

Numerical Analysis On the Impact of COVID-19 On The Insurance Industry in Malaysia

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DOI: <https://doi.org/10.30880/ekst.2023.03.01.011>

Received 15 January 2023; Accepted 20 March 2023; Available online 3 August 2023

Abstract: The Coronavirus illness, known as COVID-19 have reached pandemic proportions over the world. The virus spread rapidly and the first case of COVID-19 was detected in Malaysia on 25th January 2020. There were many impacts that affected the market of the insurance industry in Malaysia during the COVID-19 pandemic. Hence, the aim of this research is to calculate the total income of the insurance industry in Malaysia from 2019 to 2021. Then, we calculate the growth rate of the total income and we get the annual growth rate of 3.75%. We assume that the total income will be increased exponentially, we use the exponential growth function and the annual growth rate of the total income of the insurance industry to develop the forecasting graph of total income in the future three years which are 2022, 2023 and 2024. Next, the number of confirmed cases and the number of deaths of COVID-19 diseases are analysed and a graph was developed. We found that the peak of the line graph of the number of confirmed cases and number of deaths falls in August 2021 and September 2021 respectively. Not only that, we used the number of deaths to calculate the mortality rate in the population size of 100,000 to develop the analysis graph and we found that the mortality rate in 2021 is the highest, which is 0.30999. On the other hand, we also created graph of the case-fatality rate which is calculated by using the number of confirmed cases and the number of deaths. Then, the highest case-fatality rate falls in September 2021 which is 1.9230%. Furthermore, we investigate the relationship between the mortality rate and the total income of the insurance industry by analysing the data to create the graph. From the result we conclude that the total income of the life insurance industry increases as the mortality rate of COVID-19 diseases increases.

Keywords: COVID-19, Insurance Industry, Mortality Rate, Case-fatality Rate, Growth Rate

1. Introduction

The Coronavirus illness, known as COVID-19, has reached pandemic proportions over the world [1]. It was declared a pandemic by the World Health Organization (WHO) on 11th March 2019 [2]. On 25th January 2020, the first case of COVID-19 was detected in Malaysia and the situation became worse and worse over the year [3]. Thus, there were many negative impacts that affected the market of the insurance industry in Malaysia during the COVID-19 pandemic.

Some insurers in China have expanded coverage on current health policies to include treatment expenses or provide COVID-19-specific death insurance [5]. Aside from that, some health insurers have implemented emergency response plans to ensure that policyholder claims are processed quickly. They also supplied additional coverage to millions of healthcare personnel and reporters in the hardest-hit areas. Even though the pandemic was far more restricted in Singapore and Hong Kong, there was a similar picture of free extensions to cover [6]. On the other hand, healthcare costs are largely covered by the public health system in Italy [7]. As a standalone product or as an expansion to existing policies, some large insurers have already established plans to protect policyholders from the danger of COVID-19.

The aim of this research is to know how big the impact of COVID-19 on the insurance industry in Malaysia is. Then, a graph has been constructed for the total income of the insurance industry in Malaysia from the year 2019 to 2021, besides creating the mortality rate and case-fatality rate analysis graph and investigating the relationship between the mortality rate and the total income of the insurance industry during the pandemic. The results of the comparison will alert the insurer to make the change for the improvement of the market [11]. In detail, the insurer also can know what type of insurance is the most affected during the COVID-19 pandemic from this research. After that, they can focus on the most affected insurance type and make specific changes to it to achieve better achievement.

2. Materials and Methods

2.1 Data Collection

According to the financial statistical yearbook 2019 from Insurance Services Malaysia (ISM) company, we can get important data on Malaysian Insurance and Takaful including an analytical view of the industry's growth and performance [4]. We have to get the data on the financial performance of the Malaysian insurance industry from Insurance Services Malaysia (ISM) to compare the results over the years [4]. The ISM Statistical Yearbook shows the data on three type of life insurance which are annuity, investment-linked, and ordinary, net premiums, net investment income, and other income of the insurance industry in Malaysia. The data was collected from 14 general life insurance companies in Malaysia and it was the most accurate data to get the result comprising the years. From the ISM Statistical Yearbook, we get the rounded value of total income in 2019 to 2021 are 254 billion, 272 billion, and 283 billion respectively.

