

Efficiency and Competition of GCC Insurance Industry

Asif Ahmed, Rossazana Ab-Rahim, Hassan A. Shah

King Abdulaziz University
Email: aamahmed@kau.edu.sa

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Abstract

Gulf Cooperation Council (GCC) countries have both Takaful and conventional insurance players. Past studies indicate that when there are many players in a particular market it leads to competition and when there is a competition it promotes efficiency. This study therefore aims to investigate the relationship between competition and efficiency for Takaful and conventional in the GCC insurance industry over the study period of 2015 to 2020. The variables employed are labor, total fixed assets, capital equity and business services as inputs and premium and investment income as output. Lerner index method is employed to measure market power which represents the inverse degree of competition, while Data Envelopment Analysis (DEA) is used to estimate the efficiency index. To test the relationship, Granger causality test is employed. The empirical results show that conventional firms are marginally efficient in terms of technical, pure technical and scale efficiency whereas Takaful is performing better in terms of cost and allocative efficiencies. Takaful in UAE and Saudi Arabia are efficient in terms of pure, scale and allocative efficiencies. For conventional Bahrain and Qatar reflecting higher technical, pure and scale efficiencies. Overall, both *Takaful* and conventional firms are efficient and that there is a positive relationship between competition and efficiency. The institutional reform, standardizing Takaful regulations, utilizing resources efficiently and competitive industry are the key policy implications.

Keywords: Takaful, Conventional, Competition, Efficiency, Data Envelopment Analysis, Granger Causality, Lerner Index.

Introduction

The GCC countries consist of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. The insurance sector in GCC developed in the early and middle of the 19th century and almost all insurance companies transacting insurance were initially operating on a conventional basis. The commercial line of insurance was initially popular among the business community and conventional insurance was deemed to be the only option to transfer the uncertainty of businesses until Takaful emerged in 1979 as an alternative (Al-Amri, 2015). However, it was not until 2000, when the first Takaful insurance

company was formed in Kuwait, one of the GCC member country (Alshammari et al., 2018). From 2000 onwards many GCC countries have started establishing Takaful firms. Among these GCC countries, Saudi Arabia has the major Takaful insurance market and the reason behind is that Takaful is mandatory in Saudi Arabia, as per its Cooperative Insurance Law 2004, whereas in the other GCC countries there is no such requirement and the market is open to practice both Takaful or conventional insurance.

Zelizer (2017) highlighted that Takaful being *Sharia'h* compliant triggered both competition and growth in business volume in GCC countries. Garrido et al (2016) highlighted that since Takaful emergence the purchase of insurance in GCC countries has risen considerably. Miniaoui & Chaibi (2014) highlighted that GCC countries represent a major share of the Takaful contribution at a staggering amount of \$8871 bn. ASEAN represent the second largest market with writing an amount of \$4241 bn of Takaful business (Research and Markets, 2020). Major success of the GCC Takaful market attributed to Saudi Arabia which has become the leading Takaful market in the world with the overall GCC position as the number one market according to the Insurance Sector Report issued by Ang (2020). The Gross Written Contributions (GWC) in the GCC region were estimated at USD 8.9 billion, showing a year-to-year growth of 12% according to Alshammari et al. (2018). In spite of the emergence of Takaful, conventional insurance has managed to hold the major market share in the GCC countries (Alajaji et al., 2017).

Other factors that have contributed to the growth are the economic growth itself, population expansion, and increased product awareness. Moreover, the GCC growth resulted from the liberalisation policies such as carrying out institutional reforms, introducing a regulatory framework, policies for closer cooperation among GCC insurance sector to promote and develop customer safety regulations and maintain over all fair and healthy environment.

As GCC countries have both Takaful and conventional insurance players operating, consequently it has caused increased the numbers of players operating in the market. Past studies indicate that when there are many players in a particular market it leads to competition and when there is a competition it promotes efficiency. So, this motivates to investigate whether there is any relationship between competition and efficiency for Takaful and conventional insurance and whether this relationship is positive or negative.

The structure of the study is as follows: the following section will highlight the empirical literature regarding the relationship between competition and efficiency in the insurance sector. The third section shall highlight the data and methodology applying for the purpose. The fourth section contains the empirical analysis, results and discussion. The last section concludes the results and findings.

Objective of The Study

The study aims to investigate the relationship between competition and efficiency for Takaful and conventional in the GCC insurance industry

Literature Review

Efficiency is considered an important aspect of performance measurement in which an individual firm is evaluated in terms of cost, technical aspects, and revenue against the best practice firms (Miniaoui & Chaibi, 2014).

