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# IS TAKAFUL (ISLAMIC INSURANCE) MORE EFFICIENT THAN CONVENTIONAL INSURANCE? A COMPARATIVE ANALYSIS OF THE MALAYSIAN INSURANCE INDUSTRY

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## ABSTRACT

The efficiency of the Malaysian insurance industry (II) has drawn increasing international attention as the country has a dual-insurance system that comprises conventional insurance (CI) and *takaful* (Islamic) insurance (TI). Therefore, the objectives of the present study are to evaluate the efficiency of the Malaysian II as well as compare the efficiencies of CI and TI in Malaysia. Secondary data, spanning 2013-2021, from 46 CI and 28 TI providers was used. The results of the data envelopment analysis (DEA) indicates that scale efficiency (SE) has a significantly larger impact on the impact the total efficiency (TE) of the Malaysian II than pure technical efficiency (PTE). Therefore, larger insurance companies, with higher SE, are better suited to deal with large-scale risks, while smaller insurance companies may need to diversify or reinsure to limit their risk. Meanwhile, the results of the parametric and non-parametric tests indicate that there is a significant difference between the efficiencies of the Malaysian CI and TI industries. More specifically, that the *Shariah*-compliant nature of the Malaysian TI industry is a more conservative investment approach. As such, it decreases the risk of losses and financial instability. The purpose of comparing the efficiencies of the Malaysian TI and CI industries was to stimulate innovation and competition in the Malaysian II.

***Keywords***: Insurance performance, Shariah, Islamic finance, pure technical efficiency, scale efficiency

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## 1. INTRODUCTION

As Muslims comprise a significant portion of Malaysia's population and Islam is the national religion, the country employs a dual-insurance system that encompasses conventional insurance (CI) and *takaful* (Islamic) insurance (TI) to cater to the diverse demands of its consumers. As there

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are several differences between CI and TI, a comparative analysis of the two is warranted. This primarily involved comparing three crucial elements of CI; namely, uncertainty, interest, and gambling; all of which are prohibited in TI (Shaikh & Amin, 2024). These differences have led to the emergence of TI, a system that is devoid of the abovementioned three elements (Akmal & Aslam, 2019). Secondly, it is noteworthy that *takaful* serves as an alternative to CI, as its robust growth exceeds that of CI. According to Abdulkareem et al. (2022), financial products that are *Shariah*-compliant are the backbone of Islamic finance as they provide legitimacy to the range of products and services offered. Thirdly, the Islamic Financial Services Act of 2013 requires TI to have a *Shariah* advisory board that constantly monitors their activities and ensures that they comply with *Shariah* regulations. Comparing CI and TI has sparked an ongoing discussion about their effectiveness, performance, and influence on financial markets and economic growth (Rubio-Misas, 2020). The CI and TI industries in Malaysia are currently experiencing significant and accelerated expansion, with the growth trajectory of the TI industry surpassing that of CI. In 2022, the gross direct premium of the general TI industry increased by a commendable 10.0%, reaching a whopping RM19.4 billion. At the same time, the overall gross direct contribution of the general TI industry grew by 21.1%, to reach an impressive RM4.6 billion in the same period (ISM Insurance Services Malaysia Berhad, 2022). Moreover, the aggregate gross direct contribution of the family TI industry increased by a remarkable 18.3%, from RM8.5 billion to RM10.1 billion. Meanwhile, the gross premium of the the life TI industry decreased by a significant 6.9%, reaching RM12 billion in 2022 (ISM Insurance Services Malaysia Berhad, 2022).

Several issues have motivated the present study. Firstly, as the Malaysian insurance industry (II) has grown at a significant rate, expeditious insurance claim handling, increased competition, and a lack of skilled workforce may become formidable concerns down the line. Furthermore, many managers from Malaysian insurance companies have stated that the insurance claims handling processes that are currently in place are encumbered by cumbersome standard operating procedures, particularly voluminous paperwork (Gomez, 2018). Consequently, long claims handling processes may prompt customers to reconsider their choice of insurance. Furthermore, prolonged claims adjudication are also clear indicators of the inefficiency of the Malaysian II, especially significant total efficiency (TE) flaws. Secondly, intense competition may lead insurers to engage in aggressive pricing strategies in order to attract customers. This can lead to policy under-pricing, which may not adequately cover potential losses. Furthermore, under-priced policies may lead to adverse selections, wherein high-risk individuals are more likely to purchase coverage, which would increase the frequency and severity of insurance claims, which would negatively impact the efficiency of the insurance company. Thirdly, the lack of a skilled workforce will make it more difficult for insurance companies to adjust to changing consumer demands and market developments. Skilled professionals, with expertise in various domains, such as data analysis, technology, and risk assessment, are critical for conceiving and developing insurance products that are innovative. A shortage of such professionals can lead to a lack of creativity that hinders the development of insurance products that are new, competitive, and tailored as well as cater to the evolving needs of customers. Therefore, the Central Bank of Malaysia stresses that it is important that the Malaysian II continually streamlines its internal management processes to enhance its TE (Bank Negara Malaysia, 2020).

The rapid growth of both the CI and TI industries in Malaysia may, potentially, significantly influence the efficiency of Malaysian insurance companies. As insurance companies vie for market

share in this increasingly saturated environment, they will be compelled to enhance their efficiency to remain competitive. As the Malaysian TI industry has grown significantly more than the Malaysian CI industry, it broaches a pertinent question, specifically, "What is the efficiency level of the Malaysian II?" Additionally, the co-existence of these two insurance paradigms is noticeable not only in Islamic-majority nations but also increasingly evident in areas with varied insurance landscapes (Rubio-Misas, 2020). This raises an intriguing question, namely, "How do the TI industry and the CI industry compare in terms of efficiency?"

Therefore, the primary objective of the present study was to assess the TE of the Malaysian II and comprehensively analyse and compare the efficiencies of the Malaysian CI and TI industries. The present study addresses several gaps in extant literature. Firstly, some studies solely focus on the efficiency of the CI industry (Shieh et al., 2022; Upadhyaya et al., 2023), while others solely focus on the efficiency of the TI industry (Eldaia & Hanefah, 2023; Sallemi & Zouari, 2023). Secondly, only a handful of studies have compared the efficiencies of the Malaysian CI and TI industries. For example, Lim et al. (2021) only investigated the impact of capital regulation on the performance of Malaysian insurance companies up to 2017. The present study, however, compares the efficiencies of the Malaysian CI and TI industries over a longer period of time, namely, 2013-2021, which encompasses the period when the Malaysian II underwent significant transformations in terms of the adoption of digital technologies and regulatory compliance.

