Firm-Specific Determinants of Profitability of Non-life Insurance companies:

Panel Evidence from Bangladesh

**Abstract:**

This paper attempts to reveal how profitability of non-life insurance companies operating in Bangladesh are significantly affected by several insurance firm-specific factors such as profit or loss transferred from revenue account To total asset ratio, premium to total asset ratio, operating income to total asset ratio, operating cost to total asset ratio, debt to equity ratio, size of the firm and debt to total asset ratio using econometric modelling showing the causation between ROE being dependent variable measuring profitability and insurance industry specific factors being explanatory variables. We have adopted random effect and well as fixed effect method followed by pooled OLS (ordinary least square), cross-sectional GLS (generalised least square) and Dynamic panel data method using GMM (generalised method of moments) approach to estimate the coefficients of the models. Under fixed effect method, all the insurance industry specific factors except operating income to total asset ratio are found statistically significant in explaining the variation of ROE followed by Random effect, pooled OLS, and Cross-sectional time series FGLS method showing the statistical significance of all other explanatory variables included in the models except operating cost to total asset ratio. In addition, Arellano-Bond dynamic panel data approach has also estimated the coefficients corresponding to the variables included in the model and revealed that all the predictors except operating cost to total asset ratio and debt to total asset ratio are statistically significant in explaining the changes in ROE measuring profitability of general insurance companies. After comparing the outcomes estimated by several models using model specification tests, Pooled OLS along with FGLS and Dynamic panel data approach revealed the best estimations as per the ramifications of diagnostic checks such as test of heteroskedasticity, muticollinearity, autocorrelation and cross-sectional dependence to check the validity of the models followed by adopting unit root test to check the stationary position of the data series of different variables included in the model.

*Key words:* ROE, Fixed-effect, Random-effect, Pooled OLS, FGLS, GMM, Data Stationary

**1.0 Introduction**

The insurance industry of a country is very much vital for a country’s economy. The companies operating in the insurance industry follow the criteria of dividing one’s risk to many other policyholders in order to mitigate the risk. The industry of insurance becomes more significant for a country like Bangladesh where the penetration and the density rate is very low compared to other neighboring country. There are a good number of Non-life insurance companies operating in Bangladesh, 46 to be exact. Among these non-life insurance companies, one is operated by the Government and remaining 45 companies are owned by private sector. The insurance companies measure the profitability of the firms in order to observe the financial record. Profitability of a company indicates how well the business is managing its resources. It also indicates the efficiency of the management of the firm. The major objective of any business is to earn more profit than its competitors. The insurance firms think nothing different from that. Through more profit, the insurance firms can maximize the wealth as well as the profit and satisfy the stakeholders. In other words, it is a crucial factor to determine the profitability of an insurance company because it helps the insurance firms to determine the right amount of premium, efficiently manage the assets and invest in the profitable projects as well as satisfying the existing and potential policyholders.Many authors from the previous research have given their opinion regarding the profitability indicators of Non-Life Insurance Companies. They find evidence that the insurance firms’ profitability is dependent on firms’ size, amount of authorized capital as well as leverage ratios. Size of the firms and the amount of authorized capital shows significantly positive relation with the profitability. On the other hand, leverage ratio shows significantly negative relation with firms’ profitability. In our research we have tried to figure out how the Profit or loss transferred from revenue account to Total Asset, Premium to Total Asset, Operating Income to Total Asset, Operating Cost to Total Asset, Size of the Firms, Debt to Equity and Debt to Total Asset are related with the profitability being measured with ROE of the firms operating in the insurance industry. All these elements refer to firm specific factors which vary from company to company because of firm’s effectiveness and efficiency. The research is conducted to measure the determinants of profitability of the insurance industry so that it will help the firms to manage its resources. The firms can compare its profitability with the profitability of other insurance companies so that it can follow the footsteps of the higher profitable companies in order to be more profitable in the future rectifying the current flaws. The stakeholders can also predict or forecast the future state of the insurance firms through the profitability trend for a last few years.

