Modeling the Demand for Family and General Takaful in Malaysia (A Comparative Study): ARDL Approach to Cointegration

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Abstract

Objective- Nowadays, numerous studies focus on the determinant of the demand for takaful, either family or general takaful in Malaysia. In this respect, these studies employ economic and socio-demographic variables to examine the determinants of takaful. They found that income, interest rates, financial development, pensions, stocks, price of insurance, life expectancy, dependency ratio, education, and age have positive on determinants of takaful. However, previous studies have found that inflation, savings, and unemployment rate have negative relationship with the determinant of takaful in Malaysia. This study attempts to examine the determinants of the demand for family takaful and general takaful for comparative study in Malaysia for the period of 1988 to 2010. It employs economic and socio-demographic variables to measure these determinants.
Methods-Using time series data, this study applies the Autoregressive Distributive Lag (ARDL) approach to cointegration to examine the determinants of the demand for family takaful and general takaful in the short and long run.
Result-The findings indicate that the economic and socio-demographic variables such as income, and education have positive relationship with the demand for family takaful in the short run, but not in the long run.
Conclusion-Meanwhile, it also indicates that income and education have no relationship with demand for general takaful in Malaysia in the short run and long run. It indicates that if there is an increase in income, people tend to buy more family takaful of STMB. At the same time, the educated people already aware of the takaful products, they may necessarily purchase family takaful than life insurance.

Keywords :Family Takaful, General Takaful, ARDL, Economic and Socio-Demographic Variables, Malaysia

Abstrak

Tujuan - Saat ini, banyak penelitian berfokus pada determinan permintaan takaful, baik keluarga atau takaful umum di Malaysia. Untuk itu, penelitian ini menggunakan variabel-variabel ekonomi dan sosio-demografis untuk memeriksa determinan takaful. Ditemukan bahwa pendapatan, tingkat suku bunga, pengembangan keuangan, pensiun, saham, harga asuransi, harapan hidup, rasio ketergantungan, pendidikan, dan usia memiliki hubungan positif pada determinan takaful. Namun, penelitian sebelumnya ditemukan bahwa inflasi, tabungan, dan tingkat pengangguran memiliki hubungan negatif dengan determinan takaful di Malaysia. Penelitian ini mencoba untuk meneliti determinan permintaan takaful keluarga dan takaful umum dengan studi perbandingan di Malaysia dalam kurun waktu tahun 1988-2010 dengan melibatkan variabel ekonomi dan sosio-demografis untuk mengukur faktor penentu.

Metode - Menggunakan data time series, penelitian ini mengaplikasikan Autoregressive Lag Distributif (ARDL) pendekatan kointegrasi untuk menguji determinan permintaan takaful keluarga dan takaful umum dalam jangka pendek dan jangka panjang .
Hasil - Temuan menunjukkan bahwa variabel ekonomi dan sosio-demografis seperti pendapatan, dan pendidikan memiliki hubungan yang positif dengan permintaan takaful keluarga dalam jangka pendek, tetapi tidak dalam jangka panjang.
Kesimpulan - Sementara itu, pendapatan dan pendidikan tidak memiliki hubungan dengan permintaan takaful umum di Malaysia dalam jangka pendek dan jangka panjang. Hal ini menunjukkan bahwa jika ada peningkatan pendapatan, orang cenderung membeli lebih banyak takaful keluarga STMB. Pada saat yang sama, orang-orang yang berpendidikan sudah menyadari produk takaful, mereka tentu membeli takaful keluarga daripada asuransi jiwa.

Kata Kunci : Takaful Keluarga, Takaful Umum, ARDL, Variabel Ekonomi dan Sosio-demografis, Malasyia

1. Introduction

Malaysia is one of the Muslim countries where Takaful industry reaches a higher growth rates compared to other Muslim countries such as Indonesia, Bahrain and others. Zuriah and Rosylin (2003) assert that macroeconomics variables maybe the potential factors that affect the increasing demand in Takaful industry. However, there are numerous of studies which focus on the determinants the demand for conventional insurance including life insurance and general insurance, and only a few studies which focus on the determinants of the demand for takaful including family takaful and general takaful. Most of previous studies indicated that the macroeconomics and socio-economic variables have strong influences on the determinants on the demand for conventional insurance, such as GDP, financial economics, education and others.