Firstly, the non-parametric data envelopment analysis (DEA) method was used to analyse the total efficiency (TE), pure technical efficiency (PTE), and scale efficiency (SE) of 46 CI and 28 TI companies in Malaysia from 2013-2021. Secondly, several parametric and non-parametric examinations were conducted to compare the efficiencies of the CI and TI industries. The findings indicate that SE has a more significant impact on the TE of the Malaysian II than PTE. Moreover, the results of the parametric and non-parametric tests prove that there is a significant difference between the Malaysian CI and TI industries. More specifically, that the PTE of the TI industry is higher than that of the CI industry. The findings of the present study highlight the importance of advancing the evolution and innovation of the II. Furthermore, the insights gleaned by comparing the two industries may prompt the adoption of best practices as well as inspire the development of new insurance business models that enhance efficiency and meet the evolving needs of the consumer.

The present study has systematically examined the efficiency of the Malaysian II. The existence of a dual insurance system in Malaysia creates a distinct scenario that warrants a thorough assessment of the TE of both its CI and TI industries. The present study is an innovative empirical inquiry and the first to analyse and compare the efficiencies of the Malaysian TI and CI industries. Furthermore, Malaysia's unique position, as one of the few global regions practising a dual insurance system, further emphasises the exceptional nature of the present study. By using DEA to empirically analyse the efficiencies of both the CI and TI industries, the present study provides insights into the relative strengths of the different efficiency components and their implications for the II. Lastly, the findings offer valuable evidence that industry stakeholders, regulators, and policymakers can use to better understand the dynamics of both the insurance models as well as their respective roles in fulfilling the diverse needs of the consumers.

The present study is structured as follows: Section 2 provides an overview of the Malaysian II while Section 3 provides an overview of the relevant literature on the efficiency of the II.

Meanwhile, Section 4 outlines the data used, sources explored, and specifications of the model employed in the present study while Section 5 presents the empirical findings. Lastly, Section 6 provides a conclusion of the analysis.

## 2. BACKGROUND

Conventional insurance (CI) and TI are the two primary insurance products in the Malaysian II. *Takaful* insurance (TI), or 'Islamic insurance,' is a *Shariah*-compliant alternative to CI. It is meticulously tailored to cater to individuals, particularly Muslims, who want insurance products that are based on *Shariah*-compliant principles (Ben Said, 2023). This preference stems from TI's alignment with *Shariah* values. As Muslims constitute a substantial portion of the Malaysian population and Islam is the nation's official religion, the country operates a dual-insurance framework that encompasses both CI and TI.

**Figure 1:** Overview of the insurance industry in Malaysia

**Figure 1a:** New Business Growth (Life Insurance) in Malaysia

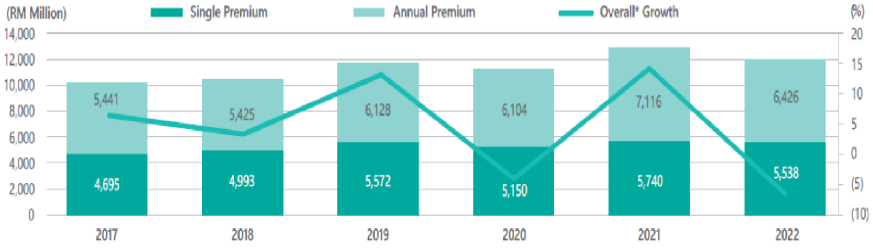



**Figure 1b:** Gross Direct Premium and Growth (General Insurance) in Malaysia

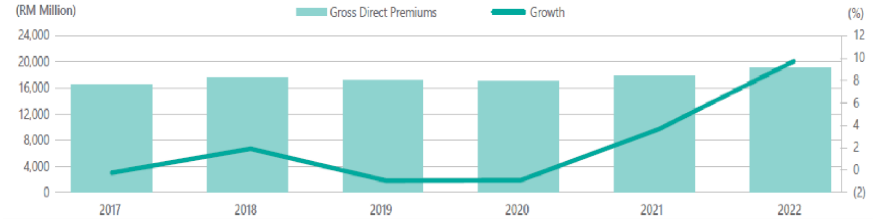



**Figure 1c:** New Business Contribution and Growth (Family Takaful) in Malaysia

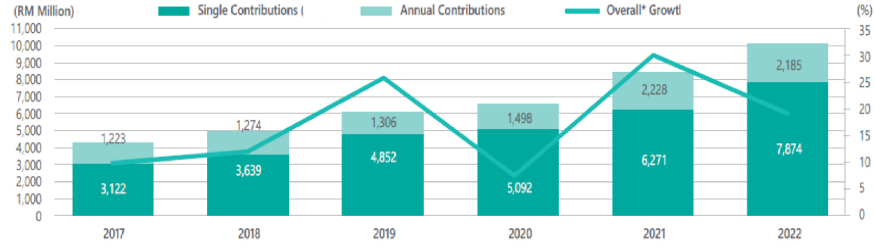
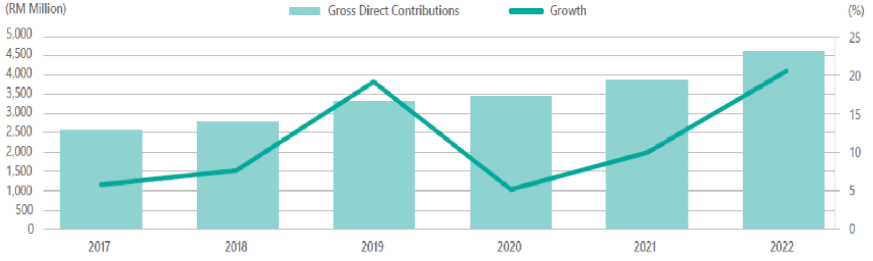



**Figure 1d:** Gross Direct Contribution and Growth (General Takaful) in Malaysia




Source: ISM Insurance Services Malaysia Berhad (2022)

Conventional insurance (CI) is an arrangement in which the insurer assumes responsibility for losses that arise from defined accidents experienced by the policyholder under the condition that the policyholder pays a premium to the insurer. It can be further categorised into life CI and general CI (ISM Insurance Services Malaysia Berhad, 2022). Life CI is a contract that pledges to provide a benefit to the policyholder upon the policyholder's demise, in exchange for the payment of a premium. Figure 1a shows the growth of the new business premium for life CI in Malaysia. In Malaysia, the new business premiums in the life CI are still in a growth phase, having decreased by 6.9%, from RM12.9 billion in 2021 to RM12.0 billion in 2022 (ISM Insurance Services Malaysia Berhad, 2022). This marks the highest decrease since 2017 and the outbreak of COVID-19. The decline in new business in 2022 is primarily attributed to whole-life and endowment insurance policies (ISM Insurance Services Malaysia Berhad, 2022).

