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The Impact of Takaful Insurance on the Manufacturing Industry in Malaysia: Empirical Evidence through ARDL Bounds Testing Approach

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Abstract

In post-financial crisis, the interconnection between the financial sector and real activity is gaining more interest in the literature. Given that the insurance sector represents a large part of the financial globe, it will be essential to explore its impact on the real economy. Further, the expansion of participative finance, in the last decade, requires contextualising the question in this sense. However, this paper experiments the effect of the Takaful insurance on real activity in Malaysia. Hence, an ARDL model is estimated on quarterly data between 2010Q1 and 2017Q4. The results show a positive and significant impact of the increase in Takaful contributions on manufacturing activity. On the same side, a long-term relationship between the two sides is established in the image of a significative cointegration..

Keywords: Takaful, Manufacturing activity, AutoRegressive Distributed Lags Model

Introduction

There's no denying that economic agents are operating in the uncertain economic environment. While this nature generates different levels of risk, it is necessary to deal with them. On this path, the insurance industry was instituted. As its essential function is the transfer of risk, the damage derived from the occurrence of certain events seems to be mitigated. In this

sense, the resilience of economic agents' balance sheets can be improved in the face of uncertainty and the associated risks. While the Great Depression of 2008 led to drastic results and severe after-effects, two notes were made. In the first part, there is growing interest in the connection between the financial sphere and economic activity. In this setting, a large literature has investigated the resilience of financial intermediaries as determinant of economic activity, as in (Creel, Hubert, and Labondance 2014) and (Asteriou end Spanos 2018). More concretely, a number of studies have highlighted the contribution of the insurance sector as an economic growth leverage (Arena 2014) and (Dash et al. 2018).

In the second part, the spotlight on participatory finance is increasingly broadened in the wake of the crisis. This interest can be explained by the relative resilience shown by this branch of finance in the face of the downturn. Indeed, the nature of the participative finance exercise, based on the principle of profit and loss sharing, favors the transfer of part of the negative shocks from the asset side to the liability side. In other words, the deterioration in the balance sheets of financial intermediaries can be channeled, entirely or partially, to those of depositors (Hamza and Saadaoui 2013). Thanks to this pass-through, institutions operating in participatory finance remain relatively resilient (Greuning and Iqbal 2007).

As a result, participatory financial institutions are more stable relative to their traditional counterparts (Ibrahim 2016). In other words, they are well positioned in the face of financial crises (Hasan et Dridi 2010). Furthermore, the stability of participatory finance cannot be dissociated from an essential component such as *Takaful* insurance. In this sense, the statistics show that the sum of global issuance and *Takaful* assets have risen from 47 billion USD in 2008 to over 170 billion USD in 2019 (IFSB 2021). In fact, *Takaful* expansion is more significant in some countries than others. In Malaysia, *Takaful* insurance operators' assets have risen exponentially from 114.2 million Malaysian Ringgit (RM) in 2010 to 41,515.2 million RM in 2020[1]. In the light of these facts, participatory finance, and more specifically the *Takaful* sector, prescribes itself as a subject for study.

Along the same lines as the two previous notes, this paper aims to verify the communication between the financial sphere and real activity in the context of participatory finance. In fact, its contribution can be located on two dimensions. Firstly, it sheds light on the role of the participatory finance industry, like the *Takaful* industry, in the economic prosperity. As the studies developed in this direction are limited, this paper contributes to enriching the empirical literature on the macroeconomic effects of *Takaful* insurance. To the best of our knowledge, three studies have been conducted in this

[1]Statistiques mensuels de la banque Negara Malaysia en décembre 2020

direction. Thes include (Rawat and Mehdi 2017), (Shahid 2018) and (Izzati, Aziz, and Kassim 2020). Only the first of these deals with macro-econometric modeling. Moreover, it examines the link from the point of view of *Takaful* insurance operators' liabilities, as contribution collected, whereas the present study examines it from the point of view of assets. in fact, we believe that looking at the structure of *Takaful* assets can best inform the strategic behavior of insurance companies.

