

Measuring the effect of GST towards performances of Malaysian takaful operators

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Submission date: 13-Apr-2023 03:45PM (UTC+0800)

Submission ID: 2063305444

File name: operatorsJournal-of-Islamic-Accounting-and-Business-Research.pdf (198.47K)

Word count: 8652

Character count: 46847

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Malaysian
takaful
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Received 19 June 2020
 Revised 26 October 2020
 30 January 2021
 1 May 2021
 25 August 2021
 10 December 2021
 Accepted 3 April 2022

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Abstract

Purpose – The main purpose of this study is to evaluate the performance of takaful operators in Malaysia.

Design/methodology/approach – The study applied the data envelopment analysis (DEA) technique and the ratio analysis, using secondary data available on Malaysian Takaful operators' annual reports. The study period for the analysis ranged from 2013 to 2016.

Findings – Based on both analyses, the performance of Takaful operators was affected due to the additional cost imposed by the goods and services tax (GST) implementation. Results showed a decline in average technical efficiency for takaful operators upon GST implementation.

Research limitations/implications – The data were taken from the annual audited reports for selected firms that were available on the firm's website only, which was limited. The data were taken till 2016, even though the GST is omitted from Malaysia on 1 June 2018. This study has applied Ratio analysis and DEA constant returns to scale (CRS) technique; the future study may adopt both DEA CRS and DEA carrying returns to scale model to evaluate along with other methods to identify the specific factors.

Practical implications – These findings may associate policymakers in identifying the shortcomings of GST or new tax implementation in a new and emerging industry. So, the policymakers and central banks may adopt necessary initiatives to support the industry. Because the Malaysian government is trying to push the takaful industry along with Islamic banking and finance in the competitive market, takaful operators may be exempted from the current sales and service tax (SST). In addition, takaful operators may use these findings to enhance their operational activities efficiently to improve performance. This paper might help the researchers and practitioners to learn the impact of GST. Even though GST seems not relevant anymore as the government has replaced it with SST, the trick is still the same as it is a kind of tax or costs incurred by the Takaful operators in running their business. Takaful managers may identify their efficient level in managerial aspects as well as the optimal scale of resources by the findings of this study.

Originality/value – To the best of the authors' knowledge, this research is original in terms of data that is gathered directly from the annual report of the company during the GST period.

Keywords Technical efficiency, Data Envelopment Analysis (DEA), GST Malaysia, Insurance efficiency, Ratio Analysis, Takaful performance

Paper type Research paper

The authors would like to thank the Malaysian Ministry of Higher Education for financial support under Research Acculturation Grant Scheme (RAGS15-060-0123) for funds granted to conduct this research.



Introduction

The Malaysian Takaful (Islamic insurance) industry is currently experiencing positive growth, albeit in a challenging economic situation due to COVID-19. According to the Malaysian Takaful Association (MTA), among the initiatives that the industry has implemented since 2020 until recently are the injection of RM8 Millions of COVID-19 Test Fund by the MTA, the Life Insurance Association of Malaysia (LIAM) and the Persatuan Insurans Am Malaysia. The MTA and Islamic Banking and Finance Institute Malaysia have also conducted a virtual Takaful Basic Examination for Takaful agents and a 90-day moratorium of premium/contribution payment, which was initiated by the MTA and LIAM (The Star, 2020). It also was reported by the Deputy Chairman of MTA that the Takaful industry had achieved RM 286.2bn for the new Takaful business, which amounted to RM 3.19 bn in total new business contribution for all certificates combined in the period from January 2020 to June 2020 (The Star, 2020). The protection value has increased by 0.97% compared with the same period in 2019 (The Star, 2020). As the industry regulator, Bank Negara Malaysia (BNM) is one of the important harbingers of change in the industry. One of the significant legislation under the purview of BNM that came into force in 2013 was the Islamic Financial Services Act (IFSA) 2013 (IFSA, 2013). IFSA focuses on the integrity, fairness and accountability of Islamic financial institutions while trying to increase the protection of the rights and interests of all the stakeholders in the industry. This regulation will distinguish takaful businesses (such as family and general), enlarge the business operation and scrutinise each stakeholder's role in the business.

