Chapter Five

Factors that Affect Total Demand of Insurance and Total Profit - The Case of Great Eastern Life Assurance

5.1 Introduction

This chapter investigates the factors that determine demand of insurance in Great Eastern and factors which significantly affect gross profit of Great Eastern, along with statistical evidence. All of the data used relates to the period 1980 to 1999. Econometric Reviews (E-Views), a statistical software has been used to carry out the analysis and testing hypothesis about the parameters of econometric models, ranging from economic criteria and statistical criteria for reliability analysis. The following section is the summary of the results.

5.2 Hypothesis

One of the major objective of this study is to identify relationships between economic variables. The problem is what explanatory or independent variables should be included in the model. Facing this uncertainty, one possible strategy is to estimate a model that includes all possible relevant variables based on theory and logic.

Hypothesis 1: Factors of Demand of Insurance in Great Eastern

Gross National Product (GNP), Population (POP), and Savings (SAV) will influence Demand of Insurance (DD).

Dependent variable: DD.

Independent variables: GNP, POP, SAV.

Hypothesis 2: Factors of Gross Profit in Great Eastern

Annul Premium (ANPRE), Investment Income (INVIN), Commission Expenses (COMEXP), and Management Expenses (MAGEXP) will influence Gross Profit (GPRO).

Dependent variable: GPRO.

Independent variables: ANPRE, INVIN, COMEXP, MAGEXP.

5.3 Theories Related to the Study

Macro-economic conditions like Gross National Product, population, and savings have a significant impacts on the performance of the life insurance sector.

Gross National Product is the sum of the value of finished goods and services produced by a society during a given year and excludes intermediate goods. Gross

National Product counts only income earned by citizens of the country including wages and profits earned by them outside the country.

In Malaysia, society pass from a phase of rapid *population* growth in which modernization especially progress in medical science and public health programs causes decreases in mortality, and then, after a lag, to a mature phase in which birth rate is high; death rate is low and population growth is once again modest.

The contribution of household savings to corporate capital formation is more than that of retained corporate profits to total private savings. In Malaysia, an important part of household savings appears to consist of forced or contractual savings, accumulated in the Employees Provident Fund, established in 1951. Total contributions to the Fund amount to 23 per cent of the wage bill, of which the employers' pay 12 per cent and 11 per cent is paid by employees.

The immediate result of a profit is to increase the surplus of Great Eastern; that is, incomes of the company will show a greater increase than the expenses. Irrespective of the source, the profit is available for distribution to the stockholders as compensation for the use of their capital. However, only a portion of the profit will normally be distributed to stockholders in cash. The remainder being left in reserve to finance the acquisition of new businesses and to provide a financial buffer against adverse contingencies.

The premium is the price charged by a life insurance company for an insurance contract. On the other hand, *annual premium* is annualized premium of all new businesses sold in the year. Assuming one of the Great Eastern agents sell a policy in November and the paymode is "monthly" and Great Eastern financial year-end is 31 December, in November, Great Eastern would have only collected actual cash of two months premium only. To report annual premium on that policy, Great Eastern need to annualize the premium over 12 months even though the company only collected 2 months worth of premium.

The investment function is directly related to the accumulation of funds inherent in the business of providing life insurance protection. For a life insurance company like Great Eastern, this suggests that a large proportion of assets be long-term investment with a yield at least equal to the interest rate guaranteed in the outstanding contracts.

Usually, *investment incomes* of Great Eastern interest from Malaysian government securities, debenture/ bonds/ loan stocks, mortgage loans, policy loans, other loans, fixed and call deposits, gross dividends from unit trust, shares quoted in Malaysia and outside Malaysia, rental income from third parties, and others.

Insurance expenses may be classified in various ways, depending upon the purpose to be served. One broad functional classification places all such expenses under one of the following three subdivisions, i.e. management, distribution, and maintenance.

Management expenses are those items of cost incurred before the agent has a policy to deliver. These would include staff salaries, directors' remuneration, auditors' remuneration, rental of offices paid to third party, depreciation of fixed assets, repairs and maintenance, and other expenses.

Commission expenses are amount payable as basic commission to the intermediary who actually sold the life insurance policy. Among the costs of distribution would include outlays for advertising, first-year commissions, agency allowances and expenses and agency supervision. Maintenance costs embrace renewal commissions, premium taxes, the expenses of collecting renewal premium, reinstatement costs, costs of executing policy loans, expenses incidental to issuance of settlement agreements, and costs of settling claims.

