermediaries. Accordingly, the intermediation approach evaluates the financial strength and condition of insurance firms (Berger & Humphrey, 1997) which is consistent with objectives of this research. Insurance firms (similar to other financial services sectors) provide a series of services to the customers of which only a certain aspect will be an end product (i.e. losses payment). Indemnity is therefore regarded as a vehicle or intermediate step through which investors get rewarded and customers get compensated for subscribing to a promise of future claim payment. Similarly, the regulator, customers, employees gets assurance of future firm solvency and continuing existence for the provision of insurance services.

Furthermore, the important roles of the *Takaful* sector in an economy as a risk management mechanism and source of long term funding make it inadequate to consider a sole objective "profit maximization" as a basis for evaluating performance. This paper employs multiple goals which combine profitability, short-term financial obligation, as well as long term ability, to discharge fiduciary responsibility as represented by solvency. Hence, four inputs (and three outputs are drawn from the composite financial information in line with Brockett et al, (2004). The following are the inputs: capital and surplus, changes in policyholders' surplus and shareholders' capital, underwriting and investment expenses and policyholders' debt capital. The output variables include the rate of return on assets (ROA), the ratio of liquid assets to liabilities, and solvency ratio.

To determine the impact of solvency on other objectives (output variables), we follow Brockett, et al, (2004) and McCabe & Witt,

(1980) where solvency proxy is modeled as a constraint because there is an additional marginal cost associated with the holding capital such as the agency cost. In line with these studies, solvency is modeled as "constraints" imposed by regulatory authorities with an allowable risk of violation to a certain extent. Therefore, the objective of the management is to maximize return (ROA), subject to solvency constraints imposed. Basically, the model assumes that the solvency constraints imposed will generally interfere with the objectives of profit maximization which is often the main objective function. The analysis is conducted twice using DEA program runs (with Matlab R2013a version) for 80 DMUs (*Takaful* firms) in the sample based on the *Takaful* firms' data set between 2009 and 2012. The first analysis includes solvency scores, while the second analysis omits the solvency scores as output variable.

5. Results and Discussion

5.1 Descriptive statistics

Table 1 shows the descriptive statistics of inputs and outputs used in the cross sectional DEA analysis for year 2009. Given an account of this year "the policyholders supplied debt capital" has the largest distribution range among the input variables. It ranges from a minimum of US$0.27 million to a maximum of more than US$1.897 billion dollars. "Change in capital and surplus" variable has the minimum value with negative value in excess of US$35 million, indicating that some *Takaful* companies experienced greater negative income (losses) in this year. Underwriting and investment expense otherwise referred to as total expenses, range from a minimum value of US$0.45 million to a maximum of US$721.45 million, with mean and standard deviation of US$69.22 million and US$122.40 million, respectively.

Table 1. Descriptive Statistics for the Selected Input and Output Variables used in the DEA Analysis for 2009

Inputs (million$) & Outputs (ratio) Variables Year 2009	Policyholders Supplied Debt Capital	Policyholders Supplied Debt Capital (complimentary value)	Underwriting & Investment Expenses	Capital & Surplus	Change in Capital & Surplus	Change in Capital & Surplus (treated)	Rate of Return on Assets	ROA (treated)	Liquid Assets / Liab	Solvency Scores
Maximum	1897.07	1999.73	721.54	784.09	218.37	255.25	0.09	0.47	4.0	8.18
Minimum	0.27	102.93	0.45	11.41	-35.88	1.0	-0.04	0.01	0.02	0.15
Mean	147.64	1852.36	69.22	123.00	7.35	44.22	-0.01	0.37	1.09	1.90
Std Dev	287.79	287.79	122.40	7.35	32.45	32.45	0.09	0.09	3.29	1.98

Table 2. Descriptive Statistics for the Selected Input and Output Variables used in the DEA Analysis for 2010

Inputs (million$) & Outputs (ratio) Variables Year 2010	Policyholders Supplied Debt Capital	Policyholders Supplied Debt Capital (complimentary value)	Underwriting & Investment Expenses	Capital & Surplus	Change in Capital & Surplus	Change in Capital & Surplus (treated)	Rate of Return on Assets	ROA (treated)	Liquid Assets / Liab	Solvency Scores
Maximum	1673.67	1999.97	633.15	917.20	133.24	162.42	0.09	0.31	4.64	8.20
Minimum	0.03	326.33	0.66	7.89	-28.18	1.0	-0.21	0.01	0.10	0.13
Mean	145.19	1854.81	72.48	115.41	5.45	34.64	-0.01	0.21	0.42	1.59
Std Dev	261.09	261.09	124.02	160.93	22.99	22.99	0.07	0.07	0.70	1.61