Few studies have been carried out to evaluate the effects of Takaful firm's distribution channel on the efficiency performance. The study analyzes both direct and indirect

distribution channels and the findings shows that results of direct distribution systems in insurance are more cost efficient, however, both distribution systems are equally efficient in taking into account the profit (Berger & Mester, 1997). In respect of the agent distribution system, there are views that reflect the direct distribution systems in which employees under the company's payroll or sponsorship are less efficient than freelancer or independent agent distribution systems (Brockett et al., 1998; Klumpes, 2004).

Alshammari (2019) mentioned that competition in the insurance sector has increased due to the number of players added by the emergence of Takaful. The study examines the impact of competition on the cost efficiency of conventional insurance and Takaful sectors in Gulf Cooperation Council (GCC) countries between 2009–2016 using a stochastic frontier cost function. Overall, results suggest that the relationship between competition and efficiency is positive and supports the Quiet Life (QL) hypothesis where managers in a less competitive market may utilize the market power of their firms and reduce their efforts.

Yasser et al (2017) studied the impact of board structure and organizational structure on the performance of Takaful and financial firms. The study examines the association between board demographics and firm financial performance of Stock Exchange companies and describe the attributes of these firms and their boards. For an organization, the structure of the organization itself is an important aspect and that the separation of ownership and control have a great impact on the eventual efficiency performance.

Ismail et al (2011) discovered that a mutual form of ownership is more proficient in controlling owner consumer or customer disputes and issues because the owners are the policyholders, and, therefore, mutual companies are more efficient than stock companies. However, it leaves a gap to study others forms of ownership efficiency performances such as limited liability company and corporations.

Ali and Markom (2020) Reinsurance support to conventional insurance firms reflect better efficiency performance when compare to the Takaful model. Re-Takaful is an Islamic alternative to the reinsurance industry in ensuring the stability of Takaful companies. This provide an opportunity to study the efficiency level of Takaful firms and market that have Re-Takaful access with those of Takaful firms who do not have the access.

Almuhlim (2019) presented empirical results obtained using data for 26 conventional and seven Takaful insurance firms for 2014–2017 indicated declining average efficiency scores for both firm types. Coscun et al (2020) used empirical studies to presents a wide range of efficiency comparisons of 41 Takaful insurance companies in 16 countries between 2009 and 2014. The results indicate that the excess in the consumption of inputs decreases while the deficit in achieved outputs has been declining in the covered period.

Cappiello (2020) highlighted that technological and digital transformation is greatly affecting the insurance industry. The study involved major 10 Takaful and 12 conventional companies in GCC for 2018-2019. The result shows conventional are ahead in using technology resulting in efficiency performance. Studies has been mainly focused on the performance firms that are advanced in using technology however and there exists a gap to study the firms that are either in its initial stages or in the process of being formed. The result will be beneficial for firms or market contemplating going to use technology.

Methodology

The GCC countries consist of Saudi Arabia, Bahrain, Kuwait, Oman, Qatar, and the United Arab Emirates. In total, there are 155 (one hundred fifty-five) insurance providers in the GCC countries, out which 60 (sixty) are Takaful providers and 95 (ninety-five) are

conventional insurance companies. Out of the total of 155 Takaful and conventional insurance companies an unbalanced set of 140 Takaful and conventional companies was selected as panel data for the period 2015 to 2019. The unbalanced of 140 firms are the combined data of Takaful and conventional firms.

The important task of the efficiency measurement for the financial sector is to provide definitions of the output, input, and their prices (Sealey & Lindley, 1977). There has been much study and discussion on the selection criteria of input and output for the financial sector, especially for the insurance sector (Khan & Noreen, 2014). The insurance industry uses inputs to produce outputs through the use of insurance contracts (Al-Amri, 2015). Khan and Noreen (2014) highlighted that different output variables have been used to identify the competition and efficiency of the insurance sector. The study shows premium income as the common output variable.

The following section highlights the approaches applying for measuring the competition and efficiency.