As most of previous studies concentrate on the determinants on the demand for conventional insurances including life and general insurances. Thus, this study attempts to examine empirically the determinants on the demand for takaful industry including family and general takaful. In this respect, we employ macroeconomics and socio-economic variables to investigate the determinants on the demand for takaful industry in Malaysia. The data obtained is from annual report of BNM (Bank Negara of Malaysia) for takaful industry, International Financial Statistics (IFS), and Ministry of High Education (MOHE) in Malaysia. The period of study is from 1988 to 2010.

Studies on conventional insurance focused on the statistical relationship of certain macroeconomics as well as demographic variables with life insurance and general insurance in terms of demand for life insurance and demand for general insurance. Outreville (1996) for instance, attempts to investigate empirically the statistical relationship between life insurance premium income, a measure of life insurance development with the financial development and the market structure of insurance institutions in 48 developing countries by using the cross section method. The study finds that life insurance development is significantly related to personal disposable income and to the country's level of financial development. Besides that, life insurance is also markedly affected by the level of anticipated inflation.

Meanwhile, Gandolfi and Miners (1996) attempt to investigate the relationship between macroeconomics variables with the overall life insurance's performances in the United States in 1984 by estimating the influence of income and the value of household production, ceteris paribus on the amount of separate life insurance purchases for husbands and wives by using the method of maximum likelihood in terms of Tobit model. They find that money income is the most significant determinant of life insurance holdings for both husbands and wives. In addition, contributions to household production as proxies by full-time work status of the wife, part-time work status of the wife, total household income, age, education, age of spouse, educational level of spouse, home ownership, family size and dependent years also influence the purchase of life insurance.

For general insurance, Outreville (1990) investigates empirically the relationship between property-liability insurance (general insurance) in terms of premiums and Gross Domestic Products and financial development. In this case, he uses a cross section method of 55 developing countries. The result indicates that income in terms of GDP and financial development are the factors that significantly contribute to the level of development of property-liability insurance demand in developing countries. In this case, we could conclude that income and financial development are the most significant

macroeconomics variables that determine the demand for life insurance as well as general insurance.

Conventional insurance generally comprises of two main types namely the life and the general insurance. There are two principal forms of life insurance policies: permanent life insurance (such as whole, universal and variable life) and temporary insurance (such as term). Permanent life insurance policies have a constant premium throughout the life of the policy. On the other hand, term insurance has a premium that is matched every year to the amount needed to insure against death during the period of the term (such as one year or five years). General insurance will insure against losses from almost any type of event, including fire, theft, negligence, malpractice, earthquakes and automobile accidents (Mishkin, 2006).

Indicators of demand for insurance vary from time to time. Many empirical evidences use the quantity demanded of insurance which represented by the average dollar amount of life and general insurance (Burnett and Palmer, 1984; Truett and Truett, 1990), the premium volume (Outreville et al., 1990, 1996; Browne and Kim, 1993), the sums insured (value indicator) as a representative for measurement of demand (Lim and Haberman, 2005).

The demand indicators are found to be associated with macroeconomics or socioeconomics variables. For instance, the insurance expenditure per capita (insurance density) and insurance expenditure divided by gross domestic product (insurance penetration) are useful indicators, particularly for international comparisons of the importance of life insurance in different countries (Carsten, 2003). Meanwhile, the demand indicators for takaful mainly used are profit before tax and zakat, and revenue (Zuriah and Rosylin, 2004; Hawariyuni, 2006). In this study, we used gross total income for proxy of demand for takaful.

The factors which determine the demand for insurance are commonly from the theory of consumption. Other factors are also important but most of them are more

concerned about the supply-side such as economic, political and social environment. According to Carsten (2003) the macroeconomics literature distinguishes various consumption theories which focus on incomes, prices and interest levels, and the population structure as important determinants for consumption. In this case, these include in particular the Keynesian consumption hypotheses (absolute and relative income hypothesis).