General CI, or non-life CI, on the other hand, encompasses categories such as motor CI, fire CI, car CI, medical and health CI, personal accident CI, travel CI, commercial CI, and other forms of CI unrelated to life CI. As seen in Figure 1b, the gross direct premium of the general CI in Malaysia increased by 10.0%, to RM19.4 billion in 2022. This increase is primarily attributed to the 9.2% growth in the business of the motor CI between 2021-2022. Additionally, the premium for fire CI also significantly increased by 6.1% in 2022 (ISM Insurance Services Malaysia Berhad, 2022). Much like CI, but using differently terms, TI can also be classified into family TI and general TI (ISM Insurance Services Malaysia Berhad, 2022). Family TI offers long-term savings and protection against death or disability, providing compensation to policyholders or their family members. In Malaysia, contributions to new family TI have grown consistently since 2017. In 2022, new business contributions surged by 18.3% to RM10.1 billion (ISM Insurance Services Malaysia Berhad, 2022). Figure 1c illustrates the new business contributions for family TI between 2017-2022. In 2022, the single contribution plan accounted for 78.3% of the total new business, marking a 25.6% increase to RM7.9 billion. Conversely, the annual contribution plan, comprising 21.7% of the total new business, experienced a 2.0% decrease to RM2.2 billion. The growth in new business contributions was primarily attributed to the group ordinary family plan, which holds a significant 58.2% share of the new business contributions in 2022.

Looking ahead, general TI provides short-term protection for the properties and liabilities of the policyholders. This encompasses motor TI, personal accident TI, fire TI, car TI, medical and health TI, liabilities TI, and TI plans unrelated to family coverage. Among these, motor TI represents the largest category in Malaysia, comprising 66.2% of the total gross contributions for general TI in 2021 (ISM Insurance Services Malaysia Berhad, 2022). This is followed by fire TI and personal accident TI, which account for 18.2% and 8%, respectively.

Figure 1d illustrates the gross direct contributions of general TI in Malaysia. The total gross direct contribution for general TI was RM4.6 billion in 2022, indicating an increase that can be attributed to more public awareness due to the COVID-19 pandemic (ISM Insurance Services Malaysia Berhad, 2022). This growth was primarily supported by motor TI and fire TI, with total gross direct contributions increasing by 20.7% and 23.7%, respectively (ISM Insurance Services Malaysia Berhad, 2022).

Although the Malaysian CI industry has a larger market share than its TI industry, the growth of the Malaysian II indicates that the development of its TI industry was significant as it grew more

than its CI industry. This is largely in part due to Malaysia's predominantly Muslim population, who prefer *Shariah*-compliant products. As such, it is worth examining the efficiencies of the Malaysian TI and CI industries as it may provide valuable insights into the stability and resilience of both industries as well as foster healthy competition between them.

## 3. LITERATURE REVIEW

The resilience of the II has encouraged many a researcher to study its performance (Che Mohd Salleh et al., 2022; Lee et al., 2018; Muhamat et al., 2023). In recent years, multiple studies have used diverse financial metrics to assess the performance of insurance companies. Notably, Ahmeti et al. (2022) used return on assets (ROA) to assess the performance of insurance companies in Kosovo. Similarly, Osman et al. (2022) and Upadhyaya et al. (2023) used both ROA and return on equity (ROE) to assess the performance of insurance companies in Nepal. Meanwhile, Goswami (2022) and Pjanić et al. (2023) solely used ROA to scrutinise the performance of insurance companies. Multiple studies evaluating firm performance have used metrics such as ROE, return on investment (ROI), and return on sales (ROS). However, academics have criticised the conventional use of performance indicators such as ROE, ROI, and ROS in the financial sector. According to Alshehadeh et al. (2022), these methods do not comprehensively assess multiple inputs and outputs, that are essential for providing a holistic view of the performance of financial firms, as they rely on unidirectional performance metrics. In the case of insurance companies, various inputs, such as labour and capital, are used to generate diverse outputs, such as claim settlements and investment returns, therefore, it is better to assess efficiency to evaluate the TE of insurance companies.

Efficiency refers to how well a firm uses less resources to produce the same outputs (Abdin et al., 2022). It is believed that a firm may reduce its inputs while maintaining its output levels by improving its efficiency. For instance, an insurance firm that enhances its efficiency may cut costs, such as labour or capital, to achieve the same outputs. Numerous studies have investigated efficiency in the insurance industry (Che Mohd Salleh et al., 2022; Kaffash et al., 2020; Karbhari et al., 2018).

The concept of efficiency originated from productivity theory, as proposed by Cobb and Douglas (2007), which aimed to examine the relationship between inputs such as capital and labour and the output of products. In this theory, Cobb and Douglas (2007) assumed that the firm is economically efficient. The Cobb-Douglas production function is as follows:

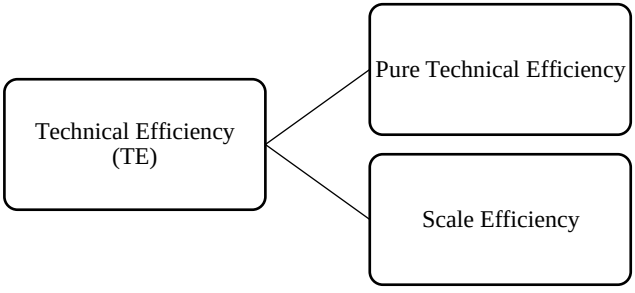
$$Y = A\,L^{\beta}K^{\alpha} \quad (1)$$

Where total factor productivity is represented by A, the input for labour is L, the input for capital is K, the output elasticities for labour is $\beta$ and the output elasticities for capital is α.

Technical efficiency (TE) is described using the Cobb-Douglas production function, which explains how variations in input levels and their combinations may impact outputs. The efficiency score is scaled between zero and one, with one representing the highest efficiency. Scale efficiency (SE) and pure technical efficiency (PTE) are subgroups of TE. Pure technical efficiency (PTE) is how effectively management reduces the inputs required to produce equal or more outputs. A

company is considered to have optimal PTE if it operates on its production frontier, reflecting the greatest feasible outputs from a given set of inputs and existing technologies. A PTE company minimises input waste and utilises them optimally to achieve the desired level of outputs. Any deviations from the production frontier indicate resource inefficiency. On the other hand, SE refers to whether a company operates at an appropriate scale relative to its production capabilities and desired output levels (Taib et al., 2018). Scale efficiency (SE) depends on the ability of management to select an appropriate input size and production scale to achieve the desired outputs (Linn & Maenhout, 2019). It mainly arises from increasing returns to scale (IRS) and decreasing returns to scale (DRS) (Castro et al., 2023). Increasing returns to scale (IRS) refer to improved efficiency as the size of the insurance firm increases, while DRS refer to a decrease in efficiency as the size of the insurance firm increases. A firm achieves SE when it reaches constant returns to scale (CRS) or SE=1, indicating that changes in the size of the insurance firm do not affect its efficiency (Castro et al., 2023). Figure 2 depicts the decomposition of efficiency.

