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Revisiting The Impact of Insurance on Eocnomic Growth: A Study of Malaysia and Singapore

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Abstract

The objective of this study is to ascertain the short-term and long-term relationship between insurance and economic growth in Malaysia and Singapore from 1990 to 2022. Government debt and government expenditure are included as control variables, leading to the formulation of separate models for each country. The study employs the Autoregressive Distributed Lag (ARDL) dynamic analysis method. The findings reveal that, concerning the government debt model and expenditure model, both Malaysia and Singapore exhibit a long-term relationship. In the government debt model and expenditure model, a short-term relationship is identified with Error Correlation Model (ECM). As a result, the study confirms the positive impact of insurance on economic growth both in short-term and long-term in Malaysia, while the impact of insurance on economic growth is asymmetric in Singapore. this study found that insurance plays a more significant role in the developing economy compared to developed economy. Therefore, this study recommends that policymakers should encourage individuals to invest in insurance, as it proves beneficial to the economy in both the short and long run.

Keywords: Economic Growth, Insurance, Government Debt, Government Expenditure, ARDL, ECM

Introduction

The intersection of insurance and economic growth is a critical aspect of economic development. Economic growth, characterized by increased production of goods and services, is integral to a nation's prosperity as it generates employment, enhances productivity, and elevates living standards (Acemoglu & Robinson, 2012). Conversely, insurance plays a pivotal role by offering financial security against various risks such as health issues, natural disasters, and corporate failures (Huang & Wald, 2017). This financial safety net provided by insurance not only shields individuals and businesses from

uncertainties but also fosters risk-taking and entrepreneurship, thereby supporting economic growth (Beck & Webb, 2003). The intricate relationship between economic growth and insurance has been a focal point of academic and policy discussions. Traditionally, it is believed that insurance positively contributes to economic growth by mitigating risk costs and providing a safety net for enterprises and individuals. Simultaneously, economic growth creates new opportunities for insurers to broaden their customer base and diversify risk portfolios (Cummins & Weiss, 2000).

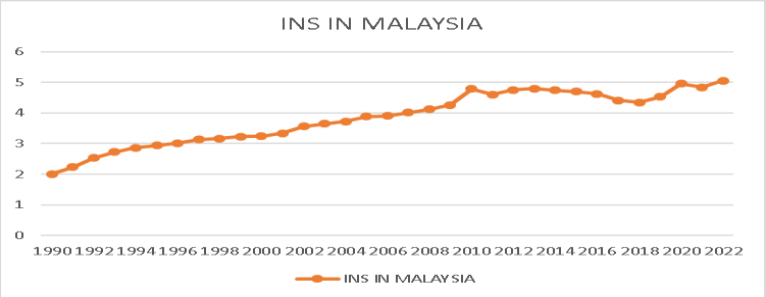

Figure 1: Insurance spending in Malaysia
Source of figure: OECD Data

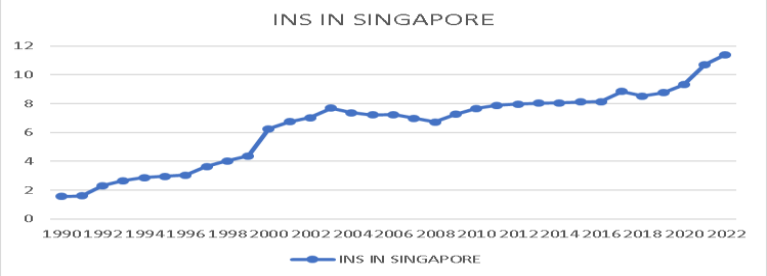

Figure 2: Insurance spending in Singapore
Source of figure: OECD Data

Above figures are the line chart of insurance spending of Malaysia and Singapore, Insurance spending is defined as the ratio of total direct premiums to GDP, representing the relative importance of the insurance industry in the domestic economy. The indicator is expressed as a percentage of GDP.

As the figure shown, the insurance spending of both countries has been increasing consistently during the time 1990 to 2022. But there still exists fluctuation, Malaysia has declined slight during 2010 to 2018, Singapore has declined slightly during 2002 to 2008. As for both countries, when there is an economic crisis, like covid-19, the insurance spending increased sharply. Technically speaking, Insurance is an important part of the modern economy, providing risk protection and facilitating economic transactions. Therefore, this is why understanding the relationship between economic growth and insurance is worthy to examine. First it can inform policy decisions, for instance, if insurance is found to have a significant positive impact on economic growth, policymakers might consider measures to promote insurance uptake, such as subsidies or incentives. Conversely, if insurance is found to hurt economic growth, policies might be implemented to mitigate this effect. Second for investment decisions: Insurance companies and investors need to understand the relationship between economic growth and insurance to make informed investment

decisions. If insurance is found to be a key driver of economic growth, investors might be more inclined to invest in the insurance sector.