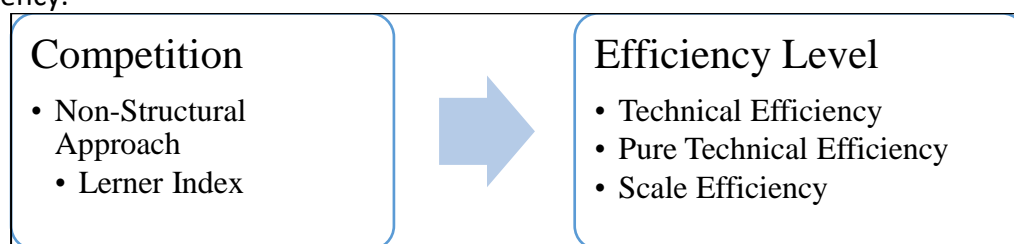


Figure 1. Model for measuring competition and efficiency in insurance sector

In the first stage we examine the degree of competition between Takaful and conventional in GCC countries using the test of Lerner index (LI). The second stage relies on the data envelopment analysis (DEA) to measure the cost efficiency of 140 insurance providers – Takaful and conventional – in GCC countries over the period 2015- 2019. In the last step, we examine the nexus between the efficiency competition of Takaful and conventional.

Lerner Index

The Lerner index is defined as the difference between price (calculated as the ratio of total costs to total assets) and marginal cost (expressed as a percentage of prices), divided by price, and used to compute several empirical studies. The Lerner Index measures the degree to which firms can mark-up output prices over the marginal cost of production. The empirical expression of the Lerner Index is:

$$LERNER = \frac{p - MC}{p}$$

Where p is the average price of the insurance (proxies as the quotient between total revenues and total cost and MC is the marginal cost of the total cost calculated from the estimation of trans-logarithmic costs function. The cos Costs function are estimated as:

$$\ln(Cost_{it}) = \beta_0 + \beta_1 \ln(Q_{it}) + \frac{1}{2} \beta_2 \ln(Q_{it}^2) + \sum_{k=1}^3 (\gamma_{kt}) \ln(W_{k,it}) + \sum_{k=1}^3 \phi_k \ln(Q_{it}) \ln(W_{k,it}) + \sum_{k=1}^3 \sum_{j=1}^3 \ln(W_{k,it}) + \varepsilon_{it} \tag{Equation 1}$$

DEA

The study analyses various efficiency measures of Takaful and conventional in GCC countries using data envelopment analysis (DEA). Charnes et al. (1978) introduced DEA and it is recognized as a benchmarking technique for efficiency measurement and evaluating the

performance of organization. Using data and the DEA methodology, the efficiency is measured in respect of TE, CE, AE, PTE, and SE.

The following equitation is highlighted by Battese and Coelli (1992):

$$\begin{aligned} & \max (u'yi/v'xi), \\ \text{s.t.} \quad & u'yi/v'xi \leq 1, j= 1,2,3..., N, \\ & u, v \geq 0 \end{aligned} \tag{Equation 2}$$

The Granger-Causality Test

The standard procedure for testing whether the financial sector, like bank efficiency Granger causing competition, involves estimating the following equations via least-squares regression:

$$y_{it} = \alpha_0 \sum_{l=1}^m \alpha_1^y y_{it-l} + \sum_{l=1}^m \delta_1^y x_{it-l} + f_i^y + u_{it}^y \tag{Equation 3}$$

$$x_{it} = \beta_0 \sum_{l=1}^m \alpha_1^x x_{it-l} + \sum_{l=1}^m \delta_1^x y_{it-l} + f_i^x + u_{it}^x \tag{Equation 4}$$

Where y represents efficiency, x represents the competition, and f represents the bank’s individual effect. i and t represent the indices for the bank and the time period, respectively. Each dependent variable is regressed on its yearly lags and on those of the other variable (Berger & DeYoung, 1997; Williams, 2004). To examine the relationship between competition and efficiency, Granger Causality is employed using input and output.

$$Eff_{it} = \alpha_i + \beta_1 Com_{it} + \beta_2 Cont_{it} + \varepsilon_{it} \tag{Equation 5}$$

$$Com_{it} = \alpha_i + \beta_1 Eff_{it} + \beta_2 Cont_{it} + \varepsilon_{it} \tag{Equation 6}$$

The equation 5 examines the effects of competition and the macroeconomics variable towards efficiency. The equation 6 examines the impact of efficiency and macroeconomics towards competition.

Analysis of Results and Discussion

The following sections shall measure the degree of competition and efficiency in GCC for *Takaful* and conventional insurance for 2015 and 2019. In the next section relationship between competition and efficiency is assessed in the GCC insurance sector.