**Figure 2:** Decomposition of Efficiency




There are two primary methods of measuring the efficiency of a firm: parametric and non-parametric. The non-parametric method, specifically DEA, is widely used to measure efficiency in the financial sector (Kaffash et al., 2020). Ashiagbor et al. (2023) examined the increase in efficiency and productivity of Ghana's life II and discovered that the industry did not benefit from pure SE. Meanwhile, Omrani et al. (2022) evaluated insurance companies while taking into account uncertainty and conducted a comparative analysis to identify benchmarks and inefficient organisations. Lastly, after analysing the efficiency of the Indian health II, Siddiqui (2022) concluded that managers of ineffective health insurance companies should promptly implement strategies to increase efficiency by making better use of existing resources and advanced technologies.

Although multiple studies have used DEA to assess the efficiency of the II, not many studies have compared the efficiencies of the Malaysian CI and TI industries. For instance, extant studies, such as Lee et al. (2019), Eldaia and Hanefah (2023), and Sallemi et al. (2023), primarily examined the efficiency of the Malaysian TI industry. Meanwhile, Muhamat et al. (2023) solely examined the efficiency of the Malaysian TI industry following the implementation of the Islamic Financial Act of 2013. Therefore, a comprehensive examination of the entire Malaysian II, including both its CI

and TI industries, is warranted to provide a holistic understanding of the efficiency of the Malaysian II.

It is also noteworthy that most comparative studies on the TE of the TI and CI industries has been conducted outside Malaysia. For instance, Harun (2020) and Sallemi (2021) examined the efficiency of insurance companies in Gulf Cooperation Council countries. Similarly, Naushad et al. (2020) examined the efficiency of insurance companies in Saudi Arabia while Abu Al-Haija and Houcine (2023) conducted a comparative analysis of the efficiencies of the TI and CI industries of Saudi Arabia and the United Arab Emirates. These studies highlight the importance of assessing the performance of the TI and CI industries, especially in countries with Islamic financial systems, such as Malaysia, to spur improvements in the II (Lim et al., 2021).

## 4. DATA AND METHODOLOGY

### *4.1 Methodology*

This research adopts a non-parametric approach, specifically employing data envelopment analysis (DEA), to investigate the operational efficiency of both conventional and Takaful insurance entities, which constitutes the primary objective of this study. This choice is grounded in the manifold advantages offered by DEA. Firstly, DEA yields a singular efficiency score for each Decision-Making Unit (DMU), facilitating the rank ordering of DMUs within the sample. Furthermore, it directs attention towards precise areas wherein individual DMUs have the potential for enhancement. For instance, when evaluating a DMU in relation to a cluster of proficient DMUs with similar input-output structures, the evaluated DMU can discern whether it has engaged inputs disproportionately or if its output generation has been suboptimal. Lastly, the approach empowers the derivation of insights pertaining to the overarching profile of the DMUs.

Assuming there are N firms each producing K outputs while using M inputs. The measure of input technical efficiency for the *j*th firm, called a Decision-Making Unit (DMU; j = 1, 2, ..., N), is formulated as follows:

$$Eff_j = \min \theta_j \quad (2)$$

In the condition that: $X\lambda_j \geq \theta_j x_j$ (3)

$$Y\lambda_j \geq y_j \quad (4)$$

$$\lambda_\alpha \geq 0 \text{ (j = 1, 2, 3, …., N)} \quad (5)$$

where Y is a K×N output matrix and X is an M×N input matrix for all firms in the sample, $y_j$ is a K×1 output vector and $x_j$ is an M×1 input vector for the *j*th firm, and $k_j$ is an N×1 intensity vector for the *j*th DMU.

In pursuit of our second research objective, which is to assess and compare the efficiency of conventional insurers and Takaful insurers, we employ a combination of parametric tests, specifically the t-test, and non-parametric tests, such as the Mann-Whitney test and Kruskal-Wallis test, following the methodology adopted by Siddiqui (2022). These tests serve the purpose of

investigating potential significant differences in efficiency between conventional insurers and Takaful insurers.

### *4.2 Data sample, inputs-outputs definition and the choice of variables*

The empirical analysis encompasses all conventional and Takaful insurers operating within Malaysia, maintaining the study's internal consistency by excluding entities from the banking sector and reinsurance firms. The examination relied on secondary data from publicly available sources, namely the annual report of the Central Bank of Malaysia and the statistical yearbook of Insurance Services Malaysia.

The definition and quantification of inputs and outputs within the insurance function are topics of ongoing debate among scholars. This study adopts a comprehensive framework involving three distinct inputs and three corresponding outputs to assess efficiency. The inputs selected encompass labour, business services, materials, equity capital, and capital debt. Notably, Kaffash et al. (2020) highlight that labour was utilised as an input in 60.72% of insurance-related studies, while capital debt was employed in 49.18% of the cases, and equity capital constituted an input in 37.7% of the studies. As a result, this investigation aligns with this prevailing trend by incorporating three specific input variables: (i) Labour, business services, and materials, (ii) Equity capital, and (iii) Capital debt. The proxies for these three input variables are as follows: operating expenses (X1), total equity (X2), and total liabilities (X3).

In the literature on the insurance industry, three widely used output approaches are the value-added approach, financial intermediary approach, and production approach. According to Kaffash et al. (2020), the study finds that 68% used the value-added approach in their insurance efficiency studies, 10% used the financial intermediary approach, 2.5% used both the value-added and financial intermediary approaches, while the production approach was used in 3% of the studies. For the output variables, this study adopts the value-added approach, which involves risk pooling and risk transfer mechanisms. This approach provides a more realistic assessment of how successfully insurers manage and disperse risks, considering the total value provided by insurance coverage. Hence, the output variables in this study are premium collected (Y1), total investment (Y2), and claims by policyholders (Y3).

The descriptive statistics for the inputs and outputs of the Malaysian insurance industry are summarised in Table 1. Firstly, the total assets of the Malaysian insurance industry increased from RM2.75 billion in 2013 to RM7.24 billion in 2021, representing nearly a 263% increase. Secondly, the premium collected from the Malaysian public throughout this period indicates increasing public awareness of the importance of insurance. Between 2013 and 2021, total premiums collected and claims increased by about 238% and around 194%, respectively. The significant increase in total premiums received implies that the Malaysian insurance market is expanding significantly. This expansion could be fuelled by a variety of factors, including an expanding economy, greater disposable income, and increased public awareness of the significance of insurance. The surge in claims, a 194% increase, can be attributed to the heightened severity and urgency of illnesses being treated and claimed, along with the added expenses incurred due to COVID-19 pandemic-related measures, including COVID-19 testing in laboratories and increased utilisation of disposable medical supplies (Bank Negara Malaysia, 2021). This development may reflect a rising

appreciation for the importance that insurance provides in protecting against financial losses caused by unexpected catastrophes.