while there is a growing body of research on the relationship between economic growth and insurance, there is a lack of research specifically focused on the context of Malaysia and Singapore. This gap in the literature is particularly important given the unique economic and regulatory environments in these countries. Moreover, the presence of government debt and government expenditure in these countries adds another layer of complexity to the relationship between economic growth and insurance. Understanding this relationship can provide valuable insights for policymakers and investors in these countries. This study aims to explore insurance as a contributor to economic growth, considering the influence of government expenditure and government debt separately. Effective government management of both variables is essential for promoting economic growth and stability. The study focuses on evaluating countries' economic growth using real gross domestic product (RGDP), consumer price index as a proxy for inflation, government expenditure, and government debt. Life insurance is employed as a measure of insurance activity. Control variables are examined separately to avoid correlation issues and ensure an accurate understanding of the factors contributing to economic growth.

With this in regard, the current study aims to achieve the following general and specific objectives. The general objective of this study is to investigate the impact of insurance on economic growth in Malaysia and Singapore for long-term and short-term. The specific objectives are; 1. With the presence of government expenditure variable as a control variable, the impact of insurance on economic growth in Malaysia and Singapore for long-term and short-term, 2. With the presence of government debt variable as a control variable, the impact of insurance on economic growth in Malaysia and Singapore for long-term and short-term.

The motivation of this study lies in the fact that while there is a growing body of research on the relationship between economic growth and insurance, there is a lack of research specifically focused on the context of Malaysia and Singapore. This gap in the literature is particularly important given the unique economic and regulatory environments in these countries. Moreover, the presence of government debt and government expenditure in these countries adds another layer of complexity to the relationship between economic growth and insurance. Understanding this relationship can provide valuable insights for policymakers and investors in these countries.

Literature Review

Numerous studies have probed the intricate relationship between insurance and economic growth. Early investigations cantered on the correlation between insurance consumption (both life and non-life insurance) and income levels (GDP per capita), as well as the link between insurance and financial development. Pioneering works such as those by Beenstock, Dickinson & Khajuria (1986); Outreville (1990) established correlations between non-life insurance demand and GDP per capita. However, a notable gap existed in understanding the causal relationship between insurance development and economic growth. Subsequent research, as exemplified by Browne & Kim (1993); Outreville (1996); Browne et al (2000); Beck & Webb (2003), delved into nuanced aspects of this association. The emergence of causal links between insurance and economic growth became a focal point. The works of Ward & Zurbruegg (2000); Webb et al (2002) advanced this exploration by examining potential causal relationships in the context of OECD countries and within a

revised Solow-Swan neoclassical economic growth model, respectively. The latter study, employing a three-stage least squares instrumental variables approach, demonstrated the influential role of banking and life insurance measures in predicting economic growth.

The assessment of the potential causal relationship between insurance market activity and economic growth has not been extensively studied. The exceptions are the works of (Ward & Zurbruegg, 2000; Webb et al., 2002). Ward and Zurbruegg examine the potential causal relationship between economic growth and insurance market activity in nine OECD countries over the period 1961 to 1996, using annual real GDP as a measure of economic activity and annual real gross premiums written as a measure of insurance activity. The long-run relationships for five countries (Australia, Canada, France, Italy, and Japan) were found on a country-by-country basis using vector autoregressive error correction models. The authors examine the statistical significance of the insurance coefficients in the long-run equation to assess the causal relationship between insurance and GDP growth in these countries.

Several studies in the literature claim that domestic savings and investment decisions are strongly influenced by the financial system, especially by financial intermediaries such as insurance companies (Fung, 2009; Vu et al., 2023). However, financial development in each country may depend on government policies, laws, financial infrastructure and enforcement norms. A large body of literature suggests that insurance activities may be effective or counterproductive for economic development, depending on the context. The impacts of insurance markets include enhancing financial stability, mobilizing domestic savings, facilitating trade and commerce, promoting capital accumulation, managing risk, mitigating losses, facilitating access to credit, and facilitating capital allocation (Guo et al., 2009; Ward & Zurbruegg, 2000; Chang et al., 2014). Insurance companies are often viewed as financial intermediaries, risk transfer providers, and institutional investors, thus contributing to economic development in a variety of ways. Conversely, insurance companies can intervene in certain aspects of aspects of economic growth that may increase moral hazard, such as the imprudent behaviour of the imprudent behaviour of the insured, especially in non-life insurance (Gueyie, 2003; Haiss & Soumegi, 2008; Lee & Qiu, 2012). In addition, scholars have argued that there is a close relationship between the two insurance companies, the industrial banking industry, etc. That the financial risk markets have been markets from irresponsible behaviour. This illustrates the complexity of the debate between insurance activity and economic growth. Overall, most studies show that insurance contribute differently to economic growth. This study aims to analyse the relationship between insurance and economic growth, with the government debt and expenditure variables in Malaysia and Singapore. The ARDL bound test is used to study the existence of long-term and short-term dynamic relationships.