Not only that, but we also collect data from the World Health Organization (WHO) to analyse the data on the number of confirmed cases and the number of deaths during the COVID-19 pandemic [9]. So, we can get the most accurate data to form the table to create the graph. Then, we can calculate the mortality rate and the case-fatality rate of the COVID-19 disease from the data analysis. From the collected data from WHO, we get the number of deaths in 2019 to 2021 are 0, 463, and 30999 respectively.

2.2 Growth Rate and Annual Growth Rate of Total Income

The total income of the insurance industry has been calculated using data collection. Then, we calculate the growth rate of the total income each year with the formula of

$$\text{Growth Rate} = \frac{\text{Final Value} - \text{Initial Value}}{\text{Initial Value}} \tag{Eq.1}$$

Next, we calculate the Annual Average Growth Rate (AGGR) of the total income of the insurance company from 2019-2021 by using the formula of:

$$\text{Annual Average Growth Rate} = \frac{\text{Growth Rate (y)} + \text{Growth Rate (y+1)} + \dots + \text{Growth Rate (y+n)}}{N} \tag{Eq.2}$$

where Growth Rate (y) is the growth rate in year one, Growth Rate (y+1) is the growth rate in the next year, Growth Rate (y+n) is the growth rate in the year n, and the N is the total number of periods.

2.3 Mortality Rate and Case-Fatality Rate of COVID-19

When calculating the mortality rate, we need the number of actual cases and the number of actual deaths [8]. Firstly, the number of actual cases is the most important this is because we need to know the number of actual cases that have already had an outcome and not the current cases that still have to resolve. The formula of the mortality rate is equal to the total number of deaths divided by the total number of the population. Only a small portion of the COVID-19 infected population is identified, verified through a laboratory test, and formally reported as a case because many individuals are asymptomatic, and testing has not been conducted on the full population [13]. Therefore, it is predicted that the true number of cases will be many times higher than the number of recorded instances. As some patients are not hospitalized and some are not tested, the number of deaths also frequently tends to be underestimated [14].

We collected data from the World Health Organization (WHO) which included the number of the population, the number of confirmed cases, and the number of deaths from 2019 to 2021 in Malaysia. Then, we analyse the data and form a table to list all the data to calculate the mortality rate and the case-fatality rate in Malaysia from 2019 to 2021. The mortality rate and case-fatality rate are very important for the research because we have to investigate the relationship between the total income of the insurance industry and the mortality rate of COVID-19 disease during the pandemic.

Next, we need to calculate the mortality rate and case-fatality rate of the COVID-19 disease by using the following formula:

$$\text{Mortality Rate} = \frac{\text{The number of deaths}}{\text{The number of population}} \times 100\% \tag{Eq.3}$$

$$\text{Case-Fatality Rate} = \frac{\text{The number of deaths}}{\text{The number of confirmed cases}} \times 100\% \tag{Eq.4}$$

2.4 Exponential Growth Function to Predict the Forecasting Graph

We assume that the total income of the insurance industry will be increased constantly over the years because the COVID-19 disease will not be disappeared within three years. So, we use the exponential growth function to predict the value of the total income in the next three years as the COVID-19 pandemic is still going on in Malaysia [12].

The exponential growth is very important to predict the data that increase exponentially at the same rate over time [10]. We can calculate the growth rate by using the formula below:

$$f(x) = a(1 + r)^x \tag{Eq.5}$$

where a is the beginning value of the data, r is the growth rate, and x is the time interval.