Thirdly, the Malaysian insurance sector has witnessed a substantial increase in its investments during this period. Over the past nine years, its total investments have surged by almost 238%. This trend may imply that insurers are using investments to secure enduring expansion and fulfil extended financial objectives, ultimately serving the interests of policyholders and shareholders. Lastly, the average operating expenses of Malaysian insurers rose by over 232% throughout the research period, climbing from RM 128.41 million in 2013 to RM 298.73 million in 2021. The substantial rise in operating expenses suggests that the cost of doing business for Malaysian insurers has significantly increased over the research period.

**Table 1:** Descriptive Statistics for Inputs and Outputs

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| **Output** | | | | | | | | | |
| **Premium Collected** | | | | | | | | | |
| Min (million) | 5.16 | 7.39 | 7.39 | 7.17 | 6.24 | .00 | .00 | 49.45 | 49.47 |
| Mean (million) | 560.23 | 647.34 | 875.47 | 935.80 | 1000.73 | 1023.79 | 1207.65 | 1257.80 | 1335.13 |
| Max (million) | 6378.33 | 6655.73 | 7006.66 | 7567.25 | 7598.13 | 8617.73 | 8631.75 | 9020.24 | 9450.18 |
| S.D (million) | 929.67 | 997.47 | 1456.89 | 1557.33 | 1613.62 | 1730.16 | 1878.57 | 1957.54 | 1989.99 |
| **Total Investment** | | | | | | | | | |
| Min (million) | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 16.82 | 21.72 |
| Mean (million) | 2241.07 | 2586.55 | 3479.59 | 3727.72 | 4214.16 | 4125.00 | 4868.54 | 5460.28 | 5680.74 |
| Max (million) | 61525.56 | 64826.27 | 54430.40 | 55942.76 | 62779.84 | 63265.48 | 66484.84 | 69505.11 | 69584.56 |
| S.D (million) | 8561.78 | 9113.76 | 8975.68 | 9382.16 | 10478.46 | 10365.34 | 11451.38 | 12312.47 | 12372.14 |
| **Total claim or life benefits** | | | | | | | | | |
| Min (million) | .00 | .00 | .16 | .00 | .00 | .00 | .00 | 20.78 | 17.84 |
| Mean (million) | 384.47 | 460.08 | 541.37 | 581.14 | 626.14 | 749.61 | 763.83 | 758.14 | 745.36 |
| Max (million) | 5959.04 | 7446.71 | 5224.87 | 5947.16 | 6211.34 | 6911.33 | 7156.40 | 7103.38 | 6195.57 |
| S.D (million) | 858.56 | 1072.93 | 998.38 | 1085.96 | 1156.19 | 1231.62 | 1361.95 | 1356.62 | 1265.13 |
| **Inputs** | | | | | | | | | |
| **Operating Expenses** | | | | | | | | | |
| Min (million) | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mean (million) | 128.41 | 144.92 | 205.95 | 225.53 | 257.64 | 236.58 | 266.55 | 278.05 | 298.72 |
| Max (million) | 1298.04 | 1336.14 | 1431.60 | 1529.28 | 1643.67 | 1738.92 | 1720.99 | 1768.11 | 2236.53 |
| S.D (million) | 200.73 | 212.40 | 318.31 | 342.22 | 368.45 | 377.87 | 391.31 | 399.19 | 460.99 |
| **Total Liabilities** | | | | | | | | | |
| Min (million) | 18.26 | 21.45 | .00 | 24.38 | 27.14 | 7.12 | .00 | 280.71 | 380.90 |
| Mean (million) | 2745.07 | 3083.36 | 4541.27 | 4855.01 | 5336.91 | 5263.73 | 6231.46 | 6989.47 | 7244.74 |
| Max (million) | 63465.35 | 66857.24 | 69354.76 | 72284.34 | 78648.14 | 80319.09 | 86109.98 | 88982.29 | 89480.35 |
| S.D (million) | 8837.87 | 9402.34 | 11218.61 | 11802.85 | 12906.09 | 12891.43 | 14458.38 | 15505.68 | 15724.30 |
| **Total Asset** | | | | | | | | | |
| Min (million) | 18.26 | 21.45 | 0.00 | 24.38 | 27.14 | 7.12 | 0.00 | 280.71 | 380.90 |
| Mean (million) | 2745.07 | 3083.36 | 4541.27 | 4855.01 | 5336.91 | 5263.73 | 6231.46 | 6989.47 | 7244.74 |
| Max (million) | 63465.35 | 66857.24 | 69354.76 | 72284.34 | 78648.14 | 80319.09 | 86109.98 | 88982.29 | 89480.35 |
| S.D (million) | 8837.87 | 9402.34 | 11218.61 | 11802.85 | 12906.09 | 12891.43 | 14458.38 | 15505.68 | 15724.30 |

## 5. RESULTS AND DISCUSSIONS

Table 2 presents the efficiency results of both the Malaysian CI and TI industries, which were obtained using the DEA method. Panels A to I depicts the results for 2013-2021. The scope of the present study was extended to encompass the assessment of the efficiencies of solely the CI industry (Panel J), solely the TI industry (Panel K), and a unified common frontier for all insurance companies, both TI and CI companies (Panel L). The average TE score of the Malaysian II was 81.04% in 2013 (Panel A). This decreased to 75.69% in 2014 (Panel B) and 72.94% in 2015 (Panel C) before it increased to 81.50% in 2016 (Panel D) and 85.60% the following year (Panel E). However, it decreased again, to 80.62%, in 2018 (Panel F) then increased to 86.42% in 2019 (Panel G) before declining to 84.63% and 84.56% in 2020 (Panel H) and 2021 (Panel I), respectively.

Panel J in Table 2 depicts the efficiency of the CI industry. The mean TE, PTE, and SE scores of the Malaysian CI industry were 78.8%, 85.1%, and 92.4%, respectively. The mean TE, PTE, and SE scores of the Malaysian TI industry, on the other hand, were 86.5%, 93.7%, and 92.5%, respectively (Table 2, Panel K). The average TE of the Malaysian CI industry was 78.8% while that of its TI industry was higher (86.5%). This could be interpreted to mean that the Malaysian CI industry could have achieved equal levels of output by using only 78.8% of their inputs. Similarly, it is plausible that the Malaysian TI industry could have decreased their inputs by 13.5% and still maintained their current levels of outputs. Therefore, the Malaysian TI industry is, evidently, more efficient that its CI counterpart. By including administrative and compliance costs in the operating expenses input variable, it underscores a notable disparity in the efficiencies of the Malaysian CI and TI industries. The main reason for this disparity is the substantial non-productive expenses that the CI industry incurs, particularly administrative and compliance costs, which negatively affect their overall PTE. The Malaysian TI industry, on the other hand, prioritises practising risk-sharing among policyholders, which creates a more transparent and collaborative risk management framework that may decrease specific administrative and compliance costs. Mohamed and Elgammal (2023) reported similar findings when they examined Islamic and conventional microfinance firms.