In addition, the traditional approaches of consumption theory which are extended by theoretical approach to explain the demand for insurance also include the factors such as uncertainty about lifetimes, bequest motives and personal level of risk aversion. We can conclude that economic, socio-demographic variable, socio-psychological factors, institutional determinants and insurer action parameters are the important factors which determine the demand for insurance from the theory of consumption.

This study attempts to examine the determinants of family and general takaful for comparative study in Malaysia for the period of 1986 to 2011. In this respect, these studies employ economic and socio-economic variables to examine the determinants of takaful. They found that income, interest rates, financial development, pensions, stocks, price of insurance, life expectancy, dependency ratio, education, and age have positive on determinants of takaful. However, previous studies have found that inflation, savings, and unemployment rate have negative relationship with the determinant of takaful in Malaysia. Using time series data, this study applies the Autoregressive Distributive Lag (ARDL) approach to cointegration to examine the determinants in the short and long run. We refer to *F-test* for the cointegration test.

This study is expected to answer main question, namely *"Is there any relationship between the economic and socio-economic variables and the demand for family takaful and general takaful as provided by takaful industry in Malaysia?"*

2. Methodology

2.1 Introduction

In this part we will provide data and methodology employed to investigate the relationship between economic and socio-demographic variables with the demand of family takaful and general takaful. In the data and variables section we will discuss the variables employed and sources of data. Furthermore, in the following section we will discuss the methodology used. In this case, we will apply the ARDL (Autoregressive Distributive Lag) methodology which is exempted from the Unit Root Test irrespective of whether the regressors are *I(0)* or *I(1).*

2.2 Data and Variables

In this study, we investigate the relationship between economic and socio-demographic variables with the demand for family and general takaful. We test for this model where gross total income as our dependent variable. We use two independent variables only which consist of economic and socio-demographic variables because of limited sample which is from 1988 to 2010. The regression will be biased if we include one or more explanatory variables because we have a limited sample, which is only 20 observations (Pattichis, 1999).

The data is taken from Ministry of higher education report, website of International Monetary Fund (IMF), takaful annual report of bank Negara Malaysia, website of bank Negara Malaysia, and Department of statistics of Malaysia. The model for the determinants of family takaful is:

$$lnFAMINCO_t = \alpha_0 + \alpha_1 lnEDUC_t + \alpha_2 lnGDP_t + \varepsilon_t \qquad (1)$$

where *lnFAMINCO* is logarithm of gross total income of family takaful, *lnGDP* is logarithm of income, *lnEDUc* is logarithm of education and ε_t is error term. Meanwhile, the model for the determinants of general takaful is:

$$lnGENINCO_t = \alpha_0 + \alpha_1 lnEDUC_t + \alpha_2 lnGDP_t + \varepsilon_t \qquad (2)$$

where *lnGENINCO* is logarithm of gross total income of general takaful, *lnGDP* is logarithm of income, *lnEDUc* is logarithm of education and ε_t is error term.

2.3 Methodology

2.3.1 Non Stationary Time Series in the Cointegration Test

The use of standard econometric analysis which required the underlying variables are stationary in the same level especially for cointegration test. However, the problem is some of the underlying variables are not stationary in the same level. Therefore, there are several methods available for conducting the cointegration test. The most widely used methods include the residual based Engle-Granger (1987) test, maximum likelihood based on Johansen et al., (1988, 1991); Johansen-Juselius (1990) test and lastly Philip and Oulirais (1990).

The above methods require that the variables in the system be of equal order of integration. Besides that, these methods do not include the information on structural break in time series data and also suffer from low power. Granger (1987) attempts to solve the problems which arise from non stationary time series by estimating a sufficiently complex dynamic specification which includes lagged dependent and independent variables, that is Autoregressive Distributive Lag (ARDL) model.