5.4 Model Set-up

Two hypotheses will be set-up in the classical linear regression model. In this section, the model is set-up to test the relevance of all the included independent variables for hypothesis 1 and hypothesis 2.

5.4.1 Hypothesis 1

Demand of Insurance (DD) is influenced by Gross National Product (GNP), Population (POP) and Savings (SAV).

Model to Test: $DD = f[GNP, POP, SAV]$

$$DD = a_0 + a_1GNP + a_2POP - a_3SAV + \sum$$

Where,

Change in Gross National Product per unit, change in Demand of Insurance per a_1 unit

Change in Population per unit, change in Demand of Insurance per a_2 unit

Change in Savings per unit, change in Demand of Insurance per a_3 unit

$\sum$ = stochastic disturbance

a_0 = the intercept

5.4.2 Hypothesis 2

Gross Profit (GPRO) is influenced by Annul Premium (ANPRE), Investment Income (INVIN), Commission Expenses (COMEXP), and Management Expenses (MAGEXP).

Model to Test:

$$GPRO = f[ANPRE, INVIN, COMEXP, MAGEXP]$$

$$GPRO = b_0 + b_1ANPRE + b_2INVIN - b_3COMEXP - b_4MAGEXP + \Sigma$$

Where,

Change in Annual Premium per unit, change in Gross Profit per b_1 unit

Change in Investment Income per unit, change in Gross Profit per b_2 unit

Change in Commission Expenses per unit, change in Gross Profit per b_3 unit

Change in Management Expenses per unit, change in Gross Profit per b_4 unit

Σ = stochastic disturbance

b_0 = the intercept

5.5 Economic Criteria

This section focuses on a major objective of economic analysis, to identify relationships between economic variables. In developing an economic model that specifies how a dependent variable relates to an independent variable, if we label a dependent variable as y and the corresponding independent variable as x, then the relationship between them can be in the general form of $y = f(x)$. This relation specifies that y is some function of x.[13]

5.5.1 Signs of Relationship

In hypothesis 1, there is an estimated high degree of observed correlation between the demand of insurance and gross national product. When gross national product increases, that means income earned by citizens of the country will also increase and their have extra money to purchase insurance. There is a positive relationship between GNP and demand of insurance in Great Eastern.

Faster population growth therefore means a larger insurance market. On the other hand, reducing population will make the market smaller.

Besides that, the increasing consumer savings should reduce demand of insurance. This is because if household savings are exceptionally high, extra money for households will be much smaller. Finally, the household will evaluate whether or not purchase the insurance. Thus, the sign of the savings variable is negative on demand of insurance in Great Eastern.

In hypothesis 2, annual premium and investment income directly contribute to the statement of revenue accounts. When annual premium and investment income increase, gross profit of Great Eastern should increase. So, annual premium and investment income should have positive relationship on gross profit of Great Eastern.

Commission and management expenses, which are costs directly incurred in securing premium on insurance policies are charged to the revenue accounts in the year in which they are incurred. Both these expenses should decrease the gross profit of Great Eastern. So, commission and management expenses should have negative relationship to gross profit of Great Eastern.

5.5.2 Elasticity

The elasticity describes the percentage rate of response of dependent variable to a percentage change in independent variable. The elasticity of dependent variable with respect to independent variable may be defined as:

η= (% change in dependent variable) / (% change in independent variable)

[13] William E. Griffiths, R. Carter Hill, George G. Judge, (1993): Learning and Practicing Econometrics, p.172.

When the elasticity is more than 1 ($\eta > 1$), the dependent variable is elastic or sensitive against independent variable. On the other hand, when the elasticity is less than 1 ($\eta < 1$), dependent variable is inelastic or insensitive against independent variable. An elasticity of 1 ($\eta = 1$) means that independent variable on that item grows at the same rate as dependent variable.

5.6 Statistical Criteria

The method that is used most extensively in this study is the method of ordinary least squares (OLS) based on the population regression function (PRF). The method of ordinary least squares is attributed to Carl Friedrich Gauss, a German mathematician.[14] This study uses the classical linear regression model involving one dependent variable and more than two independent or explanatory variables.

Generally for more than two independent variables the population regression function (PRF) may be written as:

$$\text{PRF: } Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots\ldots + \beta_j X_{ji} + u_i \qquad i = 1, 2, 3, \ldots, n$$

where, β_0 = the intercept, β_1 to β_k = partial slope coefficients, u = stochastic disturbance term, i = ith observation, n being the size of the population.

[14] Damodar N. Gujarati (1995): Basic Econometrics; Third Edition, p.52.