The four input variables are measured in US dollars; amount whereas the three outputs are in the form of ratios as noticeable in the last three rows of Table 1. As detailed in the table, the rate of return on assets extended from a minimum of -3.7% to a maximum of 9% in 2009, with a mean value of -1% and standard deviation of 9%. The second output is the ratio of "liquid assets to liability" ratio distributed from a maximum ratio of 4.64 to a minimum of 0.10 with a mean ratio of 1.09 and a standard deviation of 3.29. Solvency ratio is the third output variable: the scores range from a maximum ratio of 8.18 to a minimum ratio of 0.15 with a mean ratio of 1.90 and a standard deviation of 1.98.

Table 2 presents the descriptive statistics for 2010. As in the previous year, the "policyholders supplied debt capital" shows the largest range among the input variables with a minimum and a maximum values of US$1673.67 million and US$0.03 million respectively. The mean and the standard deviation were US$145.19 million and US$261.09 million accordingly. The underwriting and investment expenses too ranged from the minimum of US$0.66 million to the maximum of US$633.15 million. The mean and the standard deviation were given as US$72.48 million and US$124 million in that order. "Changes in capital and surplus" has a negative value in excess of US$28 million and the maximum value of US$133.24 million as the added value to the capital generated from the operations. In the same vein, the capital and surplus had a distribution ranging from a minimum value of US$917 million to US$7.89 million with a mean of US$115.41 and a standard deviation of US$160.93 million, correspondingly.

With respect to the output, the return on the asset ratio was distributed between -0.21 and 0.09 with a mean value of -0.01 and a standard deviation of 0.07. The ratio of liquid assets to liabilities also spread from a minimum of 0.10 to a maximum of 4.64 given a mean of 0.42 and a standard deviation of 0.70. The solvency ratio had a maximum score of 8.20, a minimum of 0.13, a mean of 1.59 and a standard deviation of 1.61.

Table 3. Descriptive Statistics for the Selected Input and Output Variables used in the DEA Analysis for 2011

Inputs (million$) & Outputs (ratio) Variables Year 2011	Policyholders Supplied Debt Capital	Policyholders Supplied Debt Capital (complimentary value)	Underwriting & Investment Expenses	Capital & Surplus	Change in Capital & Surplus	Change in Capital & Surplus (treated)	Rate of Return on Assets	ROA (treated)	Liquid Assets / Liab	Solvency Scores
Maximum	1645.48	1999.84	1075.75	1088.19	74.64	272.15	0.08	0.31	2.63	8.99
Minimum	0.16	354.52	0.01	5.09	-100.27	1.0	-0.23	0.01	0.01	0.11
Mean	151.75	1848.55	90.96	114.06	-1.54	17.73	-0.01	0.23	0.33	1.95
Std Dev	263.714	263.14	172.93	170.92	15.77	24.78	0.06	0.06	0.37	3.33

Table 4. Descriptive Statistics for the Selected Input and Output Variables used in the DEA Analysis for 2012

Inputs (million$) & Outputs (ratio) Variables Year 2012	Policyholders Supplied Debt Capital	Policyholders Supplied Debt Capital (complimentary value)	Underwriting & Investment Expenses	Capital & Surplus	Change in Capital & Surplus	Change in Capital & Surplus (treated)	Rate of Return on Assets	ROA (treated)	Liquid Assets / Liab	Solvency Scores
Maximum	1598.40	1999.23	1070.53	1041.93	72.46	170.37	0.82	0.47	1.36	8.14
Minimum	0.77	401.60	0.34	1.08	-97.90	1.0	-0.04	0.01	0.01	0.14
Mean	143.94	1856.05	91.11	115.11	3.95	101.86	-0.01	0.73	0.29	1.35
Std Dev	250.16	250.15	168.95	172.63	17.27	17.27	0.09	0.09	0.28	1.45