**Table 2:** Summary Statistics of Efficiency Measures

| Efficiency measures | Mean | Minimum | Maximum | SD |
|---|---|---|---|---|
| Panel A: 2013 | | | | |
| TE | 0.810 | 0.508 | 1.000 | 0.156 |
| PTE | 0.862 | 0.513 | 1.000 | 0.155 |
| SE | 0.943 | 0.626 | 1.000 | 0.083 |
| | | | | |
| Panel B: 2014 | | | | |
| TE | 0.756 | 0.408 | 1.000 | 0.180 |
| PTE | 0.823 | 0.469 | 1.000 | 0.180 |
| SE | 0.924 | 0.408 | 1.000 | 0.105 |

| | | | | |
|---|---|---|---|---|
| Panel C: 2015 | | | | |
| TE | 0.729 | 0.286 | 1.000 | 0.204 |
| PTE | 0.850 | 0.295 | 1.000 | 0.165 |
| SE | 0.856 | 0.299 | 1.000 | 0.156 |
| | | | | |
| Panel D: 2016 | | | | |
| TE | 0.815 | 0.183 | 1.000 | 0.179 |
| PTE | 0.872 | 0.389 | 1.000 | 0.160 |
| SE | 0.933 | 0.341 | 1.000 | 0.123 |
| | | | | |
| Panel E: 2017 | | | | |
| TE | 0.856 | 0.420 | 1.000 | 0.136 |
| PTE | 0.899 | 0.438 | 1.000 | 0.135 |
| SE | 0.953 | 0.587 | 1.000 | 0.070 |
| | | | | |
| Panel F: 2018 | | | | |
| TE | 0.806 | 0.312 | 1.000 | 0.169 |
| PTE | 0.865 | 0.357 | 1.000 | 0.151 |
| SE | 0.930 | 0.560 | 1.000 | 0.106 |
| | | | | |
| Panel G: 2019 | | | | |
| TE | 0.864 | 0.538 | 1.000 | 0.133 |
| PTE | 0.919 | 0.570 | 1.000 | 0.110 |
| SE | 0.939 | 0.688 | 1.000 | 0.082 |
| | | | | |
| Panel H: 2020 | | | | |
| TE | 0.846 | 0.484 | 1.000 | 0.123 |
| PTE | 0.909 | 0.604 | 1.000 | 0.113 |
| SE | 0.931 | 0.585 | 1.000 | 0.080 |
| | | | | |
| Panel I: 2021 | | | | |
| TE | 0.845 | 0.503 | 1.000 | 0.129 |
| PTE | 0.908 | 0.633 | 1.000 | 0.108 |
| SE | 0.931 | 0.522 | 1.000 | 0.092 |
| | | | | |
| Panel J: Conventional insurers only | | | | |
| TE | 0.788 | 0.183 | 1.000 | 0.159 |

| | | | | |
|---|---|---|---|---|
| PTE | 0.851 | 0.295 | 1.000 | 0.148 |
| SE | 0.924 | 0.471 | 1.000 | 0.095 |
| Panel K: Takaful insurers only | | | | |
| TE | 0.865 | 0.299 | 1.000 | 0.165 |
| PTE | 0.937 | 0.469 | 1.000 | 0.123 |
| SE | 0.925 | 0.299 | 1.000 | 0.131 |
| Panel L: All insurers all year | | | | |
| TE | 0.814 | 0.183 | 1.000 | 0.164 |
| PTE | 0.878 | 0.295 | 1.000 | 0.147 |
| SE | 0.926 | 0.299 | 1.000 | 0.106 |

Note: TE denotes overall efficiency, PTE denotes pure technical efficiency, and SE denotes scale efficiency.

The findings for all insurance companies across all years (Table 2, Panel L) generally support the view that SE is the primary determinant of efficiency in the Malaysian II. Between 2013-2021, the average TE of the Malaysian II was 81.4% (Panel L). By deconstructing this TE score into its core components, specifically PTE and SE, it becomes evident that the predominant source of inefficiency was due to PTE (12.2%) rather than SE (7.4%). Pure technical efficiency (PTE) pertains to a company's ability to optimise the use of its inputs by adopting cutting-edge technologies. Therefore, the Malaysian II can enhance its TE by embracing technology to develop better insurance pricing and claims procedures. This is in line with initiatives, such as the peer-to-peer insurance model that the Chief Executive of the Malaysian Insurance Institute introduced, which holds promise for integration within the realm of insurance technology (Lee et al., 2019).

The second aim of the present study was to analyse and compare the efficiencies of the Malaysian CI and TI industries. A combination of statistical tests, namely, a parametric t-test and two non-parametric assessments, specifically the Kolmogorov-Smirnov and Mann-Whitney tests, were used to scrutinise this hypothesis. The null hypothesis was that the Malaysian CI and TI industries had the same levels of efficiency. The results, which have been meticulously detailed in Table 3, led to the rejection of the null hypothesis (P=0.05) due to the substantial disparity in the efficiencies of the Malaysian CI and TI industries. These results corroborate the results depicted in Table 2, where the TE of the TI industry was 86.5% while that of the CI industry was 78.8%. Therefore, the TE of the Malaysian TI industry is, undoubtably, significantly higher than that of the Malaysian CI industry. Oddly, these results do not corroborate the findings of Abu Al-Haija et al. (2023), who found no significant differences in the risk management performances of TI and CI companies in Saudi Arabia and the United Arab Emirates.

**Table 3:** Summary of Parametric and Non-parametric Tests for the Null Hypothesis that Conventional (C) and Takaful (T) Insurers Possess the Same Efficiency

| | Parametric test | Non-parametric test | |
|---|---|---|---|
| Individual tests | t-test | Kolmogorov-Smirnov test | Mann-Whitney test |
| Hypotheses | $Mean_T = Mean_C$ | $distribution_T = distribution_C$ | $Median_T = Median_C$ |
| Test statistics | t (Prb > t) | K-S (Prb > K-S) | z (Prb > z) |
| Overall Efficiency | 4.577 (-0.072) | 3.660 (0.001) | -5.733 (0.001) |
| Pure Technical Efficiency | 6.238 (0.085) | 4.732 (0.001) | -8.018 (0.001) |
| Scale Efficiency | -0.451(-0.005) | 3.456 (0.001) | -3.596 (0.001) |

Note: Both parametric (t-test) and non-parametric (Kolmogorov-Smirnov and Mann-Whitney) tests are used to examine the null hypothesis that the efficiency of Takaful and conventional insurers is similar. The figures in parentheses represent the p-values of the respective tests.

The higher efficiency of Takaful insurers suggests that they may have a competitive advantage over conventional insurers in the Malaysian market. This could be attributed to the unique characteristics and principles of Takaful insurance, which align with the ethical and religious beliefs of a significant portion of the Malaysian population. Furthermore, it is possible that Takaful insurers have optimised their business plans and operational procedures to reduce waste and increase resource use. Hence, focusing on the concepts of mutuality and risk-sharing in Takaful insurance may have contributed to this efficiency by encouraging a more conservative approach to insurance operations.