3. Results and Discussion

3.1 Total Income of The Life Insurance Industry in Malaysia

Table 1 shows the total income of life insurance during the COVID-19 pandemic in Malaysia from 2019 until 2021. In 2019, the annuity, investment-linked, and ordinary life insurance were RM 3.0396 billion, RM 42.2935 billion and RM 151.5689 billion, respectively. While in 2020, the annuity, investment-linked, and ordinary life insurance were RM 3.3072 billion, RM 48.9232 billion and RM 161.3698 billion, respectively. In 2021, the annuity, investment-linked, and ordinary life insurance were RM 3.4410 billion, RM 59.0611 billion and RM 165.5117 billion, respectively.

On the other hand, the net premium of life insurance between the years 2019 and 2021 are RM 37.1497 billion, RM 38.1896 billion and RM 39.9022 billion. While, the net investment income of the life insurance industry between the years 2019 and 2021 is RM 9.9992 billion, RM 9.9189 billion, and RM 10.5928 billion. Next, the other income of the life insurance industry between 2019 and 2021 is RM 10.2830 billion, RM 10.5673 billion and RM 5.2549 billion. From all these data, we can clearly see that the total income of the insurance industry in Malaysia from 2019 until 2021 increased exponentially over the year which are RM 254.3339 billion in 2019, RM 272.2760 billion in 2020, and RM 283.7637 billion in 2021.

Table 1: The income of life insurance during the COVID-19 pandemic in Malaysia (2019-2021)

Year	Annuity (RM Bil)	Investment linked (RM Bil)	Ordinary (RM Bil)	Net Premium (RM Bil)	Net Investment Income (RM Bil)	Other Income (RM Bil)	Total (RM Bil)
2019	3.0396	42.2935	151.5689	37.1497	9.9992	10.2830	254.3339
2020	3.3072	48.9232	161.3698	38.1896	9.9189	10.5673	272.2761
2021	3.4410	59.0611	165.5117	39.9022	10.5928	5.2549	283.7637

Figure 1 shows the graph of the total income of the life insurance industry in Malaysia during the COVID-19 pandemic from 2019 until 2021. The clustered column shows the number of incomes from the policy owners' fund at the beginning of the year, the net premium, the net investment income and other income in the life insurance industry in Malaysia from 2019 until 2021 which increase initially. Then, the line graph shows the total number of incomes in the life insurance industry increased exponentially. From the graph below, we can observe that the ordinary life insurance is the highest income compare with annuity and investment-linked life insurance. This is because ordinary life insurance is the most common type of permanent insurance policy which offers a death benefit along with a savings account.

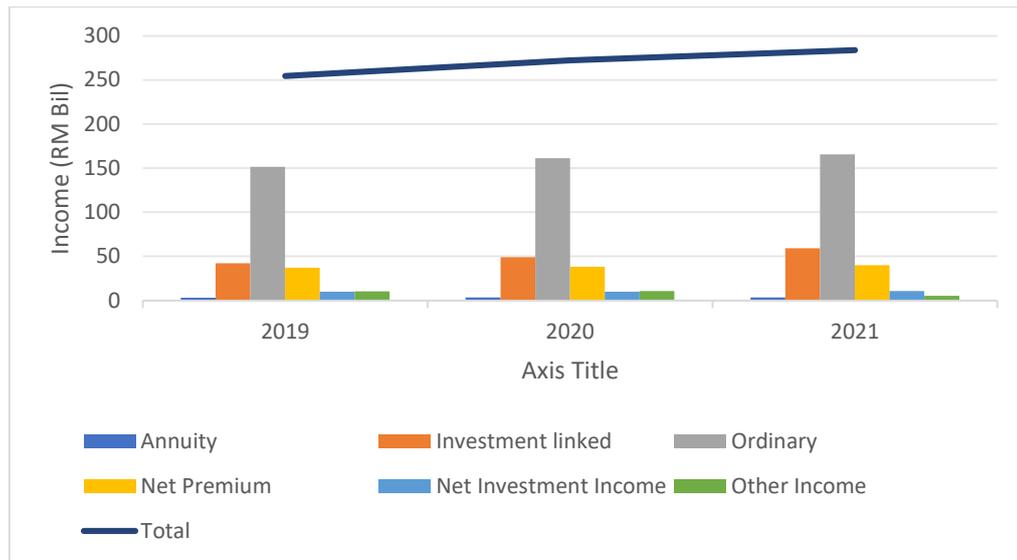


Figure 1: Total income of the insurance industry in Malaysia (2019-2021)