Methodology

In this study, there are five economic variables involved, which consist of real gross domestic product (RGDP) taken from International Monetary Fund, total life insurance (INS) taken from Federal Reserve Economic Data, Consumer Price Index (CPI) taken from World Bank, government debt (GDT), and government expenditure (GEXP) taken from International Monetary Fund. RGDP is the dependent variable, while INS, CPI, GDT, and GEXP is independent variables. The following table shows where the data for each variable was obtained from.

Based on theory and prior completed research, the signs and magnitudes of the required parameters can be determined. Due to unit differences between variables, the data has been transformed into linear ln form of logarithm for estimation purposes and to avoid normalization issues in the model. Below is the linear ln model for economic growth formed in a multiple regression model, where the least squares method can be applied:

$$lrgdp_t = \alpha 0 + \beta ins_t + \gamma lcpi_t + \delta lgexp_t + \theta lgdt_t + \varepsilon t$$

Where,

$lrgdp_t = \text{Log } of\ Real\ gross\ domestic\ product\ for\ year\ t$
$lins_t = Log\ of\ Total\ life\ insurance\ for\ year\ t$
$lcpi_t = Log\ of\ Consumer\ price\ index\ for\ year\ t$
$lgexp_t = Log\ of\ Governement\ expedniture\ for\ year\ t$
$lgdt_t = Log\ of\ Government\ debt\ for\ year\ t$
$\beta\ 0 = Coefficient\ for\ determination\ variables$
$\beta, \gamma, \delta, \theta = Parameter$
$\varepsilon = Error\ term$
$t = Period\ from\ 1990\ to\ 2022$

The model used in this study is based on Keynesian theory. The specification model in this study is a model inspired by a study conducted by (Loganathan et al., 2020). For this study the objective is to identify the existence of a dynamic relationship between the economic growth (RGDP) that is measured by the total life insurance (INS), consumer price index (CPI), government debt (GDT), government expenditure (GEXP).

In general, the study adopted the methodology employed by (Loganathan et al., 2020). This section outlines the methodology framework used. Firstly, the univariate unit root test was utilized as proposed by (Dickey & Fuller, 1979).Secondly, in order to capture the long-term relationship between the variables, the cointegration test procedure was adopted as recommended by (Pesaran et al., 2001). Furthermore, the diagnostic test is employed to identify the stability and normality, the CUSUM and CUSUMS being used.
For this study, the ARDL equation can be used as below:

$$\Delta \text{lrgdp}_t = \delta_0 + \sum_{i=1}^{l} \tau i \Delta \text{lrgdp}_{t-i} + \sum_{i=0}^{m} \theta i \Delta \text{lins}_{t-i} + \sum_{i=0}^{n} \omega i \Delta \text{lcpi}_{t-i} + \sum_{i=0}^{o} \alpha i \Delta \text{lgexp}_{t-i} + \sum_{i=0}^{p} \lambda i \Delta \text{lgdt}_{t-i} + \varphi 1 \text{lrgdp}_{t-1} + \varphi 2 \text{ins}_{t-1} + \varphi 3 \text{cpi}_{t-1} + \varphi 4 \text{lgexp}_{t-1} + \varphi 5 \text{lgdt}_{t-1} + \eta_t$$

Further, ARDL method could be used on most cases which is means that even the variables that are stationary at mixed levels which are at level and its first difference. It is an appropriate method for these types of stationary condition (Pesaran et al., 2001).

The error correction term ect_{t-1} denoted the respond of stabilizing disequilibrium system. In the existence of co-integration, ect_{t-1} should be negative and the probability is ought to be significant and also the value of ect_{t-1} should be higher than 1, so it can adjust the speed. Further, ARDL method could be used on most cases which is means that even the variables that are stationary at mixed levels which are at level and its first difference. It is an appropriate method for these types of stationary condition (Pesaran et al., 2001). While the effect of independent variables can be seen in the short-run, the equation will be as below, there are models from Error Correction Term:

Government Debt Model,

$$\Delta \mathrm{rgdp}_t = \alpha_0 + \sum_{i-1}^{g} \alpha_{2i}\, \mathrm{lrgdp}_{t-1} + \sum_{i-0}^{h} \mu_{2i}\, \mathrm{lins}_{t-1} + \sum_{i-0}^{i} \theta_{2i}\, \mathrm{lcpi}_{t-1} + \sum_{i-0}^{j} \omega_{2i}\, \mathrm{lgdt}_{t-1} + \theta \mathrm{ect}_{t-1} + \varepsilon_{2t}$$

Government Expenditure Model,

$$\Delta \mathrm{rgdp}_t = \alpha_0 + \sum_{i-1}^{g} \alpha_{2i}\, \mathrm{lrgdp}_{t-1} + \sum_{i-0}^{h} \mu_{2i}\, \mathrm{lins}_{t-1} + \sum_{i-0}^{i} \theta_{2i}\, \mathrm{lcpi}_{t-1} + \sum_{i-0}^{j} \omega_{2i}\, \mathrm{lgexp}_{t-1} + \theta \mathrm{ect}_{t-1} + \varepsilon_{2t}$$

The error correction term ect_{t-1} denoted the respond of stabilizing disequilibrium system. In the existence of co-integration, ect_{t-1} should be negative and the probability is ought to be significant and the value of ect_{t-1} should be higher than 1, so it can adjust the speed.