Table 1
Correlation between Efficiency and Competition for Takaful in GCC Insurance Sector

Model	Model 1		Model 2		Model 3		Model 4		Model 5	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Constant	-21.10	1.211	-	1.435	-	2.602	-	2.490	4.651	2.814
	-2.854***	0.619	20.537		13.456		10.219			
Lerner Index (LI)			-	1.255	-1.323	2.214**	-0.853	2.175**	0.465	2.945***
	0.2912	-0.126	0.342	-0.092	-0.452	-0.664	-0.880	-1.097	0.036	-0.566
Gross Domestic Product	0.856	-0.411	0.699	-0.257	-1.004	-1.946*	-1.659	-	0.082	-1.822*
	2.118	0.057	1.995	0.057	1.397	-0.030	1.143	0.024	-	-0.071
CPI	3.087***	0.331	2.026*	0.562	1.543	-0.287	1.071	0.238	-	-0.836
	0.0753	0.023	0.0291	-0.082	0.085	0.025	0.041	-0.049	0.113	0.065
Hausman Test	1.203	0.382	0.324	-0.987	1.032	0.326	0.418	-0.546	1.390	0.867
	11.905***		13.423***		4.479		6.880*		17.528***	

Notes: The coefficient is significant at 1% ***, 5% **, and 10% * level.

Based on Table 1, as per the Hausman test, the fixed effects model is appropriate for model 1, model 2, model 4, and model 5, while for model 3, the random-effects model is appropriate. The empirical results suggest that the Lerner index is negatively related to the scale efficiency at 10% significance. However, GDP is positively related to technical efficiency and pure technical efficiency at 1% and 10% significance for the macroeconomic variables. The results exhibit that competition has a positive relation with scale efficiency.

Table 2

Summary of Competition and Efficiency for Takaful

Model	Model 6		Model 7		Model 8		Model 9		Model 10	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Constant	11.170	1.423	9.847	1.405	6.269	1.505	5.617	1.289	8.352	1.290
	1.881*	1.110	1.816	1.057	1.165	1.303	1.121	2.712	1.629	2.395**
Technical Efficiency (TE)	0.141	-0.047	-	-	-	-	-	-	-	-
	0.856	-0.373	-	-	-	-	-	-	-	-
Pure Technical Efficiency (PTE)	-	-	0.082	0.002	-	-	-	-	-	-
	-	-	0.699	0.015	-	-	-	-	-	-
Scale Efficiency (SE)	-	-	-	-	-0.124	-0.184	-	-	-	-
	-	-	-	-	-1.004	-1.687	-	-	-	-
Allocation Efficiency (AE)	-	-	-	-	-	-	-0.158	-0.241	-	-
	-	-	-	-	-	-	-1.659	-3.260***	-	-
Cost Efficiency (CE)	-	-	-	-	-	-	-	-	0.011	-0.155
	-	-	-	-	-	-	-	-	0.082	-1.74*
Gross Domestic Product	-0.966	-0.059	-0.839	-0.065	-0.483	-0.045	-0.417	-0.010	-0.692	-0.031
	-1.760*	-0.514	-1.691*	-0.540	-0.982	-0.429	-0.914	-0.232	-1.505	-0.657
CPI	0.0003	0.029	0.0087	0.028	0.021	0.033	0.016	0.0041	0.010	0.030
	0.0074	0.692	0.120	0.666	0.483	0.798	0.394	0.108	0.218	0.727
Hausman Test	3.914		3.581		2.088		11.713***		14.536***	

Notes: The coefficient is significant at 1% ***, 5% **, and 10% * level.

Table 2 provides a summary of the correlation between competition and efficiency for *Takaful*. The Hausman test shows that the random-effects model is more appropriate for model 6, model 7, and model 8. At the same time, the fixed effects model is more suitable for model 9 and model 10. Based on the empirical results, the efficiency level has no significant impact on competition. The results show that the efficiency of insurance firms does not affect the level of competition.

Table 3

Summary of Efficiency and Competition for Conventional

Model	Model 11		Model 12		Model 13		Model 14		Model 15	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Constant	-18.817	1.340	-18.088	0.900	-27.633	-8.875	-18.874	0.139	4.739	2.369
	0.019***	0.677	-1.727*	0.840	-0.699	-2.192**	-1.591	0.052	0.506	0.777
Lerner Index (LI)	-0.375	-0.319	0.219	0.501	1.313	3.237	0.648	0.654	0.111	0.252
	-0.773	-0.761	0.312	1.362	0.496	2.332**	0.816	1.016	0.177	0.447
Gross Domestic Product	1.873	0.058	1.782	0.067	2.587	0.782	1.828	0.118	-0.299	-0.093
	2.887***	0.331	1.900*	0.705	0.731	2.177**	1.721*	0.504	-0.356	-0.345
CPI	0.090	0.028	0.027	-0.090	-0.212	-0.327	0.011	-0.042	0.110	0.106
	1.396	0.462	0.285	-1.081	-0.604	-1.043	0.108	-0.427	1.323	1.337
Hausman Test	11.192***		12.698***		1.310	2.977		0.672		

Notes: The coefficient is significant at 1% ***, 5% **, and 10% * level.