3.2 The Growth Rate and Annual Growth Rate

Table 2 shows the growth rate of the total income of the life insurance industry from 2019 until 2021. Firstly, the growth rate in the first year which is 2019 is assumed as 0% because there is no comparison to the previous year. Next, we can clearly see that the growth rate between 2019 to 2020 is 7.05% and the growth rate between 2020 to 2021 is 4.21%. From the growth rate of the year 2019 until 2021, we can calculate the average annual growth rate. Thus, the annual growth rate between these three years is 3.75%. Next, we can use the annual growth rate to find the forecasting graph of the total income of the life insurance industry from 2022 until 2024 using the exponential growth function.

Table 2: The growth rate and annual growth rate of the total income of the insurance industry

Year	Growth Rate (%)
2019	0
2020	7.05
2021	4.21
Annual Growth Rate	3.75

3.3 The Forecasting Total Income of The Insurance Industry

Table 3 shows the forecasting value of the total income of the life insurance industry using the exponential growth function with the value of the annual growth rate from 2019 until 2021. Then, we create the graph using the data below shown in Table 3.

Table 3: The forecasting value of the total income of the life insurance industry (2022-2024)

Year	Annuity (RM Bil)	Investment linked (RM Bil)	Ordinary (RM Bil)	Net Premium (RM Bil)	Net Investment Income (RM Bil)	Other Income (RM Bil)	Total (RM Bil)
2022	3.6837	61.2806	171.7318	41.4017	10.9909	5.4524	294.5407
2023	3.8222	63.5834	178.1856	42.9575	11.4039	5.6573	305.6092
2024	3.9658	65.9728	184.8813	44.5718	11.8324	5.8699	317.0937

Figure 3 shows the forecasting value of the total income of the life insurance industry in the future three years which are 2022 until 2024. Since the average annual growth rate between 2019 to 2021 is 3.75%, then we will assume the annual growth rate remains the same for the next three years. Then, using the exponential growth function and the annual growth rate 3.75%, we estimate the value of the income in the future years. We can clearly see that the total income of the forecasting graph will be increased, initially shown in Figure 3, from 2022 until 2024.