**2.0 Literature Review**

Previously many authors have given their opinion regarding the determinants of profitability of the firms operating in the insurance industry. More or less they have picked the same sorts of determinants which affect the profitability of the insurance firms. They have analyzed some external factors as well as some firms’ specific or internal factors.

**Ibrahim (2018)** has mentioned that in order to have a significant gradual growth in the insurance industry, the insurance companies should have taken some effective steps such as innovative insurance policies, productive effort in the market to maximize the income to a higher level. These steps will be able to gain more confidence of the potential policy holders of insurance companies as well as helps to understand the features of policies much more easily. **Ahmad &Khanal (2007)** have discussed that the profitability of the companies operating in the insurance industry is in rising trend and it is growing significantly. Though the sector is continually improving, some barriers are also exist regarding the FDR (Foreign Direct Investment)

.According to **Grace & Hotchkiss (1995)** the profitability of the companies operating in the insurance industry is connected with the income obtained from investments. The investment activities and the capital budgeting help the insurance firms to become more profitable compared to its competitors.

**Wright (1992)** has discussed that Non-Life Insurance companies execute various sorts of methods in order to determine the firms’ profitability. Profitability of those companies operating in the insurance industry can be affected by taxes imposed by government. **Bates and Cowling (2008)** have discussed that the firms’ sizes are positively correlated with investment decisions. The higher the asset level, the bigger the firms’ size will be. Higher asset is also related with proper investment planning.

**Hifza (2011)** has discussed that the insurance firms’ profitability is dependent on ROA, firms’ size, amount of authorized capital as well as leverage ratios. ROA, firms’ size and the amount of authorized capital shows significantly positive relation with the profitability. On the other hand, leverage ratio shows significantly negative relation with firms’ profitability. **Kozak (2011)** has said in one of his paper that the insurance companies can increase their profitability if they can improve the volume of gross premium and shorten the operating expenditures. That will eventually increase the growth rate of GDP of particular countries.

**Almajali (2012)** has discussed that the performance of any firm operating in the insurance industry can be determined by ROA. It has been also discussed that firms’ size, liquidity, management play a significant role in the profitability of the firms. It has been suggested that there may not be a particular relationship between ROA of the firm and age of the firm.**Nino D. (2016)** has found no specific proof that the profitability in return on asset of the insurance firms is directly related with Gross Domestic Product and the rate of inflation of a country.

Many of the authors who have researched on this particular topic have found that the profitability of the insurance firm depends on external as well as some internal determinants such as efficiency of management **(Jibran, Kashif, Sameen and Nouma, 2016)**, financial ratios, ROE, ROA, volume of assets of the companies **(William; 2012, Rahel, 2013)**

**Pong****pitch&Naratip (2018)** have discussed in their paper that ROA, RNP and ROE are determined in order to measure profitability. They have found from their analysis that size of the board and profitability ratio are positively co related. On the other hand, they have found the evidence of negative co relation between frequent board meeting and RNP & ROA.**Quist J (2018)** has conducted a research to find out the relationship between the total number of claim and the profitability of non insurance firms. It has been found from the research that there is a significant negative impact of total amount of claim on the profitability.**Farhadi& Maryam (2009)** have found in their research that setting the price of insurance premium is a vital factor of profitability. Through the setting of right amount of premium, the non life insurance policy providers can attract the people to buy the policies more than usual.

**Rahman, Jan and Iqbal (2018)** have found that the size of the non-life insurance firms and the growth rate of Gross Domestic Product have positive impact on the profitability of the firms operating in the insurance industry.**Demis H. (2016)** have discussed that rate of inflation, risk of underwriting negatively impacts on the profitability of the firms operating in the insurance industry. On the other hand, the growth of premium, ratio of solvency, age and the growth rate of GDP positively impacts the profitability of insurance firms. **John et al. (2013)** has conducted a research to show that the profitability of the insurance firms is affected by the leverage as well as the management of working capital.**Hussain (2015)** has discussed in his paper that the management of insurance firms will have to avail the new opportunities in order to have a significant growth in terms of profitability. The companies need to focus on those things on which the competitors are not properly good in. **Oner (2015)** has researched on the insurance firms’ profitability. He has used two variables to find out the relationship of firms’ profitability. The has also found an evidence of significant relationship between profitability and the age, size and the growth rate of premium determined by the insurance firms’ management. **Kripa and Ajasllari (2016)** have found from their research that there is a close connection lies between liquidity, capital amount, size with the profitability of firms operating in the insurance industry.