Table 3 presents the corresponding value that express losses in excess of US$100 million for the year 2011 for “changes in capital and surplus” whereas the maximum value is US$74.64 million. The policyholders’ supplied debt capital spread with a maximum value of US$1645.48 million and a minimum value of US$0.16 million. The underwriting and investment expense distribution stretched from a minimum value of US$0.01 million to a maximum value of US$1075.75 million. Meanwhile, the capital and surplus follow a similar pattern from a minimum value of US$5.09 million to a maximum value of US$1088.19 million with a mean value of US$114.06 million and a standard deviation of US$170 million. The ratio-based output value is projected with three variables: first, the return on assets with a maximum ratio of 8% and a minimum of -2.3% given the average percentage return of -1% and standard deviation of 6%. Second, the ratio of liquid assets to liabilities is distributed with a ratio ranging from a minimum of 0.01 to a maximum of 2.63 with a mean ratio specified at 0.33 and a standard deviation of 0.37. The third output variable which is the solvency ratio, spread from a minimum score of 0.11 to a maximum of 8.99, given the average score of 1.95 and standard deviation of 3.33.

Similarly, Table 4 illustrates the descriptive statistics of the input and output variable used for the DEA analysis in 2012. It follows a similar pattern as the previous years, the policyholders’ debt capital had the widest range among the input variables with a distribution spread from a minimum value of US$0.77 million to the maximum value of US$1598.40 million. “Changes in surplus and capital” extends from minus US$97.90 million (loss) to a maximum value of US$72.46 million (profit) with an average value of US$3.95 million and a standard deviation of US$17.97 million. The underwriting and investment expense, moreover, is distributed between a minimum value of US$0.34 million and a maximum value of US$1070.73 million representing the total expense incurred during insurance operations. This wide range, otherwise, can be viewed as an indication of the heterogeneous nature of a *Takaful* firm size in the region under study. ‘Capital and surpluses’ equally spread from US$1.08 million to the maximum value of US$1041.93 million. Output variables, which are in ratio form, begin with the rate of

return on assets (ROA) distributed from a minimum of -4% to a maximum of 8.2% with a mean value of -1% and standard deviation of 9%. The ratio of liquid assets to liabilities gives the range between 0.01 and 1.36 with a mean of 0.29 and a standard deviation of 0.28. In addition, solvency ratio has the highest score of 8.14 and a minimum of 0.14, given a mean of 1.35 and a standard deviation of 1.45.

Linking corresponding output variables for the four periods (2009-2012) shows that ROA was at the lowest in 2011, while the year 2010 gave the maximum ratio for "liquid assets to liability. However, the 'solvency ratio' was at the maximum in 2011, while, the minimum solvency ratio" was recorded in 2012.

As noted previously in the model specification, the efficiency scores obtained from the range adjustment measure (RAM) model were invariant of changes in the measurement units of inputs and outputs. It was also invariant of choices of origin; as a result, the negative value in the data can be eliminated. Thus, the negative value for "changes in capital and surplus" were eliminated by adding a constant to the data in the row. For example, here constant 36.88, 29.18, 101.27 and 97.91 were added to each period 2009, 2010, 2011 and 2012, respectively, and for ROA, a constant (36.88; 29.18; 101.27 & 97.91) was added to each period respectively from 2009 to 2012. It is important to also highlight that all inputs and outputs values are scaled to convenient units of $'million, as shown in the descriptive statistics from Tables 1 to 4.

Furthermore, consistent with Leverty and Grace (2010) and Brockett et al. (2004; 2005), it is desirable to use the complimentary value of policyholders' supplied debt capital rather the values itself as inputs since an increase in the policyholders' supplied debt capital, *ceteris paribus*, is less desirable rather than more desirable. For that reason, it is preferable if the same output could be obtained with less policyholders' capital. This is accomplished by initially multiplying all the values by -1 and adding the constant value to the result (i.e. 200,000), accordingly this reverses the relation previously maintained. For example, this constant value is used between the minimum and maximum values as shown in the table column

describing the policyholders' supplied debt capital as complimentary value. These data sets are used in the DEA analysis.

5.2 Ownership type-Invariance Analysis

Table A in the appendix shows the result of the DEA analysis which produces efficiency scores outcomes over the 4-year period between 2009 and 2012. The two columns respectively show the efficiency score outcome from two distinct models which respectively includes and excludes solvency ratio proxy as the output variable. Subsequently, two statistical measures, namely non-parametric Mann Whitney U statistics and latent growth curve modeling, are employed to test the hypothesis of assessing the effect of ownership type on the efficiency, as well as growth, trajectory, of *Takaful* companies.