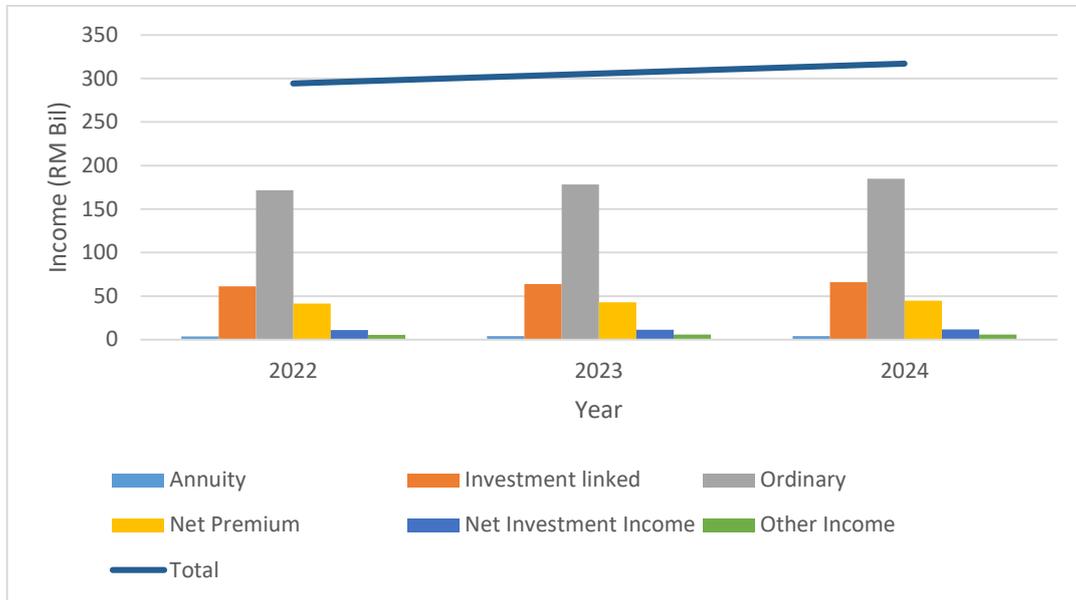


Figure 3: Forecasting on the total income of the insurance industry in Malaysia (2022-2024)

3.4 The Number of Confirmed Cases and The Number of Deaths

Figure 4 shows the line graph of the number of confirmed cases and the number of deaths of COVID-19 disease in Malaysia from 2020 to 2021 monthly. Then, we can clearly see that the peak of the line graph of the number of confirmed cases falls on August 2021 and the peak of the line graph of the number of deaths falls on September 2021. From the line graph below, we can investigate the number of confirmed cases and deaths of COVID-19 diseases in 2021 is much more than in 2020.

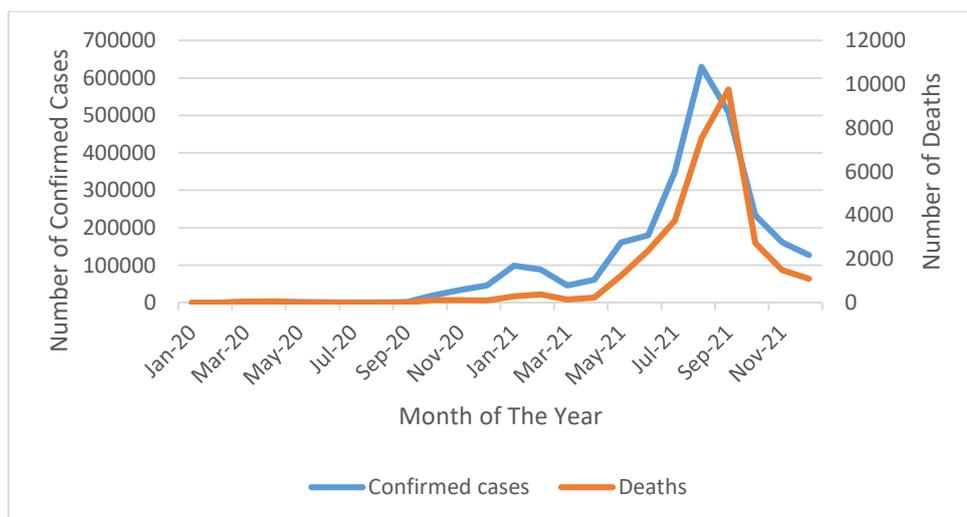


Figure 4: The number of confirmed cases and the number of deaths of COVID-19 (2020-2021)

3.5 The Mortality Rate of COVID-19

Table 5 shows the mortality rate of COVID-19 diseases in Malaysia from 2019 to 2021, with a population number of 100,000. Since there have been no deaths in 2019, the pandemic's beginning, so the mortality rate will be zero. Then, the total number of deaths in 2020 was 463 persons in the whole year. Thus, the mortality rate of COVID-19 diseases in 2020 is 0.00463 with a population number of 100,000. Not only that, the total number of deaths in 2021 increased to 30999 persons and the mortality rate of COVID-19 diseases became 0.30999 with a population number of 100,000.