He adds that the problems caused by non stationary variables in time series can be solved if the series are cointegrated. In regression analysis involving time series data, if the model includes one or more lagged values of the dependent variable among its explanatory variables, it is called an autoregressive model (equation 3) and if the regression model includes not only the current but also the lagged (past) values of the explanatory variables (the X's), it is called a distributed lag model (equation 4). Thus, a complex dynamic specification which includes lagged dependent and independent variables, that is Autoregressive Distributive Lag (ARDL) model (equation 5) (Gujarati, 2003; Brooks, 2002).

$$Y_t = \alpha + \beta X_t + \psi_1 Y_{t-1} + \ldots + \psi_i Y_{t-i} + \mu_t \quad (3)$$

$$Y_t = \alpha + \beta X_t + \omega_1 X_{t-1} + \ldots + \omega_i X_{t-i} + \mu_t \quad (4)$$

$$Y_t = \alpha + \beta X_t + \psi_1 Y_{t-1} + \omega_1 X_{t-1} + \ldots + \psi_i Y_{t-i} + \omega_i X_{t-i} + \mu_t \quad (5)$$

Pesaran and Pesaran (1997); Pesaran, Shin and Smith (2001) popularized the OLS based on Autoregressive Distributive Lag (ARDL) approach to cointegration by involving the estimation of error correction version of ARDL model.

According to Narayan (2004), the estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient given the fact that: (a) it can be applied to studies that have a small sample; (b) it estimates the long run and short run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation; (c) the ARDL method can distinguish between dependent and independent variables.

2.3.2 Testing for Cointegration: "The Bound Test"

In this study, we use a new approach to test the existence of a relationship between variables in levels due to the problems associated with unit root test which is applicable irrespective of whether the underlying regressors are purely *I(0),* purely *I(1)* or mutually cointegrated (Pesaran and Shin, 1997; Pesaran, Shin and Smith, 2001). This methodology is exempted from Augmented Dickey Fuller test (1979, 1981).

The statistics underlying this procedure is the familiar Wald or *F*- statistics in a generalized Dicky-Fuller type regression used to test the significance of lagged levels of the variables under consideration a conditional unrestricted equilibrium correction model (ECM). Pesaran, Shin and Smith (2001) show that the asymptotic distribution of both statistics are non-standard under the null hypothesis that there exists no relationship in levels between the included variables, irrespective of whether the regressors are purely *I(0),* purely *I(1)* or mutually cointegrated. In this case, they establish the proposed test which is consistent and derive its asymptotic distribution under the null and suitably

defined local alternatives, again for a set of regressors which are a mixture of *I(0)* / *I(1)* variables.

Furthermore, given the small size of our sample the Johansen (1988) multivariate estimation approach is not appropriate. In this study, we attempt to estimate the following two equations of the error correction version of ARDL model *(6)*:

$$DLFAMINCO_t = \mathrm{X}_0 + \sum_{t=1}^{k1} \beta_t \, DLEDUC_{t-1} + \sum_{t=1}^{k1} \gamma_t DLGDP_{t-1} + \sum_{t=1}^{k1} \delta_t DLFAMINCO_{t-1} + \varepsilon LFAMINCO_{t-1} + \xi LEDUC_{t-1} + \eta LGDP_{t-1} + \mu_t$$

DLFAMINCO, DLEDUC and *DLGDP* are the first differences of the logarithms of gross total income of family takaful (*LPBTZ),* education by using proxy of enrollment for tertiary education (*LEDUC)* and nominal income (*LGDP)* respectively.

Meanwhile, equation *(7)* consists of:

$$DLGENINCO = \mathrm{X}_0 + \sum_{t=1}^{k1} \beta_t DLGDP_{t-1} + \sum_{t=1}^{k1} \gamma_t DLEDUC_{t-1} + \sum_{t=1}^{k1} \psi_t DLGENINCO_{t-1} + \varepsilon LGENINCO_{t-1} + \varphi LGDP_{t-1} + \xi LEDUC_{t-1} + \mu_t$$

DLGENINCO, DLGDP and *DLEDUC* are the first differences of the logarithms of revenue (*LGENINCO),* income (*LGDP)* and education (*LEDUC).*

We employ Microfit 4.1 (Pesaran and Pesaran, 1997) for our regression. For annual data, Pesaran and Shin (1999) recommend choosing a maximum of 2 lags. Besides that, this is the maximum lag order that we think appropriate given the small size of our samples (Pattichis, 1999). In this case, we use AIC (Akaike Information Criterion) for the lag length criteria.