5.6.1 A measure of "Goodness of Fit" - R^2

R^2 show the coefficient of determination and is the most commonly used measure of the goodness of fit of a regression line. Overall, R^2 measures the proportion or percentage of the total variation in Y explained by the independent variables. R^2 lies between 0 and 1. R^2 of 1 means a perfect fit. On the other hand, an R^2 of zero means that dependent variable is not related to the independent variable.

The various sums of squares appearing can be described as follows: total variation of the actual Y values about sample mean that is $\sum y_i^2 = \sum(Y_i - \overline{Y})^2$, which is called the total sum of squares (TSS). Variation of the estimated Y values about mean ($\overline{Y} = Y$), which is appropriately called the explained sum of squares (ESS). $\sum u_i^2$ is the unexplained variation or residual sum of squares (RSS) of the Y values about the regression line.

$$R^2 = \frac{ESS}{TSS}$$
$$= 1 - \frac{RSS}{TSS}$$
$$= 1 - \frac{\sum u_i^2}{\sum y_i^2}$$

The R^2 thus defined is known as the adjusted R^2, denoted by $\overline{R}^2$. The term adjusted means adjusted for the degree of freedom (df) association with the sums of squares. $\sum u_i^2$ has n-k df in a model involving k parameters, which include the intercept term; and $\sum y_i^2$ has n-1 df. The equation can be written as:

$$\overline{R}^2 = 1 - \frac{\sum u_i^2 / (n-k)}{\sum y_i^2 / (n-1)}$$

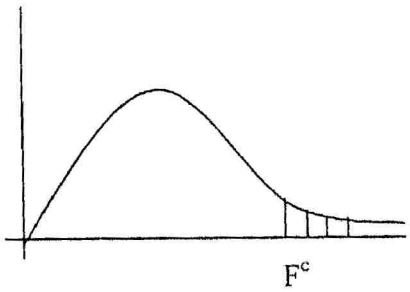
5.6.2 F-test

The F value provides a test of the null hypothesis where the true slope coefficients are simultaneously zero. If the F value computed for a regression model exceeds the critical F value from the Statistical Table of the F distribution at the α percent level of significance, H_0 should be rejected; otherwise do not reject it. Alternatively, if the p value of the observed F is sufficiently low, H_0 should also be rejected.[15]

To test the hypothesis:

Hypothesis Null, H_0 : $\beta_1 = \beta_2 = \beta_3 = 0$

Hypothesis Alternative, H_a : Not all slope coefficients are simultaneously zero.



If $F > F_\alpha (k-1, n-k)$, reject H_o; otherwise do not reject it, where $F_\alpha (k-1, n-k)$ is the critical F-value at the level of significance and (k-1) numerator df and (n-k) denominator df.

[15] Statistical Theory and Methodology in Science and Engineering (1960), John Wiley & Sons, p.278.

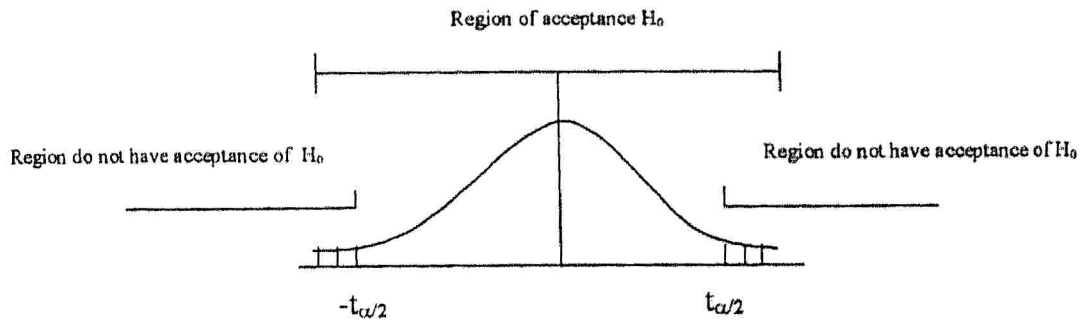
5.6.3 t-test

The test-of-significance approach developed along independent lines by R.A. Fisher and jointly by Neyman and Pearson.[16] Broadly speaking, a test of significance is a procedure by which sample results are used to verify the truth or falsity of a null hypothesis. Thus, to find whether the data contain any evidence suggesting that the dependent variable is related to the independent variable refer to H_o and H_1.