Second, it enriches empirical research on the impact of financial condition on the business cycle. In other words, it focuses on macro-financial linkage in a participatory context. Although the first dimension receives a large share of the effort in this paper, the second is implicitly considered. In other words, the present work focuses on the empirical verification of the *Takaful* insurance effect on production, represented by manufacturing activity. The rest of this paper is built as follows; in the second section a literature review is outlined. While the third presents the data and methodology adopted. Whereas the econometric model is specified in the fourth and the results are formulated and discussed in the last.

Literature review

Use In order to understand the theoretical relationship between Takaful insurance and economic activity, it will be necessary to explain the operating mechanism of Takaful operations. In this sense, a large part of the answer is represented by the nomination itself, a model based on the principle known in Arabic as Taawun, which is synonymous with solidarity (Hussain and Pasha 2012) (Yazid et al. 2012). At the start of the insurance period, institutions operating in this field receive contributions from participants (Archer, Karim, and Nienhaus 2012). While the contract defines the nature of the risks covered, the funds collected constitute the Takaful funds that are managed by the Takaful insurance operators on behalf of the members. At the end of the period and after deduction of expenses, customer claims and provisions, the final result is received by policyholders in the form of dividends. This mechanism is derived from the Mudarabah principle (Billah 2019). Under the latter, the operator receives a fee for managing Takaful funds (Ismail, Yusof, and Ahmad 2021). The last point represents the angle of divergence between conventional and Takaful insurance, where the customer's status is closer to that of an investor than a simple insured. Indeed, this is not a transfer, but rather a sharing of risk and responsibility between the members.

While its operation allows for neither Gharar nor Mayssir (Hussain and Pasha 2012) (Malik and Ullah 2019), Takaful insurance can satisfy a good part of the needs of exacting customers in terms of compliance with shariaa principles. Whereas this point may encourage demand in this sector,

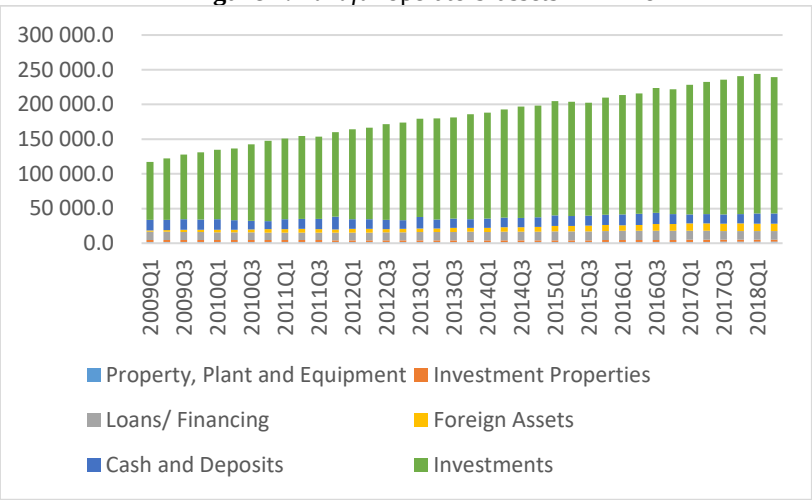
two effects may be derived from it. On the one hand, through the strengthening of financial inclusion (Haroun and Effandi 2019) (Ansari and Bahari 2021) Takaful insurance can allow the conversion of an additional portion of savings into the acquisition of Takaful assets. On the other hand, since they provide financial protection and risk mitigation (Alhabshi and Razak 2011), Takaful operations create a hard floor for economic activity (Rawat and Mehdi 2017). These two effects are bound to boost economic growth by stimulating both saving and investment (Izzati, Aziz, and Kassim 2020). In this line, (Shahid 2018) and Subsequently, there is a catalytic effect of alternative insurances, such as Takaful, on economic conditions. Although theoretically justified, empirical verification is essential.