If before in this study F-bound test is used to determine the existence of long-run relationship between variables, then ARDL coefficient estimation is used to determine the long-run coefficient estimation to justify the significant of the variable involved, and whether the exogenous variables have positive or negative relationship with endogenous variables. For the relationship between the variables in the short-run, as mention before the error correction term shall be used in the case of inconclusive result of F-bound test. The estimated coefficient for the short run model shall determine the significant of the variables and whether the exogenous variables have positive or negative relationship with endogenous variables.

CUSUM test assess the stability of coefficient β. Both of these tests are used to determine the stability of the model to test whether or not the model exhibited some structural changes over the study period of 33 years and that it can be used for reliable predictions. CUSUMQ are used to test for the stability on the long-run ARDL correct model. According to Ploberger & Kramer (1990) is relatively more powerful than the CUSUMSQ test. Besides, CUSUMSQ is preferable since it avoids the problem that the limit distribution of the test depends on the nature of the process in the regression model (Perron, 2008).

Results and Discussion

Augmented Dicky Fuller Unit Root Test

Table 1

Augmented Dickey Fuller (ADF) of Unit Root Test for Malaysia

Malaysia Data Series	LEVEL			1ST DIFFERENT		
	Intercept	Trend And Intercept	None	Intercept	Trend And Intercept	None
RGDP	-2.209(2) (0.207)	-2.688(0) (0.248)	2.948(2) (0.999)***	-4.859(0) (0.000)***	-4.524(1) (0.006)***	-1.601(3) (0.102)
INS	-2.888(0) (0.058)*	-2.242(0) (0.452)	1.396(0) (0.956)	-5.092(0) (0.000)***	-5.384(0) (0.000)***	-4.612(0) (0.000)***
CPI	-2.628(4) (0.099)*	-3.098(4) (0.126)	-1.944(0) (0.051)*	-4.122(4) (0.004)***	-3.425(8) (0.073)*	-4.156(4) (0.000)***
GDT	-0.174(4) (0.931)	-4.21(1) (0.012)**	1.788(1) (0.979)	-2.192(1) (0.213)	-2.758(3) (0.223)	-0.903(0) (0.317)
GEXP	-1.793(2) (0.377)	-0.014(2) (0.994)	2.785(1) (0.998)***	-4.390(0) (0.002)***	-3.042(3) (0.139)	-0.776(4) (0.371)

(Sources: Calculated using Software EViews 10)

Table 2

Augmented Dickey Fuller (ADF) of Unit Root Test for Singapore

(Sources: Calculated using Software EViews 10)

*** : Significant at the level of confidence 99%

** : Significant at the level of confidence 95%

Singapore Data Series	LEVEL			1ST DIFFERENT		
	Intercept	Trend And Intercept	None	Intercept	Trend And Intercept	None
RGDP	-2.393(0) (0.152)	-1.269(0) (0.878)	6.927(0) (1.000)***	-4.861(0) (0.001)***	-5.544(0) (0.000)***	-1.414(2) (0.143)
INS	-2.559(2) (0.113)	-4.712(7) (0.005)***	1.030(0) (0.917)	-4.6449(0) (0.000)***	-4.878(0) (0.002)***	-4.324(0) (0.000)***
CPI	-3.498(0) (0.015)**	-3.403(0) (0.069)*	-3.475(0) (0.001)***	-4.238(2) (0.003)***	-4.301(2) (0.010)***	-4.334(2) (0.000)***
GDT	-2.026(8) (0.275)	-1.358(8) (0.847)	9.150(0) (1.000)***	-4.272(7) (0.003)***	-5.006(7) (0.003)***	-0.542(8) (0.471)
GEXP	-0.921(0) (0.768)	-3.162(0) (0.110)	1.963(0) (0.986)**	-5.334(1) (0.000)***	-5.218(1) (0.001)***	-5.992(0) (0.000)***

* : Significant at the level of confidence 90%

To achieve the study objective this investigation needs the same stationary level for each set of data involved as variables. The ADF unit root test was adopted as an examination procedure, as the table above shown that there is mixed stationary in the level form and the first difference also none of the data was stationary in the second difference, which ensured that this study was further analyzed using the ARDL method.