Following Simpson (2005), Galony (1994) & Brockett et al. (2004), a Mann Whitney U rank statistical test is employed to evaluate the differences between each pairs of ownership type as an independent variable. Table 5 and 6 show the result of Mann Whitney U rank statistics to test the hypothesis of whether there is a significant difference in the mean rank of efficiency scores with ownership grouping as categorical independent variable over each of four time period (2009-2012). This paper identified two major ownership types group in the GCC Islamic insurance sector, namely, domestic and foreign ownership.

Table 5 shows the result of Mann Whitney U rank test of efficiency scores outcomes with solvency capital as the output variable. The result discloses evidence of significant differences in the mean rank of the efficiency scores in period 2010 as indicated by the Z statistics (-2.009) and asymptote significant *p* value (2 tailed test) 0.044< 0.05 significance level. Hence, the statistical test demonstrates that the null hypothesis of no significant differences between foreign and domestic *Takaful* companies in efficiency ranking cannot be rejected for the efficiency outcomes in all the periods except only in year 2010.

Table 5. Mann-Whitney U rank test result using Ownership type as the grouping variable

With Solvency	*Ownership Type*	*N*	*Mean Rank*	*Z Statistics*	*p Value*
2012	Domestic	54	40.59	-.058	.954
	Foreign	26	40.31		
2011	Domestic	54	43.09	-1.522	.128
	Foreign	26	35.12		
2010	Domestic	54	42.56	-2.009	.044**
	Foreign	26	32.02		
2009	Domestic	54	33.61	-.069	.945
	Foreign	26	33.26		

5% **significance level.

The second Mann-Whitney U mean rank statistical test utilizes the efficiency scores generated from omitting solvency ratios as the output variable. Table 6 shows the existence of significant differences in the ranking of efficiency scores between the ownership groupings of independent variable only in the year 2012 as indicated by Z statistics (-1.856) and *p* value 0.063<10% significance value, while other periods (ie, between 2009 and 2011) show no evidence of significant differences. In order to have a clearer idea of the plausible reasons for the results obtained, an analysis of the growth trajectory in efficiency of the firms in the sample is also conducted using the latent growth curve modeling.

Table 6. Mann-Whitney U rank test result using Ownership type as the grouping variable

Without Solvency	*Ownership Type*	*N*	*Mean Rank*	*Z Statistics*	*p Value*
2012	Domestic	54	37.44	-1.856	.063*
	Foreign	26	46.85		
2011	Domestic	54	41.13	-.406	.685
	Foreign	26	39.19		
2010	Domestic	54	39.55	-.308	.758
	Foreign	26	37.92		
2009	Domestic	54	35.17	-1.091	.275
	Foreign	26	29.93		

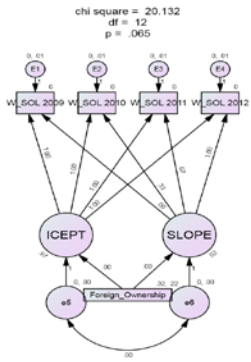
*10% **significance** level

5.3 Latent Growth Curve Modeling

The latent growth curve model provides the group level statistics the mean intercept and the mean growth rate and can be applied to test the hypotheses about a specific trajectory. It also permits the incorporation of additional predictors into the model Bollen & Curran, (2006); Raudenbush, (2004). The advantage of this model is that it enables us to estimate the initial level of the efficiency outcomes and the rate of change over time and linked these parameters of growth to the predictors (i.e., both time varying and time invariants) variables such as ownership type as obtainable in this paper.

In line with the study conducted by Singer & Willet (2003), latent growth curve model can be applied to test the hypotheses by the assessing the statistical and practical significance of the model parameters which includes the means of intercept, the slope factors, the variances and the covariance. The model-fit can be assessed and the goodness of fit is usually the pre-requisite for interpreting parameter estimates. Chi square (χ^2) statistics forms the basis from array of fit indices that can be used to measure the match between the model prediction and observed data. Therefore, the latest growth curve model represents the hypothesized null model which should be rejected if the *p*-value is less than 0.05, indicating the model does not fit the data.

Figure 1 and 2 below show the path diagram of both the unconstrained (defaults) and constrained models respectively. Foreign ownership is used as a predictor for repeated measures of efficiency scores while solvency is used as the output variable.