Stylized facts

Given that the question and model addressed in this paper focus on the impact of the *Takaful* industry on economic activity, an overview of the historical development of the two sides of the relationship is crucial. In this path, the graph below presents quarterly time series of manufacturing activity output as well as *Takaful* funds. The latter are represented by the assets of direct *Takaful* family operators. These assets include property, plant, equipment, investments, financing, investments such as Malaysian government papers and corporate securities, foreign assets, cash and deposit.

Although the Malaysian *Takaful* insurance covers two categories, general and family, only the amount collected under the latter is considered. There are two main reasons for this choice. The first is related to the difference in the operating methods of the two. While both types of *Takaful* provide the protection function, the Family branch is characterized by the addition of another function, namely the collection of long-term savings. It covers, among others, the risk of death and disability. While the General *Takaful* covers the risk of damage or loss. The term *Takaful* family is therefore likely to generate more stable resources for the economy. Secondly, data from Bank Negara show that the *Takaful* family business represents a significant portion of the Malaysian alternative insurance sector. Assets booked in this segment in 2006 amounted to 23,200 million RM. General *Takaful* assets, on the other hand, did not exceed 3,593 million RM. In the light of the above considerations, the present study focuses on family *Takaful*.

Figure 1. *Takaful* operators' assets in million RM

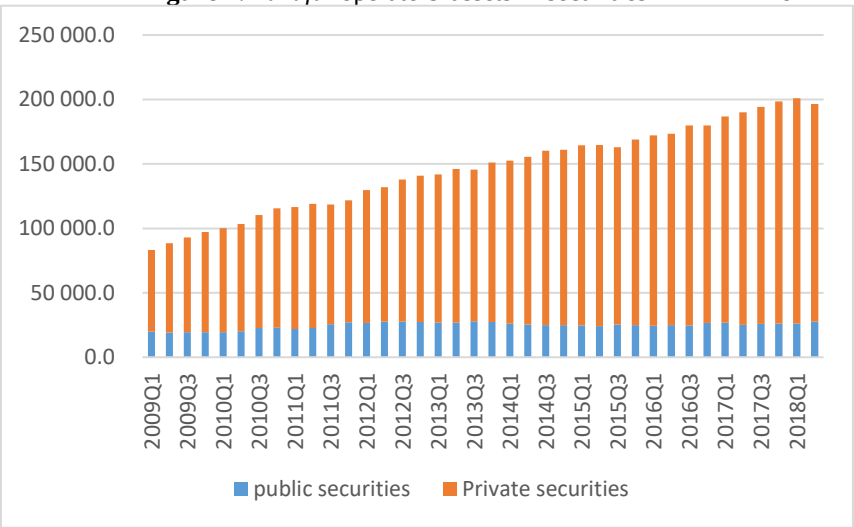


Source: Central Bank of Malaysia – Negara -

in this sense, two notable observations can be made. Firstly, the family *Takaful* industry grew at a sustained rate over the period under review. Without anything more, this evolution can be a leverage for economic growth. As this is essentially due to the increase in private and sovereign securities, the intensity of this leverage is increasingly important. In other words, *Takaful* operators are mobilizing the funds collected, primarily, towards investment. As a result, economic activity can be boosted through this channel. As shown in Figure 2, the decomposition of previous investments reveals the dominance of the effect of acquiring private rather than sovereign securities. Hence, the hypothesis that the *Takaful* industry has a positive effect on economic growth, by encouraging private investment, can be considered.

In order to maintain this hypothesis, it is imperative to observe the evolution of economic activity in Malaysia. Although the structure of the Malaysian economy is diversified, manufacturing takes a special place. Following a structural transformation of the Malaysian economy, economic growth is increasingly driven by manufacturing production. The latter is highly diversified, representing a collection of diverse activities. It is mainly dominated by the production of electrical and electronic machinery, chemicals, petroleum and coal products. In 2017, these items contributed 22%, 10% and 15% respectively to the value added of manufacturing activity. In 2020, the latter's contribution to GDP will be 22.31%.