If a given independent variable has no bearing on the dependent variable, then $H_o : \beta_k = 0$. On the other hand, if a given independent variable has a bearing on the dependent variable, then $H_1 : \beta_k \neq 0$. A hypothesis test typically consists of a null hypothesis, H_o, a test statistic, and a critical value. In principle, the critical value should be chosen so that the test rejects a correct H_o with probability α that is specified by the analyst. The critical values for t-test ($-t_{\alpha/2}$, $t_{\alpha/2}$) that lead to an area in each tail of the distribution.Two-Tail Hypothesis:

Hypothesis Null, H_0 : $\beta_k = 0$

Hypothesis Alternative, H_1 : $\beta_k \neq 0$



[16] Testing Statistical Hypotheses (1959), John Wiley & Sons.

.7 Results of the Study

Both of the hypotheses will be presented with discussion on the statistical ignificance of the regression coefficients and the reliability of the regression findings.

5.7.1 Regression Model

Hypothesis 1

Hypothesis 1 is to determine relationship between Gross National Product (GNP), Population (POP), and Savings (SAV) against Demand of Insurance (DD).

Output from E-views contains at least the estimated coefficient, standard errors, and corresponding t-values and p-values, written in columns as in Table 5.1.

Table: 5.1 Summary of Least Squares Results

Variable	Coefficient	Standard Error	t-Value (zero null)	p-Value
Constant	-230369.9	124163.2	-1.855379	0.0821
GNP	3.867610	1.164806	3.320390	0.0043
POP	11374.67	9410.448	1.208728	0.2443
SAV	-7.730969	2.404401	-3.215341	0.0054

Additionally:

R^2 = 0.875907

Adjusted R^2 = 0.852640

F-value*** = 37.64522

All data are shown in Appendix E .

The empirical results are as follows:

$$DD = -230369.9^{*} + 3.867610\ GNP^{***} + 11374.67\ POP - 7.730969\ SAV^{***}$$
$$(-1.855379) \quad (3.320390) \quad (1.208728) \quad (-3.215341)$$

❖ Brackets show t-values

The interpretation of this model is:

This model has three explanatory or independent variables, GNP, POP, and SAV. If all three explanatory variables are fixed at zero value, the average value of demand of insurance is expected to be decrease by about 230370 units.

The partial regression coefficient of 3.867610 means that, holding all other variables constant, an increase per RM in Gross National Product is accompanied by an increase demand of insurance of Great Eastern about 3.8676 units. Besides that, holding all other variables constant, an increase per person in population will cause the demand of insurance of Great Eastern to increase by about 11374.67 units. Similarly, holding all other variables constant, when household savings increase per RM, demand of insurance of Great Eastern will decrease by about 7.7310 units.

Hypothesis 2

Hypothesis 2 is to determine the relationship between Annual Premium (ANPRE), Investment Income (INVIN), Commission Expenses (COMEXP), and Management Expenses (MAGEXP) against Gross Profit (GPRO).

The estimated coefficients, standard errors, and corresponding t-values and p-values, are shown in Table 5.2.

Table: 5.2 Summary of Least Squares Results

Variable	Coefficient	Standard Error	t-Value (zero null)	p-Value
Constant	-64749971	58080324	-1.114835	0.2825
ANPRE	6.867075	1.270142	5.406542	0.0001
INVIN	1.807229	0.354881	5.092495	0.0001
COMEXP	-1.149007	0.538773	-2.132639	0.0499
MAGEXP	-9.936065	3.373213	-2.945579	0.0100

Additionally:

R^2 = 0.954308

Adjusted R^2 = 0.942123

F-value*** = 78.32056

All data are shown in Appendix E .

The empirical results are:

DD = -64749971 + 6.867075ANPRE *** + 1.807229INVIN***
(-1.114835) (5.406542) (5.092495)

- 1.149007COMEXP** - 9.936065MAGEXP***
(-2.132639) (-2.945579)

❖ Brackets show t-values

The interpretation of this model is:

This model has four explanatory or independent variables that is ANPRE, INVIN, COMEXP, and MAGEXP. If all of the four explanatory variables are fixed at zero value, the average value of gross profit is estimated to decrease by about RM64,749,971.

The partial regression coefficient of 6.867075 means that, holding all other variables constant, an increase per RM in annual premium is accompanied by an increase in gross profit of Great Eastern by about RM6.8671. Besides that, holding all other variables constant, with an increase per RM in investment income, gross profit of Great Eastern will increase by about RM1.8072. Similarly, holding all other variables constant, when commission expenses increase per RM in their company, gross profit of Great Eastern will decrease by about RM1.1490. In the same way, holding all other variables constant, when Great Eastern increase management expenses per RM in their company, gross profit of Great Eastern will decrease by about RM9.9361.