## 6. CONCLUSION

Insurance plays a pivotal role in any economy as it serves as a stabilising influence during periods of unpredictability and risk. Therefore, it is importance to evaluate the efficiency of Malaysian insurance companies to ensure the longevity and competitiveness of the Malaysian II. The present study was motivated by Malaysia's unique dual insurance system, which warrants a comprehensive evaluation of the TE of its CI and TI industries. Furthermore, at present, the swiftness with which insurance claims are processed has become a big concern in the insurance industry, as it is currently bogged down by intricate standard operating procedures that entail substantial paperwork. An indicator of the inefficiency of an insurance company is a lengthy claims adjudication process as it underscores the inadequacies of its operational management. As such, the Central Bank of Malaysia has called upon the II to improve its efficiency.

The primary objective of the present study was to examine the efficiency of the Malaysian II between 2013-2021. The TE, PTE, and SE of the Malaysian II was differentiated using DEA. In summary, the findings indicate that SE has a more significant impact on the TE of the Malaysian II than PTE.

One of the major contributions of the present study is that SE has a greater impact on the TE of the Malaysian II than PTE. Therefore, the SE of an insurance company can, practically, be improved via mergers and acquisitions (M&A). For instance, consolidating market share via a M&A with TI companies may help create a stronger presence in the II. Furthermore, gaining a larger portion of

the market enables economies of scale, which distributes fixed costs over a broader revenue base and enhances the TE of the merged entity. It is preferable to acquire insurance companies with CRS as they can expand and become more efficient (Li et al., 2020). Apart from that, policymakers and regulatory agencies should prioritise SE when formulating laws for the II. More specifically, they should strive to strike a balance between encouraging competition and allowing insurers to achieve the scales necessary for TE. Policyholders may also benefit from a more efficient II. Some of the potential advantages may include competitive pricing, a broader range of insurance products to choose from, and, potentially, better customer service from more efficient insurance companies. Lastly, insurance companies should invest in technology and innovations to enhance their TE as it can streamline operations and optimise resource consumption, resulting in increased efficiency, particularly in terms of SE.

In order to achieve its second objective, the present study conducted both parametric and non-parametric analyses to test the significant differences in the efficiencies of the Malaysian TI and CI industries. The outcomes of both the parametric and non-parametric tests provided sufficient evidence with which to reject the null hypothesis, which posits that there are no significant differences in the TE of the Malaysian CI and TI industries. Therefore, it is important that consumers and prospective investors understand the key distinctions between the Malaysian CI and TI industries as they can help them make better decisions when choosing investments or insurance products. Additionally, insurance regulatory bodies should modify their rules and guidelines to account for the differences between the Malaysian CI and TI industries. This may involve adjusting regulations to ensure that the unique characteristics of the Malaysian TI industry are adequately addressed. Furthermore, in light of the significant disparities between the Malaysian CI and TI industries, both of them should adjust their competitive strategies to enhance their strengths and address issues that are specific to their respective insurance models.

The findings of the present study provide investors and policymakers valuable insights. For instance, that integrating religious incentives and adhering to *Shariah* principles may enhance the efficiency of insurance companies. This aligns with resilience and sustainability policies, which corroborates the findings of Zamzamin et al. (2023), which highlighted the weaknesses of the conventional financial system and the promise of Islamic finance as a viable alternative.

In conclusion, the present study raised important questions regarding the efficiency of the Malaysian TI industry compared to the Malaysian CI industry. Nevertheless, there are several avenues that are worth further exploration. Firstly, the Malmquist productivity index (MPI) could be used to examine changes in the productivity of the Malaysian II over time, including technical and technological changes, to provide a deeper understanding of the industry's dynamics. Secondly, dissecting the levels of life insurance and general insurance separately, between TI and CI, may offer a deeper understanding of their respective performances. Lastly, it is essential to explore different performance indicators, such as ROA, ROE, solvency ratio, and loss reserve ratio, as they could, potentially, shed more light on the dynamics of the Malaysian II and direct future policy decisions and industry practices.

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**REFERENCES**

Abdin, Z., Prabantarikso, R. M., Fahmy, E., & Farhan, A. (2022). Analysis of the efficiency of insurance companies in Indonesia. *Decision Science Letters, 11*(2), 105–112.

Abdulkareem, I. A., Mahmud, M. S., & Abdulganiyy, A. (2022). Shariah compliance practice: An analysis of trends among Islamic banks in Nigeria. *International Journal of Business and Society, 23*(1), 137–151.

Abu Al-Haija, E., & Houcine, A. (2023)[Forthcoming]. *Risk management efficiency of Takaful and conventional insurance sectors in UAE and KSA*. Journal of Islamic Accounting and Business Research [Advanced online publication]. https://doi.org/10.1108/JIABR-03-2022-0065 Ahmeti, A., Ahmeti, S., & Aliu, M. (2022). Effect of internal audit quality on the financial performance of insurance companies: Evidence from Kosovo. *International Journal of Applied Economics, Finance and Accounting*, *12*(2), 63–68.

Akmal, M., & Aslam, M. N. (2019). Sharīah appraisal of conventional insurance and Takāful: Sharīah and ethical issues. *Majallah-e-Talim o Tahqiq, 1(2-3)*,175–196

Alshehadeh, A. R., Elrefae, G., & Injadat, E. (2022). Influence of traditional performance indicators on economic added value: Evidence from insurance companies. *Corporate Governance and Organizational Behavior Review*, *6*(4), 18–27.

Ashiagbor, A. A., Dziwornu, R., Gbade, A. V., Offei-Kwafo, K., & Liticia, G. (2023). Measuring efficiency and productivity changes: A non-parametric analysis of Ghanaian life insurance industry. *Cogent Economics & Finance*, 11(1), 2210855.

Bank Negara Malaysia. (2020). Improving the motor claims process. *BNM Annual Report 2020*, 35–48. https://www.bnm.gov.my/documents/20124/2724769/ar2019_en_box4.pdf

Bank Negara Malaysia. (2021). *Financial stability review 1H 2021: The insurance and Takaful sector*. https://www.bnm.gov.my/documents/20124/4782528/fsr2021h1_en_ch2b_ins%0Aurance.pdf

BenSaid, Y. R. (2023)[Forthcoming]. *Shariah governance and Takaful financial performance: The case of listed Takaful insurances*. *Journal of Islamic Accounting and Business Research* [Advanced online publication]. https://doi.org/10.1108/JIABR-09-2022-0236

Castro, M., Reyes Duarte, A., Villegas, A., & Chanci, L. (2023). The effect of crop insurance in Ecuadorian rice farming: A technical efficiency approach. *Agricultural Finance Review*, *83*(3), 478–497.