Pesaran *et al* (1997) provides the appropriate critical values for different numbers of regressors and whether the model contains an intercept and/or a trend. In this case, they provide two sets of asymptotic critical values for the two polar cases which assume that all the regressors are purely *I(1)* or purely *I(0).* In this case, critical values for the *I(1)*

series are referred to as the upper bound critical values, while the critical values for the *I(0)* series are referred to as the lower bound critical values. In this case, they propose a bound testing procedure. If the computed Wald or *F*-statistics falls outside the critical value bounds, a conclusive inference can be drawn without needing to know the integration/cointegration status of the underlying regressors.

If the empirical analysis shows that the estimated F- statistics is higher than the upper bound of the critical value, then the null hypothesis of no cointegration is rejected. However, if the Wald or *F*- statistics falls inside these bounds, inference is inconclusive and knowledge of the order of the integration of the underlying variables is required before conclusive inferences can be made. In this study, we refer to Pattichis (1999) who used F-statistics for the bound test where the observations was only 19 and it is based on Pesaran and Pesaran (1997). In this study, we used this F-statistics because we have limited sample which is only 20 observations.

3. Result

In this chapter, we will report the analysis and findings of empirical results obtained from the bound test for cointegration and diagnostic tests of demand for family takaful and general takaful.

3.1 The determinants the demand for family takaful and general takaful

In this section, we attempt to examine the determinants of the demand for family takaful and general takaful in the long run as well as in the short run. We employ GDP (Gross Domestic Product) as economic variable and Education (EDU) as socio-demographic variable for our independent variable. For dependent variable, we employ gross total income for family takaful and general takaful. In this respect, we provide the result of F- statistics for testing the joint null hypothesis that the coefficients of these level variables are zero. In this study, we compare the calculated F-statistics for case II (without deterministic trends) and the calculated F-statistic for case III (with deterministic

trends) to examine the determinants of the demand for family takaful industry from 1988 to 2010.

Table 1. Critical Values for the F-test (k = 2, n = 22)

	Case II		Case III	
	I(0)	I(I)	I(0)	I(I)
1%	5.288	6.309		6.520
7.584				
5%	3.793	4.855	4.903	
5.872				
10%	3.182	4.126	4.205	
5.109				

Source: Pesaran and Pesaran (1997), Case II (without deterministic trend), case III (with deterministic trend).

The calculated F-statistic for case II (without deterministic trends) is 1.4759 and it indicates that the F-statistics does not exceed the upper bound level at 1%, 5% and 10% levels. It shows that F-statistics is below lower bound level at 1%, 5% and 10% levels of significance. Meanwhile, the calculated F-statistics for case III (with deterministic trends) is 1.7253 and it also indicates that it is insignificant since the F-statistics does not exceed the upper bounds level at 1%, 5% and 10% levels of significance.

It means that there is no cointegration between gross income of family takaful dependent variable and GDP and education as independent variables in case II and case III. Even though, the calculated F-statistics indicate that there is no cointegration between dependent and independent variables for the determinants of the demand for family takaful, but we keep providing empirical results in the long run and also in the short run. We use AIC (Akaike Information Criterion) for the lag length criteria. The table 2 provides the results of the determinants of the demand for family takaful in the long run. The model is selected by AIC (2, 2, 0).

Table 2. ARDL (2, 2, 0) Model Long Run Results. Dependent variable: LFAMINCO

Regressors	*Coefficient*	*Standard Error*	**T-ratio (p-value)**
Constant	-26.85	6.62	-4.05(0.00)
LEDU	-0.16	1.96	-0.08(0.93)
LGDP	3.88	2.29	1.69(0.11)

**** significant at 1% level , ** significant at 5% level and * significant at 10% level.*

The table above indicates that GDP is insignificant at 1%, 5%, and 10% level in the long run relationship. It does not support of Outreville (1990, 1996); Browne and Kim (1993); Truett and Truett (1990); Burnet and Palmer (1984); Ahmad Syukri, Juliana, Mohd. Rasyid and Wan Norhayate (2012); and Hawariyuni (2006) but it supports Lim and Haberman (2005); Wan Aris (2004) where GDP is not significant in the long run toward the demand for conventional insurance and takaful. The table also indicates that education as a demographic variable is insignificant to the demand for takaful and therefore it is consistent with Outreville (1990, 1996) and Hawariyuni (2006) but it is not consistent with Browne and Kim (1993); Burnett and Palmer (1984); Truett and Truett (1990),Gustina and Irwani (2012); and Ahmad Syukri, Juliana, Mohd. Rashid, Wan Norhayate (2012) who find that there is significant positive relationship between demand for conventional insurance and takaful with education.