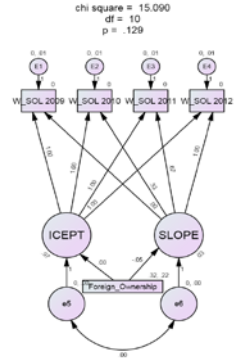
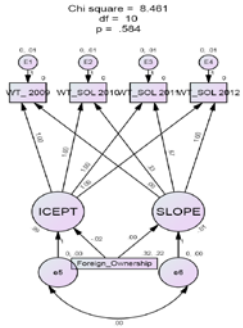
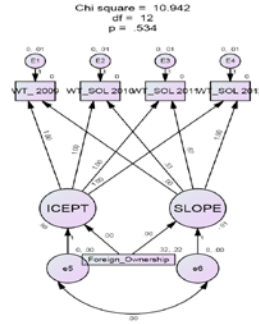


Figure 3 and 4 below show the path diagram unconstrained (default) and constrained model with foreign ownership as a predictor for the repeated measures of efficiency score for no solvency as the output variable.





Figures 1 to 4 present the path diagram of the unconstrained and constrained model of the estimated linear growth curve model with foreign ownership as a time invariant predictor of the initial status and the growth rate for the repeated measurement of efficiency scores generated from the DEA analysis of two conditions (including and omitting) solvency ratios as output variables.

Table 7 shows the assessment of models good-fit with, $\chi 2$ = 20.132, df (12) and 15.090, df (11) with *p* value = 0.065 & 0.129 >5% respectively for the unconstrained and the constrained models with solvency efficiency scores. Without solvency ratios, the model gives

the following χ^2 =8.461 (df) 10 and 10.942 (df) 12 with *p*-value = 0.584 & 0.534>5% respectively for both unconstrained and constrained models. The high value of chi squared, coupled with the non-significance of asymptote *p*-value, points to the fact that we cannot reject the latent growth curve models, thus reflecting the true representation of the population.

Table 8 represent the result of estimated parameters of the linear growth curve model with foreign ownership as the time invariant predictor of the initial status (intercept) and the growth rate as depicted in the path diagrams figure (1 to 4). The regression weight of the intercept is 0.003, indicating that the average efficiency scores of *Takaful* firms with foreign ownership is 0.003 above their domestic counterpart, while the slope regression weight is -0.046, depicting a decrease in efficiency score over the years. Moreover, a model without solvency shows regression weight estimate of -0.018 for the intercept, indicating that foreign ownership has an average efficiency scoring is below their domestic counterpart and which also decreases on the average over the years by -0.002 (representing the slope regression weight). However, the initial differences and the rate of tranjectory as represented by the regression weight of the intercept and the slope are not statistically significant enough for foreign-ownership types to represent a predictor of the initial status and rate of growth. This indicates that the efficiency scores of the foreign-owned *Takaful* firms are not significantly different from those of their domestic ownership counterparts. However, the negative correlation between the unobserved endogenous variables of the intercept and the slope suggest that the initial efficiency scores slowly decreases over time. Table 9 shows the result of estimated model comparison (constrained and unconstrained model) to test the following hypotheses.

$H_{0:}$ Foreign ownership has no effect on the regression weight of the intercept and the slope.

$H_{1:}$ Foreign ownership has effect on the regression weight of the intercept and the slope.

The model with solvency shows that the two regression weights are significantly different from zero as indicated by chi-square statistics of 9.343 with (df) 2 and *p* value 0.08 <5% critical value. The other model without solvency has its regression weight not

significantly different from zero as illustrated by the *p* value 0.289 > 5% critical value.

Table 7. Result of the model fit indices

Model	*With Solvency unconstrainted*	*With Solvency constrainted*	*Without Solvency unconstrainted*	*Without Solvency constrainted*
Chi square (χ^2)	20.132	15.090	8.461	10.942
Df	12	10	10	12
p value	0.065	0.129	0.584	0.534

Table 8. Result of the linear Growth curve with Foreign as a predictor

Effect	*Model (With solvency)*	*Model (Without solvency)*
Intercept (mean)	0.971***	0.993***
Slope (mean)	0.033	-0.008
Foreign Ownership (mean)	0.317***	0.317***
Foreign Ownership (variance)	0.217***	0.217***
Correlation (intercept & slope)	-0.001	-0.001
Intercept on Foreign Ownership (regression weight)	.003	-0.018
Slope on Foreign Ownership (regression weight)	-.046	-0.002

Table 9. showing Nested model comparison assuming unconstrained model to be correct.