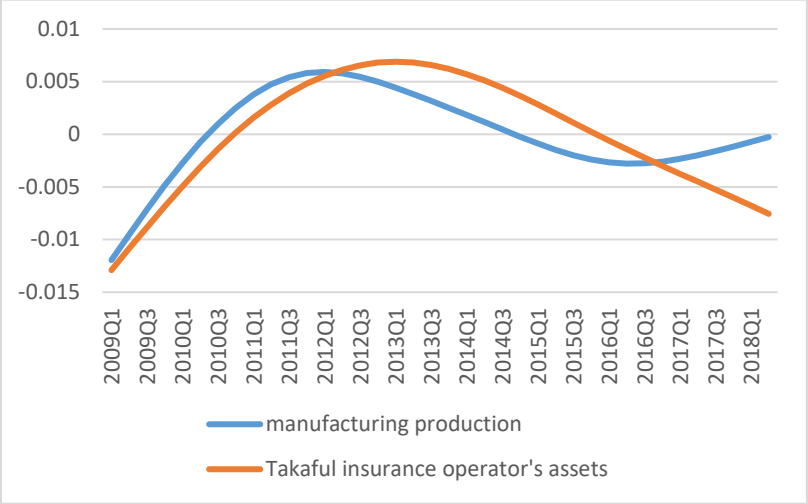
Figure 2. *Takaful* operators' assets in securities in RM million



Source: Central Bank of Malaysia – Negara –

At this point, linking the evolution of the manufacturing production time series to that of operators' assets in the *Takaful* insurance is now justified. Since both series have an upward trend, their simultaneous exposure in their unadjusted forms cannot teach significantly in terms of the aforementioned hypothesis. On the other hand, the visualization of their cyclical components may enable this. In this pathway, two transformations were applied to the series in question. first, they are seasonally adjusted using X-13ARIMA-SEATS software. Secondly, the trend effect was removed by applying HP (Hodrick-Prescott) filter. Both series are expressed in logarithm and the corresponding results are shown in Figure 3. Both series are expressed in logarithm and the results are presented in figure 3. The figure shows a matched movement in the volume of *Takaful* family assets and manufacturing output. Certainly, this finding can in no way be taken to imply causality or a relationship between the first and the second. It does, however, call for statistical exploration and econometric verification. Indeed, the correlation between the logarithms of the two series is 98%. Whereas, the empirical verification is showing and discussed in the next section.

Figure 2. Les composantes cycliques des actifs Takaful et de la production manufacturière



Source: the authors' calculations

Model specification: ARDL Model

The econometric model built in this paper considers two variables in the Malaysian economy: the assets of *Takaful* insurance operators and manufacturing output. The period considered is between 2010Q1 and 2017Q4. This is an econometric estimate of an ARDL, the aim of which is to test long-term cointegration between the two variables. Consequently, it not only looks to verify, but also to quantify the speed of adjustment between the two variables. With this in mind, the first is $Takaful\_assets_t$. It is represented by the sum of assets shown on the balance sheet of *Takaful* insurance operators in the so-called "family" industry. While the second is captured by the level of production completed by the manufacturing industry Man_t. In fact, it groups together a number of production activities as pointed out in the previous lines. In what follows, both variables are expressed in logarithmic form.

While the query is set on the effect of the variable $Takaful_assets_t$on the output of the manufacturing sector Man_t, an ARDL model can be presented, formally, as follows:

$$Man_t = \sum_{i=1}^{n} \emptyset_i \, Man_{t-i} + \sum_{i=0}^{n} \beta_i \, Takaful\_assets_{t-1} + c + \varepsilon_t$$

Where $\emptyset_i$ and β_i denote the i[th] lag coefficient, respectively, of Man and $Takaful\_assets$. While ε_t represents the term error and c denotes a constant term.