In 2015, the Malaysian government replaced Sales and Service Tax regimes with the goods and services tax (GST). Hence, there are significant findings to be shared with other researchers with regards to the GST, even though it took only two years of its implementation in Malaysia. Several possible reasons why the government imposed the GST, which including to reduce the fiscal deficit, government debts, administrative and compliance costs, price distortions, operating costs and most importantly, sustaining transparency and reducing uncertainty in the tax system (Yadav and Shankar, 2018). However, among the negative side of GST was most companies have to bear the increase in their internal cost for tax computation and planning (Palil *et al.*, 2013). In the context of takaful, because of the unclear direction of GST and how it would affect the customers, the public at that time was worried that takaful operators would increase the product price (contribution), which have a similar effect on the consumers' product due to the GST (Salleh *et al.*, 2018). As a result, it has slightly slowed down the takaful business for the short term due to the market interpretation. To ensure the industry would remain its momentum to growth in the GST era, MTA has released an announcement on the effect of GST on the takaful products and the customers. Assumedly, the GST might not affect the price of the Takaful products as well as the contribution because the amount of GST will be captivated by the operators. They parallel the definition of takaful as a scheme of donation that promotes the spirit of brotherhood among the contributors (participants).

Islamic Financial Services Act (IFSA, 2013, p. 24) defines takaful as "means an arrangement based on mutual assistance under which takaful participants agree to contribute to a common fund providing mutual financial benefits payable to the takaful participants or their beneficiaries on the occurrence of pre-agreed events" (IFSA, 2013). Researchers have shared their views on the implementation of GST on the takaful participants where they argued that takaful is based on a donation (tabarru) contract and should be exempted from the GST (Lukman and Elatrash, 2017). Therefore, a part of the business has been exempted from the GST, especially a Family Takaful business that provides coverage for death, medical and total permanent disability (Royal Malaysian Royal

Malaysian Customs, 2017). However, the fees and charges imposed on any takaful schemes are subjected to GST, such as fees for certification, fund management, transferring funds and contribution payment. On the operators' side, GST has affected their operation costs to adjust to a new system and train or employ new staff for GST purposes. This paper, therefore, is conducted to observe the effect of GST on the performance of takaful operators by measuring and comparing the efficiency of individual takaful operators for a period before and after the GST is implemented.

Literature review ¹⁰

Financial institutions' efficiency

Efficiency represents the dimension of relative performance for decision-making units of an organisation (Azad *et al.*, 2017). In general, the output to input outlines efficiency; higher output per unit of input displays better efficiency, whereas optimum efficiency is revealed by maximum output per unit of input (Sherman and Zhu, 2006). Dimension of efficiency leads the way to maximise its output and profitability while minimising costs (Mokhtar *et al.*, 2008). Besides, evaluation of efficiency identifies the scopes for managers to measure the performance and outlines insufficiency for advanced improvements (Mostafa, 2007). Nevertheless, the inefficiency of financial institutions is not inevitably happening due to incompetence of management; it might also be triggered by technical, socio-economical and managerial consequences (Sherman and Zhu, 2006).

Efficiency is classified into four segments: technical efficiency, scale efficiency, price efficiency and allocative efficiency (Sherman and Zhu, 2006). According to Sherman and Zhu (2006), technical efficiency refers to measuring the ability of a financial institution to produce actual output with given lower input or fewer resources; scale efficiency refers to an optimal level of production; price efficiency refers to the increase in inefficiency by cheaper input; allocative efficiency evaluates the optimal mix of various inputs to produce outputs. Furthermore, technical efficiency generally denotes the capability of a firm to maximise outputs by using specific inputs; or with maximisation of inputs produce the same level of outputs, whereas allocative efficiency considers the optimal arrangement of inputs and outputs in a given price (Cooper *et al.*, 2002). Thus, efficiency may also be defined as X-efficiency, measure the firm's productivity using inputs to produce outputs by choosing appropriate inputs (Othman *et al.*, 2016). This study has mainly focused on overall technical efficiency using data envelopment analysis (DEA) to evaluate the performance.

Data envelopment analysis for insurance efficiency

Previous scholars used different approaches (parametric and non-parametric) to evaluate the efficiency of financial institutions. Hence, DEA as a non-parametric approach, has been extensively used to estimate and evaluate the efficiency of insurance companies globally. This technique can incorporate several factors linked with fund performance (Galagedera and Silvapulle, 2002). The performance index refers to the surplus over and beyond the market return attained by a fund by scheming the risk of the investment and costs incurred in steering transactions (Murthi *et al.*, 1997). DEA technique discloses the reason for inefficiency and indicates how to restore the operator to an optimum level (Galagedera and Silvapulle, 2002). However, this method is a common and broadly applied non-parametric analysis for measuring efficiency (Chowdhury and Haron, 2021; Wanke *et al.*, 2016; Zerfat *et al.*, 2013). Additionally, non-parametric-DEA comparably provides better results than parametric-SFA (Parman and Featherstone, 2019; Ruggiero, 2007). Many studies have applied DEA for measuring the efficiency of insurance companies in different countries such as European countries (Biener *et al.*, 2016; Eling and Schaper, 2017; Grmanová and Strunz, 2017;