Model	*DF*	*CMIN*	*P*
Foreign Ownership Has No Effect (With solvency)	2	5.041	0.08*
Foreign Ownership Has No Effect (Without solvency)	2	2.481	0.289

6. Conclusion

We applied two statistical measures to investigate the efficiency differences between the foreign-owned and locally-owned *Takaful* company. First, Mann Whitney U rank statistics is applied to test the hypothesis of whether there was a significant difference between the mean ranks of efficiency scores of two different types of ownership in our consideration across the four-year period. The result indicates that we cannot reject the null hypothesis of no difference in the mean rank of efficiency scores between the foreign-owned and domestically-owned *Takaful* firms in all the four periods under consideration, except in the year 2010, which obviously shows significant effect at the 10% statistically significance level. Hence, we reject the null hypothesis that implies that there is no difference in the mean rank efficiency scores in that year. Comparable test was conducted for efficiency scores outcome, excluding solvency capital as the output variable. The result followed a similar pattern except that a statistically significant value is shown in period 2012.

Furthermore, the latent growth curve model, which is an application of the structural equation modeling, is used for two purposes: First, to assess the growth trajectory of the efficiency of the *Takaful* firms in the GCC with and without solvency capital; second, to assess the moderating effect of ownership type as a time-invariant predictor of the initial status and trajectory of repeated measures of efficiency scores. The estimated result of our model comparison between the unconstrained and the constrained model (i.e. foreign ownership has no effect) points out that the regression weight of both the intercept and the slope are significantly different from zero. Consequently, we reject the null hypothesis that foreign ownership has

no effect on both the initial status and the trajectory (growth rate) of efficiency among the firms in the sample. In addition, the difference in the result of the test of the two models (i.e., with and without) solvency ratio as output variable in the DEA analysis clearly show that solvency ratio has moderating influence on the efficiency differences.

Given the foregoing statistical measures and parameters estimate, we can actually conclude that the efficiency of foreign-owned *Takaful* firms are quite different from the domestically-owned *Takaful* company for the year 2010 and 2012 for the model that includes and excludes solvency ratio respectively. This may seem to be consistent with the proposition of the global advantage hypothesis, and thus, coherent with the market perception among the stakeholders that the foreign-owned firms are likely to be more efficient given that they have a brand and network advantage, as well as more skilled manpower and technological leverage.

An other interesting finding is that the home advantage hypothesis hold as far as the intercept is concerned, given the fact that the foreign-owned firms have a statistically significant lower starting efficiency score compared to the domestic firms. However, the overall evidence seems to suggest that both the regulators and the management need to pay more attention to the business operation of the domestic companies in order to align them with their foreign owned peer to prevent switch from one ownership type to another. This is because the difference in the intercept scores seems to be diminishing over the years. Moreover, the negative estimate for the slope of the firms, especially with solvency capital, may also be a portent excess capacity in which case the ratio of capital to premium underwritten is excessive.