Che Mohd Salleh, M., Chowdhury, M. A. M., Cahyono, E. F., & Widiastuti, T. (2022). Measuring the effect of GST towards performances of Malaysian takaful operators. *Journal of Islamic Accounting and Business Research*, *13*(6), 977–993.

Cobb, C. W., & Douglas, P. H. (2007). A theory of production. *American Economic Association*, *18*(1), 139–165.

Eldaia, M., Hanefah, M. (2023). Impact of audit committee effectiveness on Malaysian Takaful performance, and moderating role of Shariah committee quality. In: Alareeni, B., Hamdan, A. (eds) Explore Business, Technology Opportunities and Challenges After the Covid-19 Pandemic. ICBT 2022. Lecture Notes in Networks and Systems, vol 495. Springer, Cham.

https://doi.org/10.1007/978-3-031-08954-1_65

Gomez, O. C. (2018). *Insurance: Speeding up the claims process*. The Edge Malaysia. https://www.theedgemarkets.com/article/insurance-speeding-claims-process

Goswami, Y. (2022). Impact of frauds on the financial performance of insurance companies in India. *Science, Education and Innovations in the Context of Modern Problems*, *5*(4), 253–264.

Harun, M. S., Hussainey, K., Mohd Kharuddin, K. A., & Farooque, O. Al. (2020). CSR disclosure, corporate governance and firm value: A study on GCC islamic banks. *International Journal of Accounting and Information Management*, *28*(4), 607–638.

ISM Insurance Services Malaysia Berhad. (2022). *Statistical yearbook: Insurance and Takaful financial year 2022*. www.ism.net.my

Kaffash, S., Azizi, R., Huang, Y., & Zhu, J. (2020). A survey of data envelopment analysis applications in the insurance industry 1993–2018. *European Journal of Operational Research*, *284*(3), 801–813.

Karbhari, Y., Muye, I., Hassan, A. F. S., & Elnahass, M. (2018). Governance mechanisms and efficiency: Evidence from an alternative insurance (Takaful) market. *Journal of International Financial Markets, Institutions and Money*, *56*, 71–92.

Lee, H. S., Cheng, F. F., Nassir, A. M., Razak, N. H. A. (2018). Does efficiency promote competitiveness of the insurance industry? Journal of Business Economics and Management, *19*(4), 566–591.

Lee, H. S., Cheng, F. F., Har, W. M., Md Nassir, Ab Razak, N. H. (2019). Efficiency, firm-specific and corporate governance factors of the Takaful insurance. *International Journal of Islamic and Middle Eastern Finance and Management, 12*(3), 368-387.

Li, Z., Li, Y., & Long, D. (2020). Research on the improvement of technical efficiency of China's property insurance industry: A fuzzy-set qualitative comparative analysis. *International Journal of Emerging Markets*, *16*(6), 1077–1104.

Lim, Q. M., Lee, H. S., & Har, W. M. (2021). Efficiency, productivity and competitiveness of the Malaysian insurance sector: An analysis of risk-based capital regulation. *Geneva Papers on Risk and Insurance: Issues and Practice*, *46*(1), 146–172.

Linn, T., & Maenhout, B. (2019). The impact of environmental uncertainty on the performance of the rice supply chain in the Ayeyarwaddy Region, Myanmar. *Agricultural and Food Economics*, *7*(1), 1–29.

Mehboob Shaikh, I., & Amin, H. (2024). Customers' willingness to choose family takaful: Extending the theory of interpersonal behaviour. *Journal of Islamic Accounting and Business Research*, *15*(1), 100–118.

Mohamed, T. S., & Elgammal, M. M. (2023). Are donor funds used effectively? An examination of Islamic and conventional microfinance institutions. *International Journal of Islamic and Middle Eastern Finance and Management*, *16*(5), 1009–1029.

Muhamat, A. A., Basri, M. F., Jaafar, M. N., Mohd Azlan, D. N. A., & Zamri, N. A. (2023). Efficiency of general Takaful operators in Malaysia : Post implementation of IFSA 2013. *Iranian Economic Review*, *27*(3), 895–913.

Naushad, M., Faridi, M. R., & Faisal, S. (2020). Measuring the managerial efficiency of insurance companies in Saudi Arabia: A data envelopment analysis approach. *Journal of Asian Finance, Economics and Business*, *7*(6), 297–304.

Omrani, H., Emrouznejad, A., Shamsi, M., & Fahimi, P. (2022). Evaluation of insurance companies considering uncertainty: A multi-objective network data envelopment analysis model with negative data and undesirable outputs. *Socio-Economic Planning Sciences*,

*82*(PB), 101306.

Osman, A. M., & Samontaray, durga P. (2022). Corporate governance and performance of insurance companies in the Saudi market. *Journal of Asian Finance, Economics and Business*, *9*(4), 213–0228.

Pjanić, M., Mitrašević, M., & Luković, S. (2023). Profitability determinants of life insurance companies in the Republic of Serbia. *Strategic Management*, *XX*(00), 41–41.

Rubio-Misas, M. (2020). Ownership structure and financial stability: Evidence from Takaful and conventional insurance firms. *Pacific Basin Finance Journal*, *62*(May), 101355.

Sallemi, N., & Zouari, G. (2023)[Forthcoming].*Shariah board and Takaful performance: Mediating role of corporate social responsibility*. *International Review of Economics* [Advanced online publication]. https://doi.org/10.21203/rs.3.rs-2182974/v1

Sallemi, N., Zouari Hadiji, R., & Zouari, G. (2021). Governance mechanisms and the Takaful insurance performance: The moderating role of the leader's seniority. *Journal of Islamic Accounting and Business Research*, *12*(2), 149–168.

Shieh, H. S., Li, Y., Hu, J. L., & Ang, Y. Z. (2022). A comparison of efficiency of life insurance companies in Mainland China and Taiwan using bootstrapped truncated regression approach. *Cogent Economics and Finance*, *10*(1). https://doi.org/10.1080/23322039.2022.2043571

Siddiqui, S. A. (2022). How efficient is Indian health insurance sector: An SBM-DEA study. *Managerial and Decision Economics*, *43*(4), 950–962.

Taib, C. A., Ashraf, M. S., & Razimi, M. S. B. A. (2018). Technical, pure technical and scale efficiency: A non-parametric approach of Pakistan's insurance and Takaful industry. *Academy of Accounting and Financial Studies Journal*, *22*(Special issue), 1–11.

Upadhyaya, Y. M., Ghimire, R., & Ghimire, S. R. (2023). Determinants of financial performance in Nepalese nonlife insurance companies: A panel data analysis. *Insurance Markets and Companies*, *14*(1), 99–109.

Zamzamir Zamzamin, Z., Haron, R., Ulum, Z. K. A. B., & Othman, A. H. A. (2023). Impact of derivatives user on firms' performance of Shariah compliant firms. *International Journal of Business and Society*, *24*(1), 1–17.