Autoregressive Distributed Lag (ARDL) Bound Test

Currently, as the data has confirmed that there are no selected series I (2) or above and the optimal lag order has been determined, further analysis will examine the long run cointegration using the F-bound test, the results of which are shown in Table 3-6

respectively. The F-bound test is crucial at this stage as it will determine if the results are greater or less than the critical value of the upper bond based on the F-statistic. If the result failed to reject the null hypothesis, there is no long-run cointegration, which means that the F-statistic is less than the critical value of the upper bound, however, if the F-statistic is greater than the critical value, the result is said to reject the null hypothesis, leading to the conclusion that there is a long-run cointegration relationship. The study includes two models, one for government debt and the other for government expenditure in each country, both of which will be tested using the same methodology.

Government Debt Model

Table 3

F-Bound Test for Malaysia

Null Hypothesis: No long run relationship exists		
Test Statistic	Value	K
F- Statistic	8.760781	3
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10 %	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Table 4

F-Bound Test for Singapore

Null Hypothesis: No long run relationship exists		
Test Statistic	Value	K
F- Statistic	23.00697	3
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10 %	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Government Expenditure Model

Table 5

F-Bound Test for Malaysia

Null Hypothesis: No long run relationship exists		
Test Statistic	Value	K
F- Statistic	5.912699	3
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10 %	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Table 6
F-Bound Test for Singapore

Null Hypothesis: No long run relationship exists		
Test Statistic	Value	K
F- Statistic	4.151974	3
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10 %	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

The F-Bound test results for the government debt model in Malaysia and Singapore, as well as the government expenditure model in Malaysia and Singapore, consistently show compelling evidence. In the case of Malaysia, for both debt and expenditure models, the F-statistic values (8.760781 and 5.912699, respectively) surpass the critical values for both lower (2.37 and 2.79) and upper bounds (3.2 and 3.67) at 10% and 5% significance levels. This leads to the rejection of the null hypothesis, indicating the presence of cointegration and establishing a long-run relationship between the dependent variable (RGDP) and the independent variables (INS, CPI, GDT for the debt model, and INS, CPI, GEXP for the expenditure model). The F-Bound test results for Singapore echo a similar pattern, with F-statistic values (23.00697 and 4.151974) exceeding the critical values for both lower and upper bounds at 10% and 5% significance levels for both the debt and expenditure models. Consequently, the null hypothesis is rejected, affirming the existence of cointegration and a long-run relationship between the variables in each model.

ARDL Long-Run Coefficient Estimation

After bound test's result determined that there is long-run cointegration relationship between independent variables (RGDP) and its determinant factor, total life insurances, consumer price index, government debt and government expenditure. The following table showed the result for ARDL long run coefficients for government debt and government expenditure model.

Government Debt Model

Table 7
Long Run Coefficient Estimation for Malaysia

Variables	Coefficient	Std. error	t-statistic	Probability
INS	0.724822	0.224713	3.225543	0.0061
CPI	0.000520	0.053346	0.009753	0.9924
GDT	0.307067	0.038111	8.057184	0.0000

Table 8
Long Run Coefficient Estimation for Singapore

Variables	Coefficient	Std. error	t-statistic	Probability
INS	0.258949	0.169211	1.530329	0.1402
CPI	0.183644	0.080570	2.279303	0.0327
GDT	0.437659	0.091468	4.784822	0.0001

Government Expenditure Model

Table 9

Long Run Coefficient Estimation for Malaysia

Variables	Coefficient	Std. error	t-statistic	Probability
INS	-0.176822	0.206362	-0.856852	0.4050
CPI	-0.008620	0.057262	-0.150528	0.8824
GEXP	0.571316	0.062086	9.201941	0.0000

Table 10

Long Run Coefficient Estimation for Singapore

Variables	Coefficient	Std. error	t-statistic	Probability
INS	-0.634355	3.876828	-0.163627	0.8718
CPI	1.047116	3.591199	0.291578	0.7738
GEXP	-1.014835	7.109683	-0.142740	0.8880

According to table 7 and 8. The estimation of coefficients for the long run with the ARDL model reveals distinct relationships for Malaysia and Singapore. For government debt model. In the Malaysian context, total life insurance and government debt exhibit positive and statistically significant associations with RGDP at the 1% significance level, while the consumer price index is not statistically significant. Specifically, a 1% increase in total life insurance corresponds to a 0.72% increase in economic growth, this result is in line with H. Lee (2019) Some of the important outcomes are that insurance development has a significant contribution to the economic growth of Asian and African countries, given the huge untapped opportunities in Africa and the promising economic prospects in Asia. and a 1% rise in government debt leads to a 0.3% increase in economic growth, according to Burhanudin et al (2017) on the other hand, public debt can also contribute to higher economic growth, as in the case of Malaysia, it can be explained by the traditional view of debt as proposed by Elmendorfand Mankiw (1998) An increase in public debt will help to stimulate aggregate demand and output through, for example, job creation and productive investment. In contrast, for Singapore, total life insurance is not significant, government debt is significant at 1%, and a 1% increase in government debt corresponds to a 0.44% increase in economic growth, the result is contradicted with Liaqat (2019) analyzes Calculating domestic debt and output growth for 39 high-income countries, it reveals a negative relationship based on 1980-2017 data. This can be explained by Stimulus effect of government spending: Government debt can contribute to economic growth by increasing government spending. When the Government borrows to finance its expenditures, it injects money into the economy, which can stimulate demand and subsequently lead to economic growth. And the consumer price index is significant at 5%. a 1% increase in consumer price index leads to a 0.184% increase in economic growth.