Since the verification of cointegration between the two variables calls for the application of t-Bounds tests, it will be essential to meet the condition

of the latter, such as stationarity. More distinctly, Man_t and $Takaful\_assets_t$ must be I (0) or I (1) at most. However, they must not, in any case, be I (2) or higher. In order to verify this condition, two tests, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP), are applied for both variables. The results are shown in Table 1.

Table 1. Stationarity tests for variables

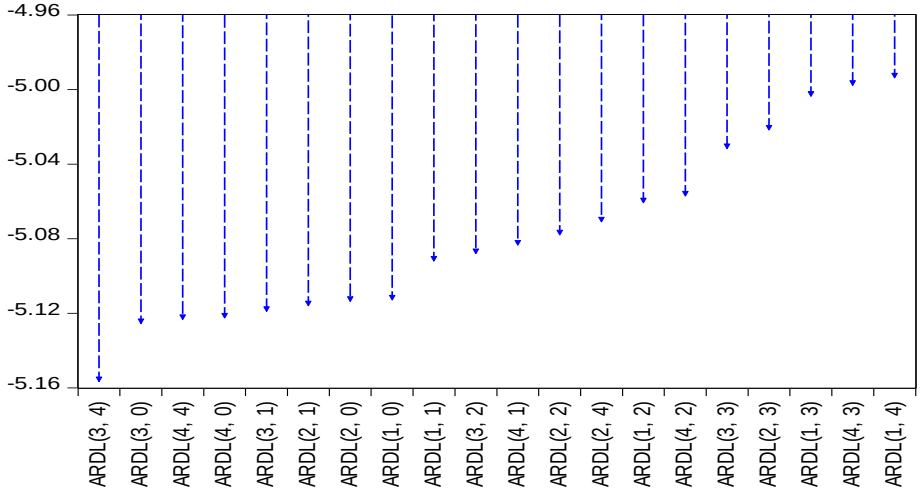
Variables		ADF			PP		
		Constat	Constant & Trend	None	Constat	Constant & Trend	None
Man_t	Level	-1.69	-4.367*	4.2712	-2.195	-4.5404	5.389
		0.42	0.0070	1.000	0.2114	0.0045	1.0000
	1st difference	-7.56*	-7.68*	-2.62*	-7.83*	-8.0940	-5.11*
		0.0000	0.0000	0.010	0.0000	0.0000	0.000
$Takaful\_assets_t$	Level	-4.10*	-2.7588	8.7190	-3.76*	-2.4629	7.7671
		0.0031	0.2215	1.000	0.0068	0.3434	1.0000
	1st difference	-5.89*	-7.450*	-2.16*	-5.898*	-7.683*	-2.872*
		0.0000	0.0000	0.031	0.0000	0.0000	0.0053

* : significant at 5% Source: the authors' calculations

The results of the ADF test do not allow us to reject the null hypothesis of stationarity at first difference. Indeed, the two variables, Man_t and $Takaful\_assets_t$ are I (1), i.e., stationary at first difference. The same conclusions are provided by the PP test. However, the methodology adopted in the present paper follows the cointegration approach developed by (Pesaran, Shin, et Smith 2001). From this point of view, ARDL model estimation is conditioned by the order of integration of the two series, which must be I (1) at most.

As the two series, Man_t and $Takaful\_assets_t$ are integrated of order 1 or (I), application of the ARDL model T-Bounds test can take place. However, it will be necessary to determine in advance the number of lags to be considered. Given that several models can be estimated according to the number of lags considered, it is essential to select the most accurate one. To this end, the Akaike Info criterion (AIC) was calculated for each of these models. Figure 4 shows the AIC values for each of the estimated models. Since the best model is the one with a high AIC value, the ARDL (3, 4) model was retained.