Table 3. ARDL(2, 2, 0) Model ECM Results. Dependent variable: ΔLFAMINCO

Regressor	*Coefficient*	*Standard Error*	**T-ratio(p-value)**
ΔLFAMINCO1	0.51	0.13	3.70(0.00)***
ΔLEDUC	0.05	0.23	0.21(0.83)
ΔLEDUC1	0.93	0.20	4.44(0.00)***
ΔLGDP	0.54	0.25	2.15(0.04)**
ΔINPT	-3.76	2.72	-1.38(0.18)
Ecm(-1)	-0.14	0.10	-1.38(0.18)

*** significant at 5% level*

Table 3 above indicates that all variables are statistically significant in the short run except the DLEDUC. This is because these economic and socio-demographic variables have significant relationship with the demand for family takaful in the short run and not in the long run. In this respect, we can state that the economic and socio-demographic variables have positive relationship with the demand for family takaful industry in Malaysia in the short-run. However, the coefficient of ECM_{t-1} is found to be small in magnitude and is statistically insignificant. It confirms no long run relationship between the variables. The coefficient of ECM term is -0.14, which suggests that 14% the

disequilibrium occurred will be corrected in the next year. This implies a relatively slow adjustment process.

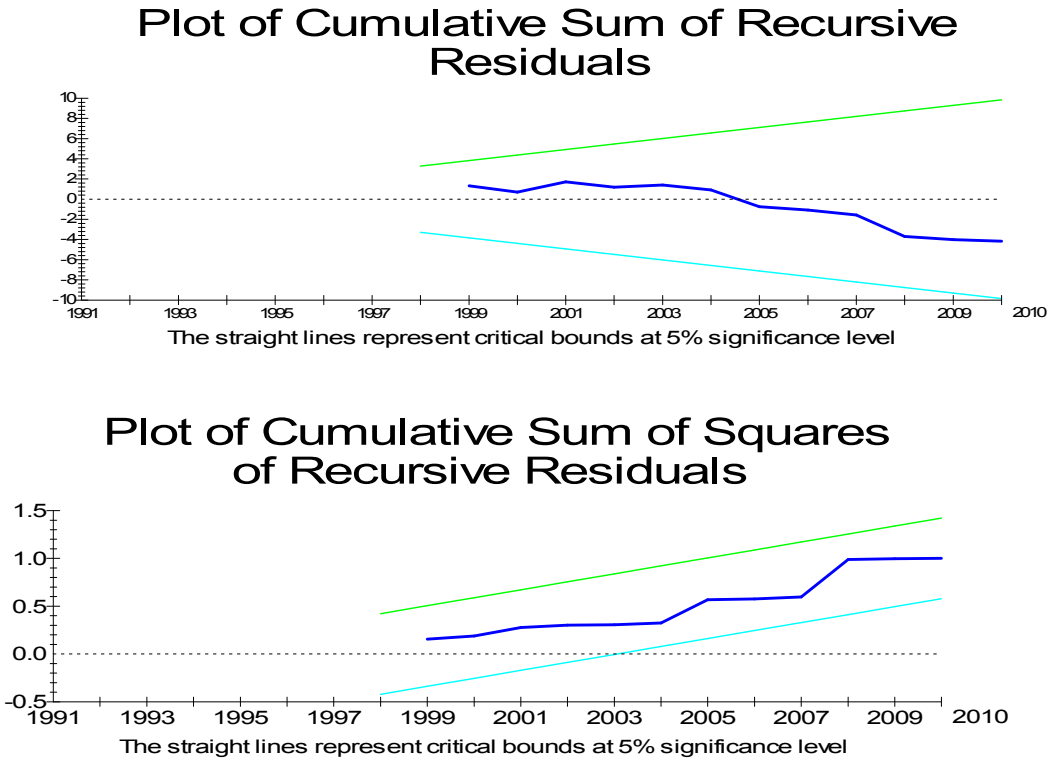


Fig. 1. (a) Plot of Cumulative Sum of Recursive Residuals; (b). Plot of Cumulative Sum of Squares of Recursive Residuals