APPENDIX

COUNTRY	COMPANY NAME	OWNERSHIP	ASSET CATEGORY	SOLVENCY WITH 2012	WITHOUT 2012	WITH 2011	WITHOUT 2011	WITH 2010	WITHOUT 2010	WITH 2009	WITHOUT 2009
BAHRAIN	BAHRAIN NAT HOLDINGS	DOMESTIC	Small	1.00000	1.00000	1.00000	1.00000			0.87535	0.99990
BAHRAIN	CHARTIS ***TAKAFUL*** ENAYA	FOREIGN	Small	1.00000	1.00000	1.00000	1.00000	0.99992	0.66666		
BAHRAIN	LEGAL & GEN ***TAKFUL***	FOREIGN	Small	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
BAHRAIN	T'AZUR ***TAKAFUL*** CO	DOMESTIC	Small	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
BAHRAIN	SOLIDARITY GEN ***TAKAFUL***	DOMESTIC	Small	1.00000	0.79823	0.99995	1.00000	0.99998	0.99999		
BAHRAIN	SOLIDARITY FAMILY	DOMESTIC	Small			0.99995	1.00000	0.99998	1.00000		
BAHRAIN	MED & GULF ***TAKAFUL***	FOREIGN	Small	1.00000	1.00000	1.00000	0.99904	0.99927	1.00000		
BAHRAIN	ALAHLIA INSUR BAHRAIN	DOMESTIC	Small	0.99944	1.00000	0.99922	1.00000	1.00000	1.00000	1.00000	1.00000
BAHRAIN	***TAKAFUL*** INTERN CO BAHRAIN	DOMESTIC	Small	1.00000	0.80132	0.99978	0.99995	1.00000	1.00000	0.97431	1.00000
BAHRAIN	BAHRAIN KUWAIT NAT INS	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	0.99999	1.00000	1.00000	1.00000
BAHRAIN	ARAB INSUR BAHRAIN	FOREIGN	Large	0.93519	0.99999	1.00000	1.00000	1.00000	1.00000	0.94273	1.00000
KUWAIT	WETHAQ ***TAKAFUL*** KUWAIT	DOMESTIC	Small	1.00000	1.00000	0.99983	0.99552	1.00000	0.99998	0.99953	0.99999
KUWAIT	FIRST ***TAKAFUL*** KUWAIT	DOMESTIC	Small	1.00000	1.00000	1.00000	0.66667	0.99995	0.99912	0.99871	0.99617
KUWAIT	AL-MUTHANNA ***TAKAFUL***	DOMESTIC	Small			1.00000	1.00000	1.00000	1.00000	1.00000	0.99999
KUWAIT	RITAJ ***TAKAFUL***	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99999	1.00000
KUWAIT	AL SAFFAT ***TAKAFUL***	DOMESTIC	Large	1.00000	0.98851	1.00000	1.00000	1.00000	0.99999	1.00000	1.00000

KUWAIT	AL-AHLEIA INS KUWAIT	DOMESTIC	Large	1.00000	1.00000	0.99998	1.00000	1.00000	1.00000	1.00000	1.00000
KUWAIT	GULF ***TAKAFUL*** KUWAIT	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.98935	0.99974
QATAR	QATAR ISLAMIC	DOMESTIC	Large	0.99999	1.00000	1.00000	1.00000	0.42857	1.00000	1.00000	1.00000
QATAR	AL KHALEEJ INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99999	1.00000
QATAR	DOHA ***TAKAFUL***	DOMESTIC	Large	1.00000	1.00000	0.99058	1.00000	0.96376	1.00000	0.99794	1.00000
QATAR	GENERAL ***TAKAFUL*** CO.	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
QATAR	QATAR ***TAKAFUL***	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	ISLAMIC CORP INSURANCE	DOMESTIC	Small	1.00000	1.00000						
SAUDI ARABIA	SAUDI INDIA COOP INSUR	FOREIGN	Small	0.99999	1.00000	0.99998	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	ALLIED COOP INS	FOREIGN	Small	1.00000	1.00000	0.99996	1.00000	0.89591	1.00000	1.00000	0.99384
SAUDI ARABIA	SALAMA COOP INSURANCE	FOREIGN	Small	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	AL AHLIA FOR COOP INSUR	FOREIGN	Small	0.99995	1.00000	0.57143	0.99682	1.00000	0.99994	1.00000	1.00000
SAUDI ARABIA	AL -BURUJ COOP INS	FOREIGN	Small	1.00000	1.00000	1.00000	1.00000	0.99992	1.00000		
SAUDI ARABIA	SANAD COOP	DOMESTIC	Small	0.99999	1.00000	1.00000	1.00000	1.00000	0.99987	0.99717	1.00000
SAUDI ARABIA	AMANA COOP	DOMESTIC	Large	0.99999	0.99999	1.00000	1.00000	0.99999	1.00000		
SAUDI ARABIA	WEQAYA ***TAKAFUL*** SAUDI	FOREIGN	Large	0.99988	0.22585	1.00000	1.00000	1.00000	0.99997	0.99989	1.00000
SAUDI ARABIA	ACE ARABIA COOP INSUR	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99311
SAUDI ARABIA	SAUDI UNITED COOP INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	0.99999	0.99998	1.00000	1.00000
SAUDI ARABIA	AL ALAMIYA FOR COOP INSUR	DOMESTIC	Large	0.99999	1.00000	1.00000	1.00000	1.00000	1.00000		