Table 5: The mortality rate of COVID-19 diseases (2019-2021)

Year	Total Deaths	Mortality Rate (Total population 100,000)
2019	0	0
2020	463	0.00463
2021	30999	0.30999

Figure 5 shows the clustered column graph of the mortality rate of COVID-19 diseases from 2019 to 2021 in Malaysia with a population number of 100,000. From the figure below, we can investigate the highest mortality rate. Then, the highest mortality rate is in 2021 at 0.30999 because the number of deaths in 2021 increased dramatically which is 30999 much more than the previous year. Then, we can conclude that the higher the number of deaths for COVID-19 diseases, the higher the mortality rate.

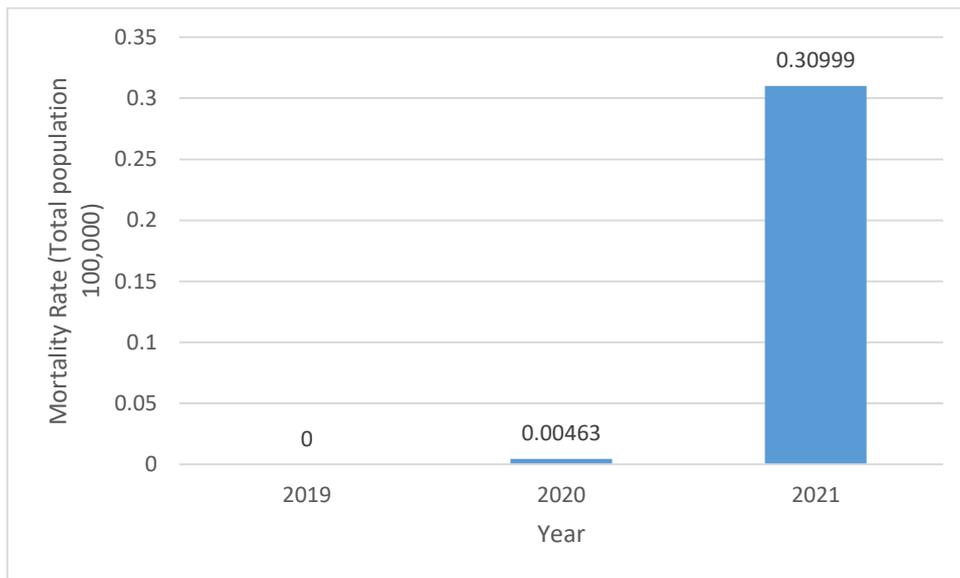


Figure 5: The mortality rate of COVID-19 diseases in Malaysia (2019-2021)

3.6 The Case-Fatality Rate of COVID-19

Figure 6 shows the line graph of the case-fatality rate of COVID-19 diseases from 2020 until 2021 monthly. From Figure 6, the case-fatality rate in January and February 2020 is zero because there were no deaths that month. Then, we can see that the case-fatality rate increased dramatically from March 2020 to April 2020. Next, we also can investigate the peak of the line graph of the case-fatality rate between 2020 and 2021, which falls on September 2021 at 1.9230%. Thus, the case-fatality rate of COVID-19 disease in 2021 is higher than the case-fatality rate of COVID-19 disease in 2020.