Figure 3. Models and their AIC



Source : the authors' calculations

By setting the maximum lags of the dependent variable and regressor to 4 lags, and relying on Akaike info criterion (AIC), the model selected is an ARDL (3 ,4) after the evaluation of some twenty models. In order to verify the robustness of the selected model, a set of tests is required. Table 2 is designed for this purpose. Indeed, the Jarque-Bera test value is 0.18, which is in favor of rejecting the alternative hypothesis and accepting the null hypothesis. In other words, the errors are normally distributed. As for the Breusch-Godfrey test, it shows a value of 0.753346. Therefore, the null hypothesis of no error autocorrelation is accepted. Furthermore, the Breusch-Pagan-Godfrey value is 0.688131. At this point, his null hypothesis cannot be rejected. Thereafter, the residuals are homoscedastic. Whereas Ramsey's specification test shows a value of 1.033150. In fact, the model is correctly specified and no specification errors were found. In summary, all four tests converge in confirming the non-violation of the model's key assumptions. The last test therefore remains valid.

Table 2. Model robustness tests

Test	Value	Probability	Decision
Omitted variable : Ramsey RESET	1.033150	0.3128	The model does not suffer from a specification error
Normality : Jarque-Bera	0.180224	0.91382	Residues are normally distributed
Error autocorrelation: Breusch-Godfrey	0.753346	0.4831	The model does not suffer from error autocorrelation
Heteroskedasticity : Breusch-Pagan-Godfrey	0.688131	0.6978	Errors are homoscedastic

Source : authors' development

Results

The empirical verification of the relationship between *Takaful* assets and manufacturing output is shown on two levels. The first concerns the qualitative aspect. In other words, it inspects the existence of long-term cointegration between the two components of the potential relationship. In this sense, an ARDL bounds test, as advanced in (Pesaran, Shin, and Smith 2001), was proceeded. The following table shows the results obtained. While the F-statistic displays a value above the critical thresholds in both the upper and lower bounds, the null hypothesis of non-existence of cointegration is rejected. On the other hand, the hypothesis of long-term cointegration between the two variables is maintained. In other words, the results support a long-run equilibrium relationship between *Takaful* assets and manufacturing output. Moreover, the relationship is significant at the 1% level.

Table 3. Bounds test results

	Value	Signif.	I(0)	I(1)
F-statistic	6.204353	10%	3.02	3.51
K	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

Source : authors' development

As the long-term relationship has been confirmed in the first level, its quantification remains necessary in the second. In addition, the coefficients of the relationship need to be determined. Given that two horizons of the relationship can be distinguished, short-term and long-term, two categories of coefficients are considered. The table below shows those related to long-term dynamics. In this sense, it shows a positive and significant coefficient value for the explanatory variable, i.e., $Takaful\_assets_t$. In addition, the coefficient is 0.735244. In other words, a 1% increase in *Takaful* assets generates a 73.52% increase in manufacturing output. In summary, a significant effect of the *Takaful* insurance on economic activity, like manufacturing, is revealed in the long term.

Tableau 4. Les coefficients de la dynamique à long terme

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\boldsymbol{Actif\_Takaful_t}$	0.735244***	0.039540	18.59514	0.0000
C	2.081458	0.500464	4.159058	0.0004

*** : significant à 1% Source : authors' development

The estimation of short-term coefficients is part of an effort to complete the methodology adopted in this paper. Additionally, to understand the dynamics of long-term variables, we need to know how they behave in the long term. In other words, estimating the short-term relationship is essential to quantifying the speed of adjustment towards long-term equilibrium. To this end, the results of the error correction model (ECM) must be used. The estimated ECM is shown in the table below. They reveal a negative and significant value for the error term coefficient CointEq. As the latter is within the accepted range, i.e., between 0 and -1, the stability of the long-term equilibrium is retained. Moreover, its value indicates that 74.90% of adjustment is achieved in each period.