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Zimková, 2015), Gulf Cooperation Council (GCC) countries (Al-Amri, 2015), Turkey (Ertugrul *et al.*, 2016), Saudi Arabia (Akhtar, 2018; Benyoussef and Hemrit, 2019), Jordan (Jaloudi, 2019), Iran (Gharakhani *et al.*, 2018), Pakistan (A. Khan and Noreen, 2014) and Malaysia (Antonio *et al.*, 2013; Bao *et al.*, 2018; Jaaman and Roplan, 2019; Nourani *et al.*, 2018; Yakob *et al.*, 2014). In these consequences, the DEA approach seems to be the most affluent and adequate methodology for measuring the efficiency of insurance companies.

Benyoussef and Hemrit (2019) studied 23 insurance companies; Akhtar (2018) compared the efficiency level between takaful and conventional insurances; Almulhim (2019) applied DEA to measure the efficiency and performance of 23 conventional and seven takaful insurance companies in Saudi Arabia. Jaloudi (2019) has used DEA for measuring the technical efficiency of insurance companies in Jordan. Gharakhani *et al.* (2018) evaluated the efficiency of 30 non-life insurance companies with DEA applications in Iran. Grmanová and Strunz (2017); Zimková (2015) applied DEA to determine the technical efficiency and super-efficiency score of insurance companies in Slovakia. Likewise, Wanke and Barros (2016) applied DEA to determine the efficiency of Brazilian insurance companies, Ertugrul *et al.* (2016) for Turkish insurance companies, Biener *et al.* (2016) for Swiss insurances and Khan and Noreen (2014) for Pakistani insurance companies. Furthermore, Eling and Schaper (2017) adopted DEA to evaluate the efficiencies of insurance companies for 14 European countries, Al-Amri (2015) in GCC countries, Eling and Jia (2019) for global insurance companies. So, it is acknowledged that DEA approach is widely and successfully used to measure the efficiencies of insurance companies globally. Furthermore, DEA application provides an overall performance evaluation of management and also allows the integration of insurance companies' performance (Bao *et al.*, 2018).

Hence, few studies evaluated efficiency and performance using the DEA approach for takaful operators and conventional insurances in Malaysia. Accordingly, Jaaman and Roplan (2019) adopted DEA to measure the efficiency of general insurance in Malaysia. The findings denoted that the general insurance company must develop its investment strategy and identify suitable investment tools to achieve better returns. Similarly, Bao *et al.* (2018) found that the efficiency of local insurance companies increased from 78.9% in 2014 to 79.1% in 2015 by evaluating the performances of 24 local insurance companies with the DEA approach. Indeed, the efficiency of local insurance companies is lower than foreign-owned insurance companies (Nourani *et al.*, 2018). The study suggested that the lack of total investment and high usage of input amounts are the main reasons for lower efficiency for locally owned insurance companies. Using a similar approach, Yakob *et al.* (2014) found Takaful operators were more efficient than the conventional insurance in terms of risk management by measuring 20 conventional and takaful insurances. On the contrary, Antonio *et al.* (2013) found conventional insurance companies with better efficiencies than takaful operators in 2011. Past studies stated similar results (Abduh and Omar, 2012; Ismail *et al.*, 2011; Saad *et al.*, 2006; Saad, 2012). The study suggested that takaful operators should be concerned about external expenses as scale efficiency gradually decreases. These findings stimulated the inefficiencies of takaful operators idiosyncratically or comparably to conventional insurance companies in Malaysia.

Ratio analysis and other techniques for performance

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Apart from the DEA approach, a few more techniques were used to evaluate the performances of insurance companies in Malaysia. Using ratio analysis, Hidayat and Abdulla (2015) found that the conventional insurance companies have achieved a better position in profitability and efficiency than Takaful operators in Bahrain (considering data from the year 2006 to 2011). Similarly, Abdou *et al.* (2014) stated that conventional insurance

companies performed better than takaful operators in profitability and risk management while takaful operators outperformed in the context of premium to surplus ratio. Thus, the performance of takaful operators is lower than conventional insurance companies in Malaysia (Abduh and Omar, 2012; Ismail *et al.*, 2011).

Several factors were found to affect takaful performance positively such as commitments, inspirations, dedication (Hamid and Rahman, 2011), contribution growth, investment income, takaful leverage, liquidity and Islamic equity index (Abduh and Zein Isma, 2017), size, re-takaful dependency, solvency (Ismail, 2013). On the other hand, size, risk retention, expenses and profit rate were recorded to negatively influence the equity to asset ratio (Abduh and Zein Isma, 2017). In these circumstances, several factors have impacted the performance of takaful operators. Furthermore, the above findings of efficiency and performance of takaful operators idiosyncratically and comparably provided mixed results. Thus, the implementation of GST led the organisation to adjust to the system by using additional staff and operating systems such as software. As a result, this study attempted to fill the gaps by evaluating the efficiency and performance of takaful operators before and during the GST implementation.