5.7.2 Economic Criteria

Hypothesis 1

i. Signs of Relationship

DD = -230369.9* + 3.867610 GNP*** + 11374.67 POP - 7.730969 SAV***

Based on the above results, the signs of the relationship of all independent variables are consistent with the estimated model. The gross national product has a positive effect on demand of insurance in Great Eastern, which is consistent with theory.

Besides that, statistically population do not have significant effects on demand of insurance in Great Eastern although this variable have theoretically consistent signs of coefficients. The sign of savings also has a significant negative effect on demand of insurance in Great Eastern.

ii. Elasticity Aspect

The results of this aspect are varied. However, the effect is not as strong as we might expect from independent variables. In general a partial derivative describes how dependent variable changes when independent variable changes and all other variables are held constant.

i) Elasticity of DD with respect to GNP is defined as

$$\eta = \Delta DD/\Delta GNP \times \bar{GNP}/\bar{DD}$$

$$= 3.867610 \times \frac{2,698,682/20}{2,746,595/20}$$

$$= 3.8001$$

- With $\eta > 1$, when Gross National Product increase by 1%, Demand of Insurance will increase by 3.8001%.

ii) Elasticity of DD with respect to POP is defined as

$$\eta = \Delta DD/\Delta POP \times \bar{POP}/\bar{DD}$$

$$= 11374.67 \times \frac{362.38/20}{2,746,595/20}$$

$$= 1.5008$$

- With $\eta > 1$, when Population increase by 1%, Demand of Insurance will increase by 1.5008%.

iii) Elasticity of DD with respect to SAV is defined as

$$\eta = \Delta DD/\Delta SAV \times \bar{SAV}/\bar{DD}$$

$$= -7.730969 \times \frac{2932,019/20}{2,746,595/20}$$

$$= -2.6234$$

- With $\eta > 1$, if Savings increase by 1%, Demand of Insurance will decrease by 2.6234%.

Hypothesis 2

i. Signs of Relationship

GPRO= - 0.2825 + 0.0001(ANPRE)*** + 0.0001(INVIN) *** -0.0499(COMEXP)**
- 0.0100(MAGEXP)***

Based on the above results, the sign of relationship of all independent variables are consistent with the estimated model. Both the annual premium and investment income have a positive effect with gross profit of Great Eastern, which is consistent with

: other hand, the sign of commission expenses and management

;nificant negative effect on gross profit in Great Eastern.

:t

GPRO with respect to ANPRE is defined as

$$\Delta GPRO/\Delta ANPRE \times \overline{ANPRE} / \overline{GPRO}$$

$$6.867075 \times \frac{2.73E+09/20}{1.06E+10/20}$$

$$= 1.77$$

1, when Annual Premium increases by 1%, Gross Profit will increase by

of GPRO with respect to INVIN is defined as

$$= \Delta GPRO/\Delta INVIN \times \overline{INVIN} / \overline{GPRO}$$

$$= 1.807229 \times \frac{4.33E+09/20}{1.06E+10/20}$$

$$= 0.73$$

1, when Investment Income increase by 1%, Gross Profit will increase

iii) Elasticity of GPRO with respect to COMEXP is defined as

$$\eta = \Delta GPRO/\Delta COMEXP \times \overline{COMEXP}/\overline{GPRO}$$

$$= -1.149007 \times \frac{3.95E+09/20}{1.06E+10/20}$$

$$= -0.43\%$$

➢ With $\eta < 1$, if Commission Expenses increase by 1%, Gross Profit will decrease by 0.43%.

iv) Elasticity of GPRO with respect to MAGEXP is defined as

$$\eta = \Delta GPRO/\Delta MAGEXP \times \overline{MAGEXP}/\overline{GPRO}$$

$$= -9.936065 \times \frac{1.02E+09/20}{1.06E+10/20}$$

$$= -0.96\%$$

➢ With $\eta < 1$, if Management Expenses increase by 1%, Gross Profit will decrease by 0.96%.

5.7.3 Statistical Criteria

Hypothesis 1

i) R square

The R^2 value of 0.875907 shows that the three independent variables GNP, POP, and SAV accounted for over 87 per cent of the variation in demand of insurance in Great Eastern over the period 1980-1999. On the other hand, the constant 0.124093 explains other independent variables besides GNP, POP and SAV variables. The adjusted coefficient of determination can be $\overline{R}^2$ adjusted for the degree of freedom association with the sums of squares equal to 0.852640, which is still high.

ii) F-test

F-test gives the total variation in dependent variables. The variation is explain independent variables and the unexplained variation. It also gives the ratio of the explained to the unexplained, which provides a test of the "significance" of the overall relationship.