SAUDI ARABIA	SOLIDARITY SAUDI ***TAKAFUL***	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000		
SAUDI ARABIA	WATANIYA	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	0.99998	1.00000	1.00000	1.00000
SAUDI ARABIA	ARABIA SHEILD COOP INSUR	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	ALAHLI ***TAKAFUL*** CO	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	GULF GENERAL COOP INSUR	FOREIGN	Large	1.00000	0.99991	1.00000	1.00000	1.00000	1.00000		
SAUDI ARABIA	AL SAGR COOP	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	SAUDI ARABIA COOP INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99982
SAUDI ARABIA	GULF UNION COOP INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	AXA COOP INS	FOREIGN	Large	1.00000	1.00000	0.99922	1.00000	1.00000	1.00000	0.97182	0.66667
SAUDI ARABIA	AL RAHJI COOP INSUR	DOMESTIC	Large	1.00000	0.99378	1.00000	1.00000	0.99996	1.00000		
SAUDI ARABIA	SABB ***TAKAFUL*** COOP INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	0.33333	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	TRADE UNION COOP INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	MALATH COOP INSURANCE	DOMESTIC	Large	0.99996	0.99998	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	UNITED COOP INSURANCE	FOREIGN	Large	1.00000	1.00000	0.99986	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	ALLIANZE SAUDI FRANSI COOP	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	0.99944	0.99999	1.00000
SAUDI ARABIA	ARABIA INSUR COOP INSUR	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99999	0.99999
SAUDI ARABIA	BUPA ARABIA COOP	DOMESTIC	Large	1.00000	0.77106	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
SAUDI ARABIA	MED & GULF COOP INSUR	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	0.33333	0.60451	1.00000
SAUDI ARABIA	COMPANY FOR COOP	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	0.99993	1.00000	1.00000	1.00000

UAE	DAAR AL ***TAKAFUL***	DOMESTIC	Small	1.00000	1.00000	1.00000	1.00000	0.99999	0.99985	0.56957	1.00000
UAE	NATIONAL ***TAKAFUL***	DOMESTIC	Small	1.00000	1.00000	0.99907	1.00000				
UAE	***TAKAFUL***-RE	DOMESTIC	Small	1.00000	0.99999						
UAE	METHAQ ***TAKAFUL***	DOMESTIC	Small	1.00000	0.45620	1.00000	1.00000	0.99996	1.00000	1.00000	1.00000
UAE	***TAKAFUL*** EMARAT INS UAE	DOMESTIC	Small	1.00000	1.00000	0.99999	1.00000	1.00000	0.99994	0.99991	0.99946
UAE	GREEN CRESCENT UAE	DOMESTIC	Small	1.00000	0.99995	1.00000	1.00000	1.00000	1.00000	0.99996	1.00000
UAE	UNITED INSUR UAE	DOMESTIC	Small	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	INSURANCE HOUSE	DOMESTIC	Small	0.99999	1.00000	0.92772	1.00000				
UAE	AL FUJAIRAH UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	ARABIA SCANDI INSURANCE	FOREIGN	Large	0.00000	1.00000	1.00000	1.00000	0.99989	1.00000	1.00000	1.00000
UAE	SHARJAH INSUR UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	DUBAI NAT INS	DOMESTIC	Large	0.99901	1.00000	0.99997	1.00000	1.00000	0.99991	1.00000	0.99999
UAE	RAS AL KHAIMAH	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	ABU DHABI NAT ***TAKAFUL***	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	UNION INS	DOMESTIC	Large	0.99998	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	DUBAI ISLAMIC INSUR	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	0.99998	0.74998	1.00000
UAE	DUBAI INSUR CO	DOMESTIC	Large	0.99997	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	AL DHAFRA INS UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99976
UAE	NATIONAL GEN INSURANCE	DOMESTIC	Large	0.87716	0.99747	1.00000	1.00000	0.99681	0.86956	0.50820	1.00000

UAE	AL WATHBA INS UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.33333
UAE	AL KHAZNA CO UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	ALLIANCE INSUR uae	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80712	1.00000
UAE	AL SAGR NAT UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
UAE	AL AIN AHLIA INS UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.99992	1.00000
UAE	EMIRATE INSUR UAE	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	0.99998	0.99975	1.00000
UAE	AL-BUHAIRA NAT INSUR.	DOMESTIC	Large	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.68432	0.99994
UAE	OMAN INSUR UAE	FOREIGN	Large	1.00000	1.00000	1.00000	1.00000	0.57143	1.00000	1.00000	1.00000
UAE	ISLAMIC ARAB INSURANCE	FOREIGN	Large	1.00000	1.00000	0.42857	1.00000	0.99999	1.00000	0.99949	1.00000