The performance of the Takaful industry have changed due to several issues. It includes changing in medical technologies and income levels and expanding the Islamic financial industry (Sherif and Azlina Shaairi, 2013). Zainol and Soon (2015) used the impact of GST on SMEs in different countries such as Australia, New Zealand, Singapore and Malaysia. The study denoted that GST implementation has increased the additional cost for the companies to adopt and install a new system along with training the employees to learn the recording GST input in Malaysia. Though, Malaysia has appreciated export-oriented businesses by exempting GST from export-oriented products. Companies can claim back the GST that is paid during the purchase of raw materials and other services before the end of exported products. The companies still spent additional costs to establish the new system and updated the software to keep a good record of all transactions and expenditures. Similarly, Zainal *et al.* (2016) found that the implementation of GST has increased the prices of housing materials, whereas the developers faced several issues in terms of capital and cash flow that led to higher cost of construction. Hence, Khan (2015) identified that the outspoken agency fee has an inverse relationship with the performance of insurance companies in terms of profitability, which significantly impacts the expenses of the insurance companies. Due to GST implementation, there might be a possible downward performance of takaful operators in this scenario.

Methodology

Mainly there are two types of principal methodologies used, non-parametric-DEA and non-parametric-SFA (Stochastic Frontier Approach), for measuring the efficiency of financial institutions (Tamatum *et al.*, 2019). DEA technique is linear mathematical programming formed by Charnes *et al.* (1978) to measure the relative efficiency of production units. The DEA technique can be analysed in two ways; input and output-oriented (Galagedera and Silvapulle, 2022). However, this study follows the output-oriented DEA-constant returns to scale (CRS).

The DEA technique usually measures the efficiency of each DMU with a given DMUs set, inputs and outputs attained as a ratio of weighted outputs to weighted inputs (Wanke and Barros, 2016). For instance, a set of n observations on the DMUs and each observation, DMU _{j} (whereby $j = 1, \dots, n$) applies m inputs X_{ij} (whereby $i = 1, \dots, m$) to yield s outputs Y_{rj} (whereby $r = 1, \dots, s$). DMU _{o} refers to one of the n DMUs under assessment, X_{io} and Y_{ro} refer to i th input and r th output for DMU _{o} , correspondingly. The application of DEA considers both CRS and carrying returns to scale (VRS) analysis. CRS named as Charnes, Cooper and Rhodes (CCR) model, proposed by (Charnes *et al.*, 1978), whereas VRS named as Banker,

Charnes and Cooper model, proposed by (Banker *et al.*, 1984). So, the CRS model mainly measures the constant returns to scale, which presents overall technical efficiency. This study has aimed to evaluate the performance of takaful operators over the study period. Therefore, the CRS model is chosen to achieve the objective of this study. The data envelopment model for the CCR frontiers is presented in Table 1.

More so, paired *t*-test was applied to identify the significant differences in efficiency and performances of takaful operators. By categorising before and after GST implementation, this study conducted mean differences analysis to find the statistical effect on the differences in performance. The following equation exhibits the calculation of paired *t*-test for paired differences:

$$t = \frac{\bar{X}_d - \mu_d}{S_d/\sqrt{n}}$$

Where \bar{X}_d = mean of the sample;
 μ_d = assumed mean;
 S_d = standard deviation; and
 n = number of observations.

Selection of data 47

The appropriate selection of inputs and outputs of financial institutions, especially the insurance industry, is challenging and critical (Khan and Noreen, 2014; Worthington and Hurley, 2002). Past studies have used different inputs and outputs to measure the efficiency and productivity of insurance companies (Appendix). They were mainly provided two services: risk management and financial intermediaries (Cummins and Zi, 1998). Thus, an intermediate approach is applied to select inputs and outputs for this study.

Labor (salaries and wages), capital and business services are generally referred to as inputs to measure efficiency (Cummins *et al.*, 1996; Greene and Segal, 2004) and equity capital is being used as input (Cummins *et al.*, 1996; Greene and Segal, 2004; Jeng and Lai, 2005). GST implementation costs the operators additional staff and software to maintain it; thus, the salaries and wages have increased simultaneously. Insurers must maintain equity capital to settle the claims payment for policyholders if there is any loss incurred (A. Khan and Noreen, 2014). This study includes three inputs labour (X1), equity capital (X2) and business services (X3).