Table 5. ECM model

Variable	Coefficient	Std. Déviation	t-Statistique	Prob.
D(MAN(-1))	0.553324	0.217934	2.538954	0.0183
D(MAN(-2))	0.447989	0.197524	2.268026	0.0330
D(L_FAMILY)	0.219742	0.237094	0.926814	0.3636
D(L_FAMILY(-1))	-0.377257	0.237330	-1.58959	0.1256
D(L_FAMILY(-2))	-0.344199	0.243299	-1.41471	0.1705
D(L_FAMILY(-3))	-0.623696	0.265581	-2.34842	0.0278
CointEq(-1)*	**-0.74908*** **	0.166539	-4.497953	0.0002

*** : significant at 1% Source : authors' development

Discussion

The results processed in this paper drop in the same direction as (Shahid 2018), which affirms the significant macroeconomic implications of the *Takaful* industry. By promoting productivity and enabling economic security, *Takaful* products can stimulate economic activity and subsequently foster prosperity. Along the same lines (Rawat and Mehdi 2017) use panel data from Malaysian banks and *Takaful* operators to arrive at the same result. There is a significant relationship between total *Takaful* contributions and economic growth. As for (Izzati, Aziz, and Kassim 2020), through a smart-PLS applied in the Malaysian context, investigate and reach the same previous conclusions. They explained the latter by the ability of the *Takaful* industry to convert savings into investment, and subsequently increased domestic production. On the other hand, others conclude with a negative relationship between *Takaful* insurance and economic growth. (Rawat and Mehdi 2017) explains the finding by the inefficiency of the investment strategies adopted by *Takaful* operators.

These results can be explained by the *Takaful* industry's ability to mobilize savings and protection against risk. Given that these functions are

similar to those of the conventional insurance sector, similar conclusions can be drawn elsewhere. A study of 29 European countries (Haiss and Sümegi 2008) demonstrated a positive relationship between life insurance and economic growth. In the same way, (Ward and Zurbruegg 2000) assert a cointegration between gross domestic production and insurance premiums. More precisely, through Granger causality, they showed that the latter leads to economic growth.

As for the major specificity of the model, *Takaful* insurance lies in compliance with shariaa (Hassan 2020). Given that conventional practice in the insurance sector is associated, in the literature, with *Gharar* and *Mayssir*. Indeed, a large proportion of the demand for insurance services is excluded for reasons essentially linked to religion. The conception of an alternative insurance sector, like *Takaful*, is becoming increasingly necessary. It enables us to respond to demand that has escaped the conventional insurance sector. Subsequently, financial inclusion is promoted (Faisal 2016), (Haroun and Effandi 2019) and (Gherbi 2020).

Conclusion

In the aftermath of the 2008 crisis, the interaction between the financial sphere and real business is receiving an increasing attention in the literature. Meanwhile, participatory finance is proving relatively resilient. These two points form the starting line of the present paper, in which the impact of the *Takaful* industry on economic activity is verified. To this end, the Bounds Testing approach has been adopted and applied to the Malaysian economy. Based on the series of family *Takaful* assets and manufacturing output between 2010Q1 and 2017Q4, an ARDL model is specified and estimated. In the light of the results provided by the latter, the cointegration test was conducted. The conclusions are in favor of the existence of a stable long-term relationship between the variables concerned. Given that the coefficients derived from the estimation are positive and significant, the assets of *Takaful* insurance operators positively influence the volume of manufacturing industry output.

These results are in line with those established by (Shahid 2018) and (Izzati, Aziz, and Kassim 2020). The relationship finds its foundations in the structure of the *Takaful* insurance model and its ability to drain savings, transforming constituted funds to investments. Subsequently, economic activity can be boosted. However, these results depend on the performance and efficiency of *Takaful* insurance operators' investment strategies. In this sense (Rawat and Mehdi 2017) presents the *Takaful* industry as a brake on economic growth. It is therefore vital to focus professional and academic efforts on improving the performance of *Takaful* insurance operators.

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Data Availability: All of the data are included in the content of the paper.

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