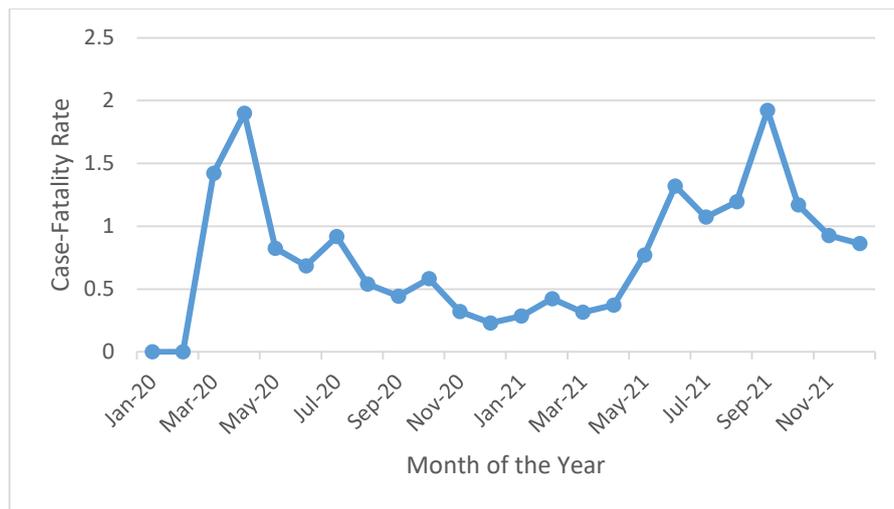


Figure 6: The case-fatality rate of COVID-19 (2021-2021)

3.7 Investigate the Relationship Between the Mortality Rate and The Total Income of the Insurance Industry

Figure 7 shows the stacked column graph of the total income of the life insurance industry and the mortality rate of COVID-19 diseases from 2019 to 2021. We can clearly see that the total income of the life insurance industry and the mortality rate of COVID-19 diseases increase initially towards the year. The total income from 2019 to 2021 are RM 254.334 billion, RM 272.276 billion, and RM 283.764 billion respectively. The mortality rate of COVID-19 from 2019 to 2021 are 0%, 0.463% and 3.0999% respectively.

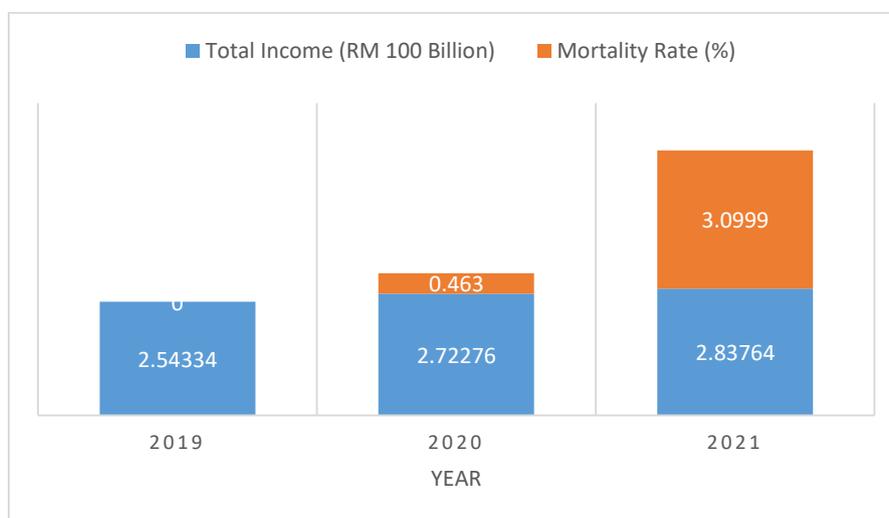


Figure 7: Comparison of the total income of the insurance industry and mortality rate of COVID-19

4. Conclusion

From this study, we know that the total income of life insurance industry was increase exponentially on 2019 to 2021 from the result above which are RM 254.3339 billion, RM 272.2760 billion, and RM 283.7637 billion respectively. Next, we also can observe that the mortality rate of COVID-19 disease was 0.00463 on 2020 and increase dramatically on 2021 which is 0.30999. Thus, we can conclude that the total income of the life insurance industry increases as the mortality rate of COVID-19 diseases increases. We made the hypothesis when the mortality rate of COVID-19 increased, most of the people

were willing to buy life insurance from the insurance company to minimize their risk during the pandemic.

Acknowledgement

This research was made possible by funding provided by the Ministry of Higher Education, Malaysia. The authors would also like to thank the Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia for its support.

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