Table 3 explains the relationship between efficiency and competition for conventional. The Hausman test suggests that the fixed effects model is appropriate for model 11 and model 12, while the random effects model is more suitable for model 13, model 14, and model 15. Competition and GDP are positively related to scale efficiency. The result explains that the increase in market power and GDP improves conventional insurance firms' scale efficiency.

Table 4

Summary of Competition and Efficiency for Conventional

Model	Model 16		Model 17		Model 18		Model 19		Model 20	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Constant	0.177	1.105	2.408	1.056	2.220	1.223	2.972	1.229	1.866	1.057
	0.042	1.027	0.621	1.025	0.615	2.310**	0.794	0.844	0.515	0.705
Technical Efficiency (TE)	-0.091	-0.064	-	-	-	-	-	-	-	-
	-0.773	-0.699	-	-	-	-	-	-	-	-
Pure Technical Efficiency (PTE)	-	-	0.026	0.032	-	-	-	-	-	-
	-	-	0.312	0.434	-	-	-	-	-	-
Scale Efficiency (SE)	-	-	-	-	0.011	0.042	-	-	-	-
	-	-	-	-	0.496	2.099*	-	-	-	-
Allocation Efficiency (AE)	-	-	-	-	-	-	0.058	0.053	-	-
	-	-	-	-	-	-	0.816	0.802	-	-
Cost Efficiency (CE)	-	-	-	-	-	-	-	-	0.017	0.032
	-	-	-	-	-	-	-	-	0.177	0.353
Gross Domestic Product	0.060	-0.027	-0.160	-0.038	-0.140	-0.053	-0.216	-0.058	-0.109	-0.038
	0.154	-0.278	-0.450	-0.407	-0.431	-1.074	-0.633	-0.436	-0.335	-0.281
CPI	0.037	0.029	0.029	0.028	0.032	0.024	0.028	0.030	0.028	0.026
	1.147	0.984	0.922	0.927	1.010	0.808	0.908	1.022	0.843	0.811
Hausman Test	3.675		3.928		15.824***		1.341		1.154	

Notes: The coefficient is significant at 1% ***, 5% **, and 10% * level.

Table 4 exhibited the correlation of competition with efficiency for conventional insurance firms. The random-effects model is appropriate for model 16, model 17, model 19, and model 20, whilst the fixed effects model is more suitable for model 1. The empirical results for the conventional are the same as for *Takaful*. The efficiency level of insurance firms does not affect market power.

Granger Causality Test to Assess the Relationship between Efficiency and Competition within the GCC Insurance Industry.

The Granger causality tests are performed for each type of efficiency, namely, technical, pure technical, scale efficiency, cost efficiency, and allocative efficiency to examine the relationship between efficiency and competition within the GCC insurance industry. Before

proceeding with the Granger Causality test, the first step is selecting an appropriate lag length. Therefore, the lag length selection is carried out, which the Akaike information criterion (AIC) suggests. Hence, by choosing an appropriate lag, the model selection test AIC has been conducted.

Regression Results

Based on the findings, it is suggested that technical efficiency (TE) affects the Lerner index (LI) in the long run at 10% significance. There is a strong relationship between LI and allocative efficiency (AE) at 5% significance. LI and CE affect GDP at 10% significance.