According to table 9 and 10. The ARDL model for government expenditure model. Malaysia indicates a negative relationship between consumer price index and insurance with RGDP, while government expenditure and RGDP are positively related. However, only GEXP statistically significant, and a 1% rise in government expenditure leads to a 0.57% increase in economic growth, this is consistent with Bahal et al (2018), by the crowding out effect, which is effective in the long run. This occurs when governments borrow more in the loanable funds market and interest rates begin to rise. Conversely, for Singapore, there is a negative relationship for insurance and government expenditure, and a positive relationship for consumer price index, but none of these relationships are statistically significant.

Short-Run Dynamic Test (Error Correction Model)

Next, to investigate the short-run relationship, error correction model will be implemented in both government debt and government expenditure model. In table below, the value of coefficient of the error correction term must significant and have negative sign to shows that there is cointegration relationship between variables involved.

Government Debt Model

Table 11

Short-Run Dynamic Test (Error Correction Model) for Malaysia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDPM(-1))	-0.712673	0.175420	-4.062656	0.0012
D(RGDPM(-2))	-0.542170	0.095825	-5.657936	0.0001
D(RGDPM(-3))	-0.531477	0.143142	-3.712935	0.0023
D(INSM)	-0.150195	0.052826	-2.843188	0.0130
D(INSM(-1))	-0.154285	0.056014	-2.754395	0.0155
D(CPIM)	-0.018951	0.005833	-3.249154	0.0058
D(CPIM(-1))	-0.026971	0.007114	-3.791428	0.0020
D(CPIM(-2))	-0.008813	0.006575	-1.340311	0.2015
D(GDTM)	-0.522985	0.102560	-5.099305	0.0002
D(GDTM(-1))	-0.664172	0.212398	-3.127013	0.0074
CointEq(-1)*	-0.334235	0.044537	-7.504619	0.0000

Short-Run Dynamic Test (Error Correction Model) for Singapore

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPIS)	0.015596	0.004059	3.842169	0.0009
D(CPIS(-1))	-0.032564	0.004421	-7.366520	0.0000
D(CPIS(-2))	-0.012717	0.004209	-3.021251	0.0063
CointEq(-1)*	-0.194263	0.016661	-11.65977	0.0000

Government Expenditure Model

Table 13

Short-Run Dynamic Test (Error Correction Model) for Malaysia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INSM)	-0.128718	0.075924	-1.695363	0.1107
D(INSM(-1))	0.132368	0.077164	1.715415	0.1068
D(INSM(-2))	0.227978	0.079539	2.866248	0.0118
D(CPIM)	-0.006177	0.009648	-0.640234	0.5317
D(CPIM(-1))	-0.019447	0.010221	-1.902610	0.0765
D(GEXPM)	0.081526	0.103788	0.785501	0.4444
D(GEXPM(-1))	-0.162260	0.132823	-1.221626	0.2407
D(GEXPM(-2))	-0.432862	0.118342	-3.657730	0.0023
D(GEXPM(-3))	-0.202941	0.114849	-1.767029	0.0976
CointEq(-1)*	-0.382491	0.062505	-6.119403	0.0000

Table 14
Short-Run Dynamic Test (Error Correction Model) for Singapore

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDPS(-1))	0.183487	0.154157	1.190259	0.2486
D(CPIS)	0.015049	0.003301	4.558887	0.0002
D(CPIS(-1))	-0.016228	0.003153	-5.146575	0.0001
D(GEXPS)	-0.118425	0.020666	-5.730348	0.0000
D(GEXPS(-1))	0.028905	0.025658	1.126532	0.2740
D(GEXPS(-2))	-0.036618	0.021611	-1.694448	0.1065
CointEq(-1)*	-0.011665	0.002327	-5.013020	0.0001