Frontiers	Envelopment
CCR Model Constant Returns to Scale (CRS)	$\begin{aligned} & \text{Max } \theta \\ & \text{s.t.} \\ & \sum_{j=1}^n \lambda_j X_{ij} \leq X_{io}, \forall i \\ & \sum_{j=1}^n \lambda_j Y_{rj} \geq \theta Y_{ro}, \forall r \\ & \lambda_j \geq 0, \forall j \end{aligned}$

Table 1.
DEA Output-oriented
envelopment

Source: Wanke and Barros (2016)

Takaful operators mainly collect contributions from participants in the scheme of risk-sharing and re-distributing among the participants in need. Another takaful operators' approach acts as financial intermediaries by investing assets. Therefore, this study includes net takaful contribution (Y1) and investment income (Y2) as outputs.

For the analysis, DEA is adopted to measure the operational efficiency of the takaful operators under study. Besides the DEA method, ratio analysis is conducted in this study, including net premium and investment income received to total asset ratio and total return to total assets ratio. The ratio of net premium and investment income to total asset ratio signifies the performance of the companies in managing the liquidity position, and the total return to total assets ratio was performed to evaluate the capability of management to make a return from the investment of the assets. The management was performed well in their asset deployment if the ratio was high. Total nine takaful operators were selected for this study.

Nine Malaysian takaful operators were selected for this study. Although, only eleven takaful operators (Bank Negara Malaysia, 2020) provide Islamic insurance facilities. The data were collected from audited financial statements of nine operators from 2013 to 2016 (GST implemented from March 2015) due to the availability of reports during the period of data collection.

Results

Descriptive statistics

As mentioned earlier, DEA is performed with three inputs and two outputs for each takaful operator. As such, labour and equity capital is considered as inputs. Meanwhile, net takaful contribution and investment income become the output of the operators. Results of descriptive analysis for all variables are exhibited in Table 3. In detail, for net premium, the highest amount that managed to be collected by the operators was RM 1,338,467m. Meanwhile, for investment income, on average, the operators have gathered a total of 50,282 within the range 4,828 and 232,705. On average, there were 39,406 workers been employed in the industry, with equity capital 229,204.6 and 78,693 businesses gained.

The net takaful contribution ranges from 54,317 to 1,169,612. Besides, the mean value is 497,686.40. The investment income ranges from 5,892 to 1,169,612, and the mean value is 57,893.56. In 2014, the labour cost (salaries and wages) for all takaful firms ranged from 9,831 to 120,980, whereas the mean value was 40,786.33. Finally, the equity capital ranged from 60,702 to 615,110, with mean value is 240,569.10. Business services ranged from RM 9,068 to RM 221,675, whereas the mean value is 83,952.22.

According to Table 2, net takaful contribution ranges from 49,193 to 1,256,406. The investment income ranges from 7,130 to 267,553. In 2015, the labour cost for all takaful firms ranged from 9,784 to 133,637. The mean value is recorded at 44,788. The equity capital

Year Variable	2013		2014		2015		2016	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Y1	450,125.3	427,566.3	497,686.4	383,293.8	524,153.6	437,993.7	585,995.7	512,252.4
Y2	50,282	73,530	57,893.6	76,458.8	65,621.3	82,590.3	70,532.7	86,325.1
X1	39,405.8	40,759.6	40,786.3	35,730.1	44,788.1	39,917.3	48,978.1	43,068.2
X2	229,204.6	202,755.1	240,569.1	222,201.8	238,803	229,939.6	248,521.7	238,604
X3	78,693.1	62,990	83,952.2	65,201	86,998.9	82,103.3	99,315.1	92,464.2

Note: *(Y1 = net Takaful contribution, Y2 = investment income, X1 = Labour, X2 = Equity capital and X3 = business services)

Table 2.
Descriptive statistics
for the input and
output

ranges from 60,245 to 708,769. Business services ranged from 1,708 to 276,664, and the mean value is 86,998.89.

The output variable net takaful contribution ranges from 47,410 to 1,486,309. The investment income ranges from 8,270 to 280,693. Regarding input variables, the labour cost for all takaful firms ranges from 12,716 to 147,638, and the mean value is 48,978.11. The equity capital ranges from 52,898 to 743,143. Business services ranged from 4,691 to 315,123, and the mean value is 99,315.11.