Hypothesis 1: $DD = a_0 + a_1GNP + a_2POP - a_3SAV + \sum$

Hypothesis Null, H_0 : $\beta_1 = \beta_2 = \beta_3 = 0$

Hypothesis Alternative, H_a : Not all slope coefficients are simultaneously zero.

Number of Observation to test, N	= 20
Number of independent variables include intercept, K	= 4
F-value	= 37.64522
Critical F-value (Statistical Table of the F distribution) ($F^C_{3,16}$)	= 5.29

F-value (37.64522) computed from computer output for Hypothesis 1 exceeds the critical F-value (5.29) at the α =1 % level of significance. So, F-value is significant, and hence the null hypothesis can be rejected. Incidentally, the p value of the observed F is extremely small. This means that all independent variables explained overall relationship to the demand of insurance significant at 99% confidence level.

iii) t-test

Hypothesis 1: $DD = a_0 + a_1GNP + a_2POP + a_3SAV + \Sigma$

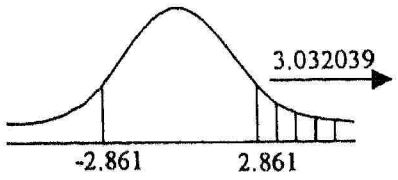
a) t-test for Gross National Product (a_1) :

Ho : $a_1 = 0$

H_1 : $a_1 \neq 0$

$\alpha = 0.01$

at the level of significance, $\alpha/2 = 0.005$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.005, 19}, t_{0.005, 19}$

-2.861, 2.861 (Statistical Table of the t distribution)

T-Statistic = 3.320390 > $t_{\alpha/2,n-1}$ = 2.861

Result: reject H_o , GNP is significant.

- Gross National Product is related to the Demand of Insurance in Great Eastern.

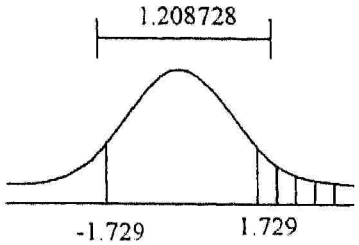
b) t-test for Population (a_2) :

Ho : $a_2 = 0$

H_1 : $a_2 \neq 0$

$\alpha = 0.10$

at the level of significance, $\alpha/2 = 0.05$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.05, 19}, t_{0.05, 19}$

-1.729, 1.729 (Statistical Table of the t distribution)

T-Statistic = 1.208728 < $t_{\alpha/2,n-1}$ = 1.729

Result: do not reject H_o , POP is not significant.

➢ Population is not related to the Demand of Insurance in Great Eastern.

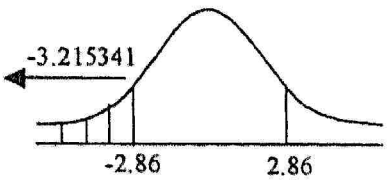
c) t-test for Savings (a_3) :

Ho : $a_3 = 0$

H_1 : $a_3 \neq 0$

$\alpha = 0.01$

at the level of significance, $\alpha/2 = 0.005$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.005, 19}, t_{0.005, 19}$

-2.861, 2.861 (Statistical Table of the t distribution)

T-Statistic = -3.215341 < $t_{\alpha/2,n-1}$ = -2.861

Result: reject H_o , SAV is significant.

➢ Savings is related to the Demand of Insurance in Great Eastern.

The p-value

The p-value known as the observed or exact level of significance. The p-values also give the exact probability of obtaining the estimated test statistic under the null hypothesis.

Hypothesis 1: DD = - 0.0821 + 0.0043(GNP)*** + 0.2443(POP) - 0.0054(SAV)***

a) 0.0043(GNP)*** means that GNP = 0.0043

= 1 - 0.0043

= 0.9957

= 99%

- GNP affects to DD over 99%.

b) 0.2443(POP) means that POP = 0.2443

= 1 - 0.2443

= 0.7557

= 75%

- POP affects to DD over 75%.

c) 0.0054(SAV)*** means that GNP = 0.0054

= 1 - 0.0054

= 0.9946

= 99%

- SAV affects to DD over 99%.