Table 4. Critical Values for the F-test (k = 2, n = 22)

	Case II		Case III	
	I(0)	I(I)	I(0)	I(I)
1%	5.288	6.309	6.520	7.584
5%	3.793	4.855	4.903	5.872
10%	3.182	4.126	4.205	5.109

Source: Pesaran and Pesaran (1997), Case II (without deterministic trend), case III (with deterministic trend).

The calculated F-statistic from table 4 for case II (without deterministic trends) is 1.8433 and it indicates that the F-statistics does not exceed the upper bound level at 1%, 5% and 10% levels. It shows that F-statistics is below lower bound level at 1%, 5% and 10% levels of significance. Meanwhile, the calculated F-statistics for case III (with deterministic trends) is 4.5653 and it indicates that it is inconclusive since the F-statistics falls within the critical value band I(0) and I(1) at 5% and 10% levels of significance, and it depends on whether the underlying variables are I(0) or I(1).

In this respect, we choose the calculated F-statistics based on case II (without trend). It means that there is no cointegration between gross income of general takaful as dependent variable towards GDP and education as independent variables. Even though, the calculated F-statistics indicate that there is no cointegration between dependent and independent variables for the determinants of the demand for general takaful, but we keep providing empirical results in the long run and also in the short run. We use AIC (Akaike Information Criterion) for the lag length criteria. The table 5 provides the results of the determinants of the demand for general takaful in the long run. The model is selected by AIC (1, 0, 0).

Table 5. ARDL (1, 1, 0) Model Long Run Results. Dependent variable: LGENINCO

Regressors	*Coefficient*	*Standard Error*	**T-ratio (p-value)**
Constant	65.87	705.88	0.09(0.92)
LEDU	8.56	76.69	0.11(0.91)
LGDP	-11.25	123.10	-0.09(0.92)

**** significant at 1% level , ** significant at 5% level and * significant at 10% level.*

The results is similar the determinants of the demand for family takaful. The table above indicates that GDP is insignificant at 1%, 5%, and 10% level in the long run relationship. It does not support of Outreville (1990, 1996); Browne and Kim (1993); Truett and Truett (1990); Burnet and Palmer (1984), Ahmad Syukri, Juliana, Mohd. Rasyid and Wan Norhayate (2012), and Hawariyuni (2006) but it supports Lim and Haberman (2005); Wan Aris (2004) where GDP is not significant in the long run toward the demand for conventional insurance and takaful.

The table also indicates that education as a demographic variable is insignificant to the demand for general takaful and therefore it is consistent with Outreville (1990, 1996) and Hawariyuni (2006) but it is not consistent with Browne and Kim (1993); Burnett and Palmer (1984); Truett and Truett (1990),Gustina and Irwani (2012); and Ahmad Syukri, Juliana, Mohd. Rashid, Wan Norhayate (2012) who find that there is

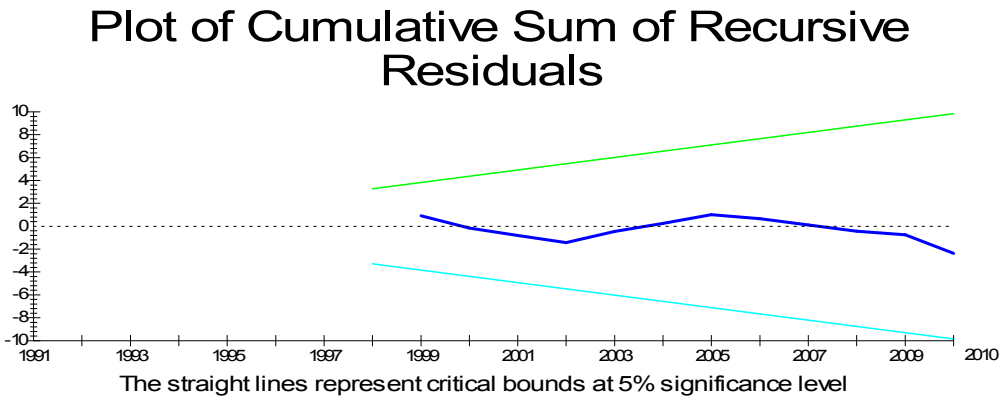
significant positive relationship between demand for conventional insurance and takaful with education.