Ratio analysis

Net contribution and investment income are divided by the total asset of the takaful operators. The summation of net takaful contribution and investment income is divided by total assets to find the ratio (Table 3). According to the mean value of the takaful industry, it gradually showed a drop in net premium and investment income on total assets over the years. Such as the means displayed in the table are; 40.78 (2013), 38.53 (2014), 35.23 (2015) and 35.29 (2016). From the results, it is observed that in 2015 and 2016, the ratio of net premium and investment income over total assets fell by more than 3%, whereas the change from 2013 to 2014 is a decline of 2%. It indicates that the takaful operators have a downward impact on liquidity conditions after implementing the GST in 2015. In these consequences, GST implementation might cause these drops in contribution and investment income on total assets. Additional expenses related to GST implementation, calculation and technology adoption led to such drops.

The return on total assets ratio was calculated by dividing the total return by the total assets of the takaful firms. Based on the result in Table 4, the performance of the Takaful industry slowed downwards compared with years before the GST implementation. The results for the respective years are 7.65% (2013), 7.24% (2014), 6.01% (2015) and 4.55% (2016). It is noticeable that the GST implementation has affected the industry in terms of performance through lower profitability. For 2015 and 2016, the profitability rate has significantly dropped compared with the top 2013 and 2014. The change in performance of the takaful industry through the profitability rate is significant. The lower cost enhances the profit rate for the firms. According to the changes in profitability for the takaful industry in 2015 and 2016, it is very transparent that the GST implementation has enhanced the firms' expenditure which reduced the profit rate for the firms. These findings are consistent with Khan (2015) that additional costs lower the takaful operators' performance. However, the GST implementation may affect the profitability; there could be other factors such as the unavailability of investment opportunities and less efficiency in the investment analysis.

Table 3.
Net takaful
contribution and
investment income
on total asset (%)

Takaful operator	2013	2014	2015	2016
AIA Public	42.75	46.91	53.11	68.16
AmMetLife	60.50	36.49	31.09	25.56
Great Eastern	65.08	65.29	48.28	46.09
HSBC Amanah	22.10	23.01	19.14	14.88
Prudential BSN	64.21	60.04	57.44	56.37
Sun Life Malaysia	21.79	25.70	27.49	22.89
Syarikat Takaful	24.01	20.95	21.61	24.47
Takaful Ikhlas	28.80	27.22	26.66	26.29
Zurich Takaful Malaysia	37.82	41.11	32.22	32.86
Mean	40.78	38.53	35.23	35.29

Results and discussion

The performance of takaful operators over the years is measured via different weightage of takaful operators over the years. The measurement of performance was compared between the same operators in different years. According to Fare *et al.* (1994), the achievable output is attained by dividing the output by maximised input. In addition, the weights more than one show higher performance attained by the company, which is efficient and less weighted, indicating lower performance. Table 5 exhibits the technical efficiency of selected takaful operators. The results provided mixed efficiency scores over the period. The average efficiency for takaful operators displays a downward trend from 2014 to 2016. For instance, the average efficiency for selected operators was 0.878 in 2014, dropping to 0.803 in 2015 and another drop to 0.715 in 2016.

Hence, Takaful Ikhlas Berhad performed well in four years as their efficiency is 1, indicating the firm is efficient over the input. The performance of AIA PUBLIC Takaful Bhd for the year 2014–2016 is better as the CRS scale shows the efficiency. Prudential Bank Simpanan Nasional (BSN) Takaful Berhad has shown efficiency based on the CRS scale for 2013, 2014 and 2015. But it has significantly dropped in 2016, which is 0.593. Syarikat Takaful Malaysia Berhad has performed better from 2013 to 2015, but the weight has dropped to 0.888 on a scale of 1. Apart from these firms, no other firm is shown to be efficient in performance in four years of study. Furthermore, most of the firms showed a gradual drop in performance during 2015 and 2016. But the performance of Zurich Takaful Malaysia Berhad has tremendously dropped in 2016 compared with 2015 from 0.669 to

Takaful Operator	2013	2014	2015	2016
AIA PUBLIC	-1.66	-1.94	2.08	0.38
AmMetLife	-7.26	-1.62	-4.33	-10.26
Great Eastern	-1.28	1.21	-2.48	-2.70
HSBC Amanah	13.44	6.19	5.12	4.04
Prudential BSN	2.89	2.11	1.92	2.79
Sun Life Malaysia	5.38	6.19	6.82	5.80
Syarikat Takaful	9.56	7.86	6.28	6.37
Takaful Ikhlas	0.73	0.72	0.90	-0.89
Zurich Takaful Malaysia	47.03	44.43	37.79	35.46
Mean	7.65	7.24	6.01	4.55

Table 4.
Return on total assets
(ROA) (%)