Based on table 11 and 13. In Malaysia, the government debt model displays a significant and negative ECM coefficient of -0.334235 at the 1% significance level, indicating a speed of error correction towards long-run equilibrium at 33 percent, the overall model fit is robust, and joint significance of variables at the 1% level. The results suggest that insurance, consumer price index, and government debt have both short-run impacts on economic growth. Furthermore, the coefficient of insurance is generally negative, the value of insurance of lag1 is -0.154285, which is negative at 0.05 significance level, this result is in line with Sajid Mohy ul din et al (2017) In the short term, developing country governments may focus on immediate needs and priorities, which may not necessarily be in the long-term interest of insurance. Similarly, in the government expenditure model for Malaysia, the ECM coefficient is -0.382491, significant at 1%, with a speed of error correction at 38 percent. The model demonstrates good fit with an R2 of 0.699488 and joint significance of variables at the 1% level, Furthermore, the coefficient of insurance is -0.128718, and it shifted to positive value 0.227978 with lag changed, and from not significant to significant of 0.05 significance level, this result is consistent with Balcilar et al (2020) Development of the insurance industry pulls the economic long-term growth through savings mobilization, capital accumulation and risk transfer. the coefficient of consumer price index is generally negative, the value of consumer price index of lag1 is -0.019447, which is negative, but not significant. the coefficient of government expenditure is generally negative, the value of government expenditure of lag2 is -0.432862, which is negative at 0.01 significance level, this result of positive relationship is in line with Apergis, Nicholas and Poufinas, Thomas (2020) Governments often invest in infrastructure development, which requires significant insurance coverage. Insurance companies can provide the necessary coverage, thereby contributing to economic growth. This is particularly true in developing countries, where infrastructure development is a key driver of economic growth.

Based on table 12 and 14. For Singapore, both the government debt and government expenditure models exhibit significant and negative ECM coefficients of -0.194263 and -0.011665, respectively, at the 1% significance level. The negative signs indicate error correction toward long-run equilibrium with speeds of 19 percent and 1.2 percent, respectively. The models display robust fits, with high R2 values of 0.624321 and 0.826847. Moreover, the coefficient of consumer price index is generally negative, the value of consumer price index of lag1 is -0.032564, which is negative at 0.01 significance level. There is no significant relationship between insurance and economic growth for short run. This result is in line with Asongu and Odhiambo (2020) Study reporting that insignificant or negative impacts of insurance on economic growth use aggregated data or different insurance proxy. This can be explained by Government debt plays an overlapping function with insurance, such as health care, retirement and disability support in developed

countries reduce the need for private insurance. This reduces the impact of insurance on economic growth, as individuals rely on strong public welfare systems to provide basic services, thereby minimizing reliance on private insurance. the coefficient of consumer price index can be positive and negative, the value of consumer price index is 0.015049, the value of consumer price index of lag1 is -0.016228, which are positive and negative, and both are at 0.01 significance level. the coefficient of government expenditure is generally negative, the value of government expenditure is -0.118425, which is negative at 0.01 significance level, the result of negative relationship can be explained by in developed countries, many of the areas targeted by government expenditures may already be insured. Therefore, additional insurance may not be necessary or beneficial in the short term in developed countries, many of the areas targeted by government expenditures may already be insured. Therefore, additional insurance may not be necessary or beneficial in the short term. Steven Weisbart. (2018)

CUSUM And CUSUMQ Test

This study used Cumulative Sum of Residuals (CUSUM) to check for stability. The result shows that the test is within the critical bounds indicated by a pair of straight lines. The results indicate that the model is stable over the same period.