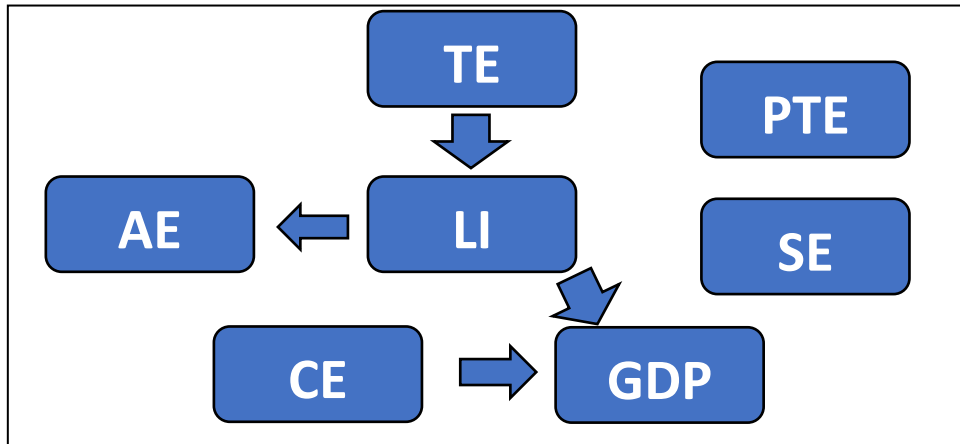


Figure 2: Direction of Causal Relationship for *Takaful*

Figure 2 summarizes the granger causality results via a diagram to identify the relationship between the Lerner index and the efficiency of Takaful insurance firms. The relationship between the Lerner index and allocation efficiency is unidirectional in the long run. This explains that an improvement in the market power of insurance firms will improve/reduce the AE in the long run. In the long run, there is a unidirectional relationship between the Lerner index and technical efficiency. The findings explain that technically efficient insurance firms improve/reduce the market power in the long run. Besides that, CE and LI have a unidirectional relationship with GDP in the long run.

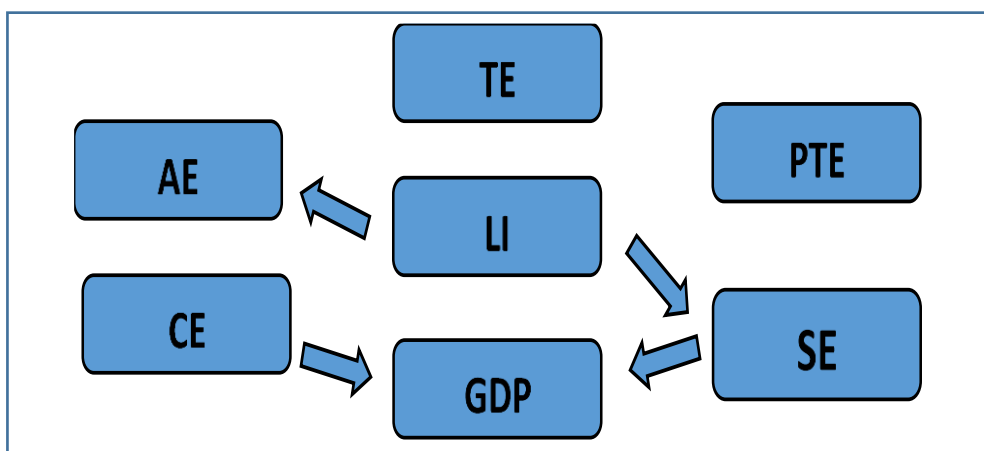


Figure 3: Direction of Causal Relationship for *Conventional*

Figure 3 summarizes the granger causality results via a diagram to identify the relationship between the Lerner index and conventional insurance firms' efficiency. The relationship between the Lerner index and allocation efficiency is unidirectional in the long run. In the long run, there is a unidirectional relationship between the Lerner index and scale efficiency. Furthermore, SE and CE have a unidirectional relationship with GDP.

Conclusion

The Granger causality is employed to assess the relationship between *Takaful* and conventional insurance efficiency and competition in the GCC. *Takaful* firms' results indicate a unidirectional relationship between technical efficiency and the Lerner Index and the Lerner Index with allocative efficiency in the long run. The conventional firms' results show that the Lerner index has a unidirectional relationship with allocative efficiency and scale efficiency. Furthermore, TE correlated with LI, and LI is associated with AE in the long run for *Takaful* firms, while, for conventional firms, LI is related to AE and SE in the long run. In a nutshell, CE and LI have a unidirectional relationship with GDP in the long run for *Takaful* firms. In contrast, SE and CE have a unidirectional relationship with GDP for conventional firms.

The contribution of the study is that it transpired the impact of efficiency and competition. Based on the study *Takaful* and conventional insurance firms are gaining scale efficiency together with market power. Whereas GDP boosts technical efficiency and pure technical efficiency. Further, when the economies of the countries improve it increases the utilization of the resources and the adoption of the best managerial practices. On the other hand, for conventional insurance firms, GDP boosts the scale efficiency.

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