Note:

* significant at 90% confidence level

** significant at 95% confidence level

*** significant at 99% confidence level

Hypothesis 2

i) R square

The R^2 value of 0.954308 shows that the four independent variables namely ANPRE, INVIN, COMEXP, and MAGEXP account for about 95 per cent of the variation in gross profit in Great Eastern over the period 1980-1999. On the other

hand, about 0.045692 explain by another independent variables beside ANPRE, INVIN, COMEXP, and MAGEXP variables. The adjusted coefficient of determination can be $\overline{R}^2$ adjusted for the degree of freedom association with the sums of squares equal to 0.942123, which is still high.

ii) F-test

Hypothesis 2: $GPRO = b_0 + b_1ANPRE + b_2INVIN - b_3COMEXP - b_4MAGEXP + \Sigma$

Hypothesis Null, H_0 : $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

Hypothesis Alternative, H_a : Not all slope coefficients are simultaneously zero.

Number of Observation to test, N	= 20
Number of independent variables include intercept, K	= 5
F-value	= 78.32056
Critical F-value (Statistical Table of the F distribution) ($F^C_{4,15}$)	= 4.89

F-value (78.32056) computed from computer output for Hypothesis 2 exceeds the critical F-value (4.89) at the α =1 % level of significance. So, F-value is significant, and hence the null hypothesis can be rejected. Incidentally, the p value of the observed F is extremely small. That means all independent variables explained the overall relationship to the gross profit significant at 99% confidence level.

iii) t-test

Hypothesis 2: $GPRO = b_0 + b_1ANPRE + b_2INVIN + b_3COMEXP + b_4MAGEXP + \Sigma$

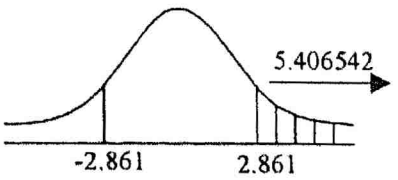
a) t-test for Annual Premium (b_1) :

Ho : $b_1 = 0$

$H_1 : b_1 \neq 0$

$\alpha = 0.01$

at the level of significance, $\alpha/2 = 0.005$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.005, 19}, t_{0.005, 19}$

-2.861, 2.861 (Statistical Table of the t distribution)

T-Statistic = 5.406542 > $t_{\alpha/2,n-1}$ = 2.861

Result: reject H_o , ANPRE is significant.

➢ Annual Premium is related to the Gross Profit in Great Eastern.

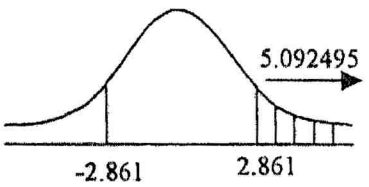
b) t-test for Investment Income (b_2) :

Ho : $b_2 = 0$

$H_1 : b_2 \neq 0$

$\alpha = 0.01$

at the level of significance, $\alpha/2 = 0.005$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.005, 19}, t_{0.005, 19}$

-2.861, 2.861 (Statistical Table of the t distribution)

T-Statistic = 5.092495 > $t_{\alpha/2,n-1}$ = 2.861

Result: reject H_o , INVIN is significant.

➢ Investment Income is related to the Gross Profit in Great Eastern.

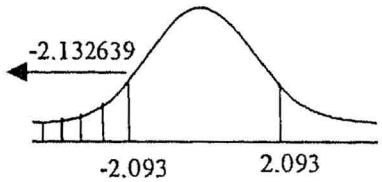
c) t-test for COMEXP (b_3) :

Ho : $b_3 = 0$

H_1 : $b_3 \neq 0$

$\alpha = 0.05$

at the level of significance, $\alpha/2 = 0.025$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.025, 19}, t_{0.025, 19}$

-2.093, 2.093 (Statistical Table of the t distribution)

T-Statistic = -2.132639 < $t_{\alpha/2,n-1}$ = -2.093

Result: reject H_o , COMEXP is significant.

➢ Commission Expenses is related to the Gross Profit in Great Eastern.

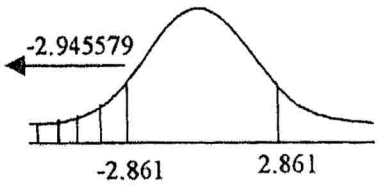
d) t-test for Management Expenses (b_4) :

Ho : $b_4 = 0$

H_1 : $b_4 \neq 0$

$\alpha = 0.01$

at the level of significance, $\alpha/2 = 0.005$



critical value $-t_{\alpha/2,n-1}, t_{\alpha/2,n-1}$

$-t_{0.005, 19}, t_{0.005, 19}$

-2.861, 2.861 (Statistical Table of the t distribution)

T-Statistic = -2.945579 < $t_{\alpha/2,n-1}$ = -2.861

Result: reject H_o , MAGEXP is significant.