Government Debt Model

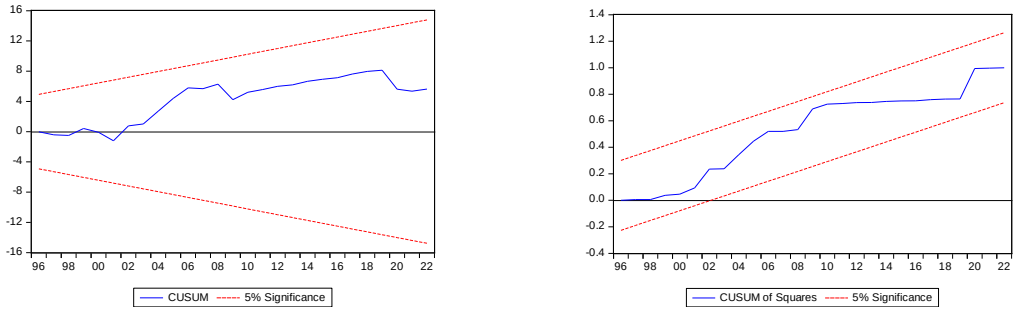

Figure 3: CUSUM test and CUSUM Square for Malaysia

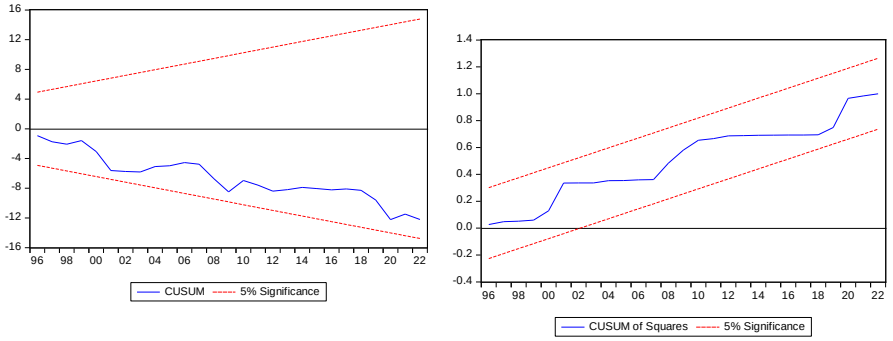

Figure 4: CUSUM test and CUSUM Square for Singapore

Government Expenditure Model

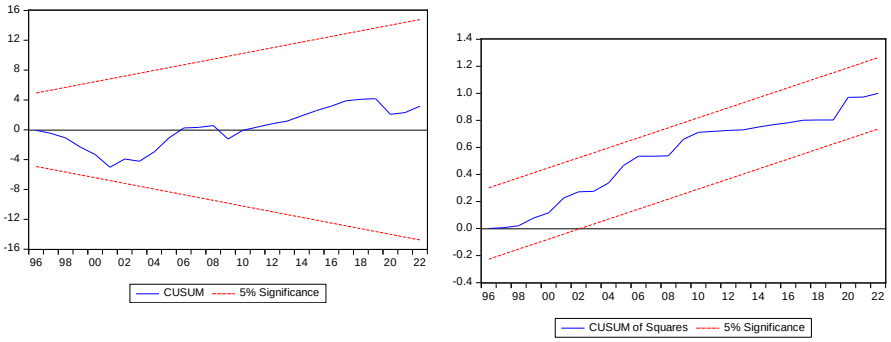

Figure 5: CUSUM and CUSUM Square for Malaysia

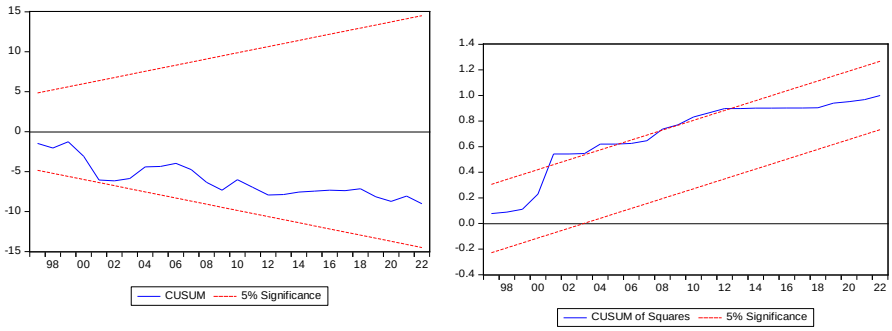

Figure 6: CUSUM test and CUSUM Square for Singapore

The stability analysis of the model is conducted through both CUSUM and CUSUM Square tests, and the results consistently indicate that the test lines remain within the critical bounds represented by a pair of straight lines. This pattern holds true across the entire examined period, suggesting that the model remains stable over time. Specifically, the CUSUM test results show that the line is consistently within the critical boundary, confirming the stability of the model throughout the entire time frame. However, when considering the CUSUM Square test, there is a notable deviation from the critical boundary observed in the middle of the period (from 2001 to 2012). Despite this deviation, the line falls back within the critical boundary for the remaining period, indicating a stable model. Overall, the results from both tests collectively support the conclusion that the model remains stable over the specified period, with the CUSUM Square test showing a temporary deviation in the middle years.

Conclusion

Overall, this chapter summarizes the results of testing the existence of both short-term and long-term dynamic relationship between insurance and economic growth in Malaysia and Singapore. The study provides evidence of a stronger significant relationship between insurance development and economic growth in Malaysia rather than Singapore in both long-term and short-term. This in line with Pradhan et al. (2015) examining the Relationship Between Insurance Market Development, Financial Development and the economic growth in the emerging economy 34 OECD countries. The results suggest that the development of insurance and financial markets are long-term drivers of economic growth. For Singapore, the relationship between insurance and economic growth seems not significant and asymmetric in both long-term and short-term. This is consistent with Dragota (2017) used a sample of 20 developed and 10 emerging countries to describe the results of the study on

the impact of the institutional environment on life insurance consumption show that This has contributed to the growth of life insurance in emerging countries but not in developed countries, strong regulatory and legal frameworks are needed. This evidence is important for a full understanding of the upward trend in economic growth and insurance development.

The policy implication for both countries in the recommendations is to encourage the insurance industry to be more competitive, durable and innovative within their frameworks in order to diversify not only the economic risks of individuals themselves, but also of global firms and the country itself. Meanwhile policymakers should create a platform like Regulatory Sandbag. A regulatory sandbox strategy provides a venue for testing insurance technologies under a different regulatory framework than the standard regulatory framework. Taking the approach of the Monetary Authority of Singapore (MAS) as an example, the strategy adopted by MAS is to recognize the potential benefits of new technologies in terms of increased efficiency, improved risk management, creation of new possibilities, and improvement of people's lives.

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