Takaful operator	2013	2014	2015	2016
AIA PUBLIC	0.712	1	1	1
AmMetLife	0.571	0.369	0.313	0.323
Great Eastern	0.678	0.771	0.606	0.684
HSBC Amanah	0.828	0.941	0.856	0.849
Prudential BSN	1	1	1	0.593
Sun Life Malaysia	1	0.97	0.789	0.779
Syarikat Takaful	1	1	1	0.888
Takaful Ikhlas	1	1	1	1
Zurich Takaful Malaysia	0.728	0.855	0.669	0.327
Mean	0.835	0.878	0.803	0.715

Table 5.
Technical efficiency

0.327. The table indicates the reduction of weights (performance) for most takaful firms in 2015 and 2016.

From 2013 to 2014, the performance of the takaful industry in Malaysia appreciated by 5.17%. These results indicate that any dynamic changes in financial institutions' market structure lead to higher operating costs and ultimately reduce profitability; hence, efficiency. As GST was implemented in March 2015, the takaful operators started to record lower efficiency, which was incurred due to higher costs. Hence, the performance of the Takaful industry declined by 8.51% and 10.92% for the year 2014 to 2015 and 2015 to 2016 consecutively. The GST implementation enhanced the service fees for consumers and also the cost of management in terms of using IT experts and establishing a new system to record the GST. As a result, it boosts the additional business service cost for the company. Takaful firms were not exempted from the GST even though few scholars suggested that takaful should be considered based on Tabarru' concept (Lukman and Elatrash, 2017). However, the Family takaful was exempted from GST, whereas firms were still required to establish a new system and employees to adopt the new system and bookkeeping. Thus, it is acknowledged that the GST implementation has increased the input of takaful firms during 2015 and 2016; as a result, the performance of the takaful industry significantly dropped with the penetration of GST.

Based on paired *t*-test results, the mean differences in efficiency score, net premium and investment income ratio and return of asset ratio did not exhibit statistical significance (refer to Table 6). Even though the difference in efficiency was not statistically significant, the reduction in efficiency is quite higher. Accordingly, the differences in both ratios were not significant statistically. Even though the takaful operators have not shown a statistically significant drop in efficiency or performance, but posed a weak performance after GST implementation. However, it is still worth acknowledging this finding if the GST is imposed again in the future.

Conclusions

This study aims to evaluate the changes in performance of the takaful industry before and after the GST implementation in Malaysia. The ratio analysis and DEA method were used to achieve the objective of this study, while paired *t*-test was applied to find the significant mean difference before and after. Both analyses found the performance of the takaful industry is less efficient in the years 2015 and 2016 in the DEA analysis by observing the efficient scale of weights. The study found that the GST implementation insignificantly impacted the takaful industry's efficiency. However, the DEA analysis showed a reduction in 2014 compared with 2013 in the absence of GST. But compared with 2015 and 2016, the percentage of difference in 2014 from 2013 was significantly less. The changes in the efficiency scale of the takaful industry were significant during the 2015–2016-year end, which showed the remarkable worse efficiency of the takaful industry. Because the CRS is the return of firms' output divided by input, mathematically, the higher input lessens the

Variable	Before GST mean score (SD)	After GST mean score (SD)	Mean difference (95% CI)	<i>t</i> -statistic (df)	<i>p</i> -value
Efficiency	0.857 (0.177)	0.760 (0.234)	0.097 (–0.0037, 0.198)	2.22 (8)	0.057
Premium <i>N</i>	39.65 (16.72)	35.26 (15.7)	4.398 (–3.83, 12.63)	1.232 (8)	0.253
inv. income	7.443 (15.11)	5.283 (12.538)	2.16 (–0.539, 4.86)	1.845 (8)	0.102
ROA					

Table 6.
Results of paired
t-test

return, indicating the management failed to use the input successfully. In this circumstance, the additional cost linked with business services may lead to higher input, such as additional service tax, natural disasters, economic recession and lack of skilled employees (Akhter, 2018). The GST was implemented in Malaysia from 1 April 2015, which was outraged for most companies regarding the system's adoption.

In the recent period, the new government has imposed various taxes regimes to increase revenue collection, including imposing a new Sugar Tax (effective from 1 July 2019), widening the scope of the SST. In 2020, the government implemented the Digital Services Tax effective from 1 January 2020. There is also a suggestion to bring back GST recently, given various challenges that happened in Malaysia, including political instability, stimulus packages provided by the government due to the pandemic, world oil prices, close to zero activity in the tourism sector and economic turbulence caused by COVID-19 (Ann, 2021).