➢ Management Expenses is related to the Demand of Insurance in Great Eastern.

The p-value

Hypothesis 2: GPRO = - 0.2825 + 0.0001(ANPRE)*** + 0.0001(INVIN) ***
- 0.0499(COMEXP)** - 0.0100(MAGEXP)***

a) 0.0001(ANPRE)*** means that ANPRE = 0.0001

= 1 - 0.0001

= 0.9999

= 99%

- ANPRE affects to GPRO over 99%.

b) 0.0001(INVIN) *** means that INVIN = 0.0001

= 1 - 0.0001

= 0.9999

= 99%

- INVIN affects to GPRO over 99%.

c) 0.0499(COMEXP) ** means that COMEXP = 0.0499

= 1 - 0.0499

= 0.9501

= 95%

- COMEXP affects to GPRO over 95%.

d) 0.0100(MAGEXP) *** means that MAGEXP = 0.0100

= 1 - 0.0100

= 0.99

= 99%

- MAGEXP affects to GPRO about 99%.

Note:

* significant at 90% confidence level

** significant at 95% confidence level

*** significant at 99% confidence level

5.8 Findings and Discussion

Demand of insurance in the life insurance industry recorded a faster growth rate than Gross National Product during the period 1980-1999. This reflects the high correlation between demand for insurance in Great Eastern and growth in Gross National Product. The elasticity of growth in demand of insurance increase significantly with growth in Gross National Product.

There are no significant relationship between population and demand of insurance in Great Eastern. When population increases, the demand of insurance in Great Eastern is not increased significantly because the poor may not purchase insurance.

Based on previous studies discussed in Chapter Two, the personal, social, and psychological factors are primary factors affecting demand of insurance. Nonetheless, consumers purchasing insurance products rely primarily on advertising, sales promotion literature, internet web sites, friends, and family for information about insurance products. Most consumers purchasing insurance products consider that the insurance agent really known their needs for life insurance.

The level of demand of life insurance in Great Eastern depend on a number of factors. One of the more important factors is the savings style of households of a country. For example, the increasing consumer savings in 1996 resulted in a sharp reduction in the demand of insurance in Great Eastern. This is because household savings in the EPF and deposits in bank are quite high. Clearly savings is the cause of demand of insurance as well as an effect.

The level of gross profit may also reflect the marketing structures and techniques employed in the selling of the product besides the annual premium, investment income, commission expenses, and management expenses.

Most significantly, gross profit may actually feed on itself by creating the incentive to annual premium. Besides that, it is also true that there is a significant relationship between gross profit and investment income. Both of these are consistent with the hypothesis that gross profit would increase when annual premium and investment income increase. This is attributable to the increase product sales and advantage of opportunities to realize profits from the sale of fixed income securities and equity. This resulted in the high level of gross profit of Great Eastern.

Some allowance should be made for the fact that the gross profit enjoys significant commission expenses. There is also significant observed correlation between gross profit and management expenses. The increase of commission expenses and management expenses will increase the direct costs of incurred in securing premium on insurance policies, therefore decreasing the gross profit for the Great Eastern.

As discussed in the Chapter Two, the life insurance industry is quite dependent on information technology (IT) because IT would provide the much-needed competitive advantage., Therefore, the high level of IT will also affect the total profit of Great Eastern. Besides that, insurance marketers today practice event-oriented marketing, as a response to such consumer needs. In event-oriented marketing agents establish an ongoing relationship with their clients to be better able to respond to significant events in their clients' lives.

Insurance companies like Great Eastern must continually monitor the persistency of their products because is a strong indicator of how satisfied customers are with product, an agent, or a company, and how suitable the product is to the client's means and needs. In addition to the factors that will also affect the profitability of the company include pricing assumptions, mortality tables used and changes to mortality, lapse of older policies, growth in new business linked to demand of insurance products, and sale product mix.[17]

5.9 Conclusion

While it is difficult to pinpoint the general factors causing the slide in demand of insurance and gross profit in Great Eastern, a few probable ones may be mentioned.

Overall, this study obtained some evidence that gross national product and savings are significant related to demand of insurance in Great Eastern besides the population variable. On the other hand, all independent variables, i.e. annual premium, investment income, commission expenses, and management expenses are significant ly related to total gross profit in Great Eastern.

[17] Quoted from Bruce Lee, Assistant General Manager of Great Eastern (Finance & Customer Service).