Table 6. ARDL(1, 0, 0) Model ECM Results. Dependent variable: ΔLFAMINCO

Regressor	*Coefficient*	*Standard Error*	**T-ratio(p-value)**
ΔLEDUC	0.13	0.11	1.18(0.25)
ΔLGDP	-0.17	0.31	-0.57(0.57)
ΔINPT	1.04	1.52	0.68(0.50)
Ecm(-1)	-0.01	0.14	-0.10(0.91)

*** significant at 5% level*

Table 6 above indicates that all variables are statistically insignificant in the short run. In this case, we can state that the economic and socio-demographic variables have no positive relationship with the demand for general takaful industry in Malaysia in the short-run. However, the coefficient of ECM_{t-1} is found to be small in magnitude and is statistically insignificant. It confirms no long run relationship between the variables. The coefficient of ECM term is -0.01, which suggests that 10% the disequilibrium occurred will be corrected in the next year. This implies a relatively slow adjustment process.



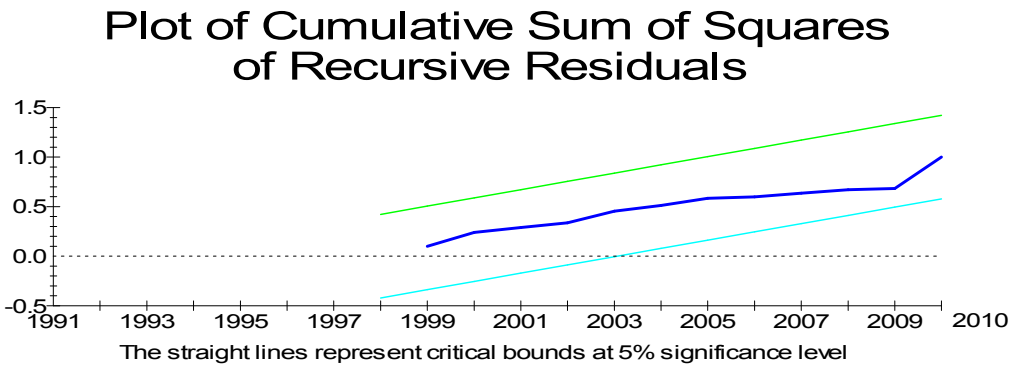


Fig. 2. (a). Plot of Cumulative Sum of Recursive Residuals; (b). Plot of Cumulative Sum of Squares of Recursive Residulas.

Figure 2 indicates that the plot of the stability test results (CUSUM and CUSUMQ) of the ARDL model against the critical bound of the 5% significance level show that the model is stable over time.

4. Conclusion

We find that the income variable which representative by GDP and education has significant positive relationship with the demand for family takaful in the short run but not in the long run. If there is an increase in income, people tend to buy more takaful of STMB. At the same time, education as a socio-demographic variable indicates significant relationship with the demand for family takaful in the short run but not in the long run. This means that in the case of Malaysia, the educated people already aware of the takaful products, they may necessarily purchase family takaful than life insurance.

However, the GDP as proxy of income variable and education indicate no positive relationship with the demand for general takaful, either in the short-run or in the long run. These findings hope to enable the actuaries, marketers, product developers and insurance funds managers of takaful of STMB to come out with the innovative products with the competitive price or by lowering the price of takaful of STMB in order to encourage people with more income to purchase more takaful of STMB. To enhance and enrich the findings, more analysis may be needed. It is suggested that other variables such as business variables, socio-psychological variables, institutional determinants variables and insurer action parameters variables are incorporated so as to come up with a more comprehensive analysis of demand for family takaful and general takaful industries in Malaysia.

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