Findings can be useful for policymakers to identify the shortcomings of GST or new tax implementation on new and emerging industries. So, the policymakers and central banks may implement necessary initiatives to support the emerging industry. Because the Malaysian government promotes the takaful industry and Islamic banking and finance in the competitive market, takaful operators may be exempted from the current SST. Takaful operators may find these findings to enhance their operational activities efficiently to improve performance. By improvising current strategies, they may improve their business performances by complying with and adjusting existing or future government-imposed taxes. Even though GST seems not relevant anymore as the government has replaced it with SST, the trick is still the same as it is a kind of tax or costs incurred by the takaful operators in operating their business. To this extent, takaful managers may identify their efficient level in managerial aspects and optimal scale of resources. Finally, the findings of this study will contribute to knowledge and pin the basis for future studies.

A few limitations of the research are that the data were taken from the annual audited reports for selected firms available on the firm's website only. The data were taken till 2016, even though the GST was omitted from Malaysia on the 1 June 2018. This study has applied Ratio analysis and DEA CRS technique; the future study may adopt both DEA CRS and DEA VRS models to evaluate along with other methods to identify the specific factors.

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Source	Country	Period	Input	Output
Almulhim (2019)	Saudi Arabia	2014-2017	Equity, Net claims incurred, General and administrative expenses	Net premium earned, Investment and management fee income
Benyoussef and Hemrit (2019)	Saudi Arabia	2014	Gross Premium Capital	Investment, Claim
Eling and Jia (2019)	Global	2003–2013	Number of employees, Equity capital, Debt capital	Net premiums written, Total invested assets, Profit or less before tax
Jaaman and Roplan (2019)	Malaysia	2011–2015	Operating expenses, Insurance expenses	Underwriting profit, Investment income
Jaloudi (2019)	Jordan	2000–16	total operating expenses, debt and owner's equity, total technical provisions	Net earned premiums, Investments income
Gharakhani et al. (2018)	Iran	2013–15	Operation expenses, Insurance expenses, Labour	Underwriting profit, Investment profit, no of premiums issued
Akhtar (2018)	Saudi Arabia	2010–15	Equity, Net claims incurred, General and administrative expenses	Investment income, Net premium earned, investment and management fee income
Bao et al. (2018)	Malaysia	2014–2015	Operating expenses, Equity capital, Commission	Net premium, Net investment income, Net incurred claim
Nourani et al. (2018)	Malaysia	2007–2014	Labour and business service expenses, Debt capital	Investment income, Net profit
Eling and Schaper (2017)	14 European countries	2002–13	Equity Capital, Debt capital, Number of employees	Invested assets, losses plus additions to reserves
Grmanová and Strunz (2017)	Slovakia	2013–15	Claims incurred, Operating expenses	Earned premiums, Investment income
Wanke and Barros (2016)	Brazil	1995–13	Current assets, Real assets, Long term fixed assets, Other long term assets	Direct premium, Insurance premium, Retained premium, Earned premium
Ertugrul et al. (2016)	Turkey	2010–14	Labour, Equity capital, Debt capital	Insurance technical provisions, losses paid
Biener et al. (2016)	Switzerland	1997–13	Labour, Business services, Debt capital, Equity capital	Losses incurred, Total investments
Al-Amri (2015)	GCC countries	2004–09	Labour, Debt capital, Equity capital	Investments and losses incurred
Zimková (2015)	Slovakia	2013	Equity, Total operating expenses	Premium written

Table A1.
Past studies on insurance using DEA

(continued)

Source	Country	Period	Input	Output
Khan and Noreen (2014)	Pakistan	2006–10	Labour, Fixed Assets, Business services Equity capital	Invested assets Net premium
Yakob et al. (2014)	Malaysia	2003–07	Variance of investment return, Variance of (benefit paid/ premium), Leverage – for measurement of risk management; actuarial reserves, Total investment assets- for investment management	Net incurred benefit plus reserves – for management risk; TFI, Investment return – for investment management
Antonio et al. (2013)	Malaysia	2009–11	Management expenses, Fees and commission expenses	Gross premium Investment income
Abduh and Omar (2012)	Malaysia	2008–12	Commission	Premium, Investment income
Saad (2012)	Malaysia	2007–09	Management expenses Commission	Premium, Net Investment income
Ismail et al. (2011)	Malaysia	2004–09	Labour cost, Management expenses, Invested assets	Gross premium/Contribution, Investment income
Saad et al. (2006)	Malaysia	2002–05	Commission expenses, Management expenses	Premium, Net investment income
Jeng and Lai (2005)	Japan	1983–94	Labour, Business services, Debt and Equity capital	Number of policies in short-tail lines, long-tail lines, saving-type lines Total invested assets
Worthington and Hurley (2002)	Australia	1998	Labour, Information technology expenses, Physical capital expenses, Financial capital expenses	Net premium earned, Invested assets

Table A1.

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