**3.0 Objective**

This paper imparts at revealing the causation between profitability being measured with ROE (return on equity) of non-life insurance firm in Bangladesh and several insurance industry specific-factors being measured with profit/loss transferred from consolidated revenue account, profit on sale of assets and sundry income TO total assets, Ratio of Operating cost TO total asset, Ratio of Debt TO equity, Size of the firm measured with natural log of total assets and Ratio of Debt TO total assets ratio in order to demonstrate how these factors are affecting the profitability of general insurance firms considering only micro environment.

**4.0 Data and Methods**

This segment identifies the overall structure of the research explaining about how the information has been collected, what and how the tools will be implemented to analyze the data collected from different sources as mentioned below:

***4.1 Research type:***

This is an explanatory research showing the impact of insurance industry specific factors such asRatio of Profit/loss transferred from consolidated revenue account TO total assets, Ratio of Total premium TO total assets, Ratio of Total operating income considering the summation of profit/loss transferred from consolidated revenue account, profit on sale of assets and sundry income TO total assets, Ratio of Operating cost TO total asset, Ratio of Debt TO equity, Size of the firm measured with natural log of total assets and Ratio of Debt TO total assetson the profitability being measured with ROE of non-life insurance companies in Bangladesh.

***4.2 Data type and sample selection procedure:***

We have adopted secondary sources of data for the variables mentioned under following table since the last 10 years collected from annual reports of 04 (four) non-life insurance companies listed below and selected using non-probabilistic convenience sampling approach depending on the availability of data from Pragati insurance Limited, Agrani Insurance Limited, Green Delta Insurance Limited and SadharanBima corporation Limited. So, the sample size is 40 for this paper.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Notation** | **Expected sign of coefficients** | **Data Source** |
| ROE (Dependent Variables) | roe |  | Annual Report |
|  Independent variables (∑X) |  |
| X1=Profit/loss transferred from consolidated revenue account TO total assets ratio | profitorlosstototalasset | + (positive) | Annual Report |
| X2=Total premium TO total assets ratio | totaltototalasset | + (positive) | Annual Report |
| X3=Total operating income TO total assets ratio | totaloperatingincometototalasset | + (positive) | Annual Report |
| X4=Operating cost TO total asset ratio | totaloperatingcosttototalasset | * (Negative)
 | Annual Report |
| X5=Debt TO equity ratio | debttoequity | * (Negative)
 | Annual Report |
| X6=Size of the firm | sizeofthefirm | + (positive) | Annual Report |
| X7=Debt TO total assets ratio | debttototalasset | * (Negative)
 | Annual Report |

***4.3 Data analysis tools:***

For analysing the data collected from different secondary sources as mentioned earlier, we have developed our hypothesis as well as corresponding econometric models as revealed below:

4.3.1 Development of Hypothesis:

Following hypothesis has been constructed to examine the impact of several factors affecting the profitability of general insurance companies in Bangladesh:

Ho: There is no significant relationship between ROE and several Insurance Industry specific factors

H1: There is a significant relationship between ROE and several Insurance Industry specific factors

4.3.2 Formation of Econometric Modeling:

Following econometric models have been developed in order to reveal the causation between ROE and several insurance industry specific factors as mentioned earlier:

$$ROE\_{it}=α\_{it}+\sum\_{k=1}^{7}δ\_{it}X\_{itk}+ ε\_{it} (Equation No.01)$$

$$ROE\_{it}=α\_{it}+\sum\_{k=1}^{7}δ\_{it}X\_{itk}+u\_{it}+ ε\_{it} (Equation No.02)$$

$$ROE\_{it}=α\_{it}+ROE\_{i\left(t-1\right)}+\sum\_{k=1}^{7}δ\_{it}X\_{itk}+ ε\_{it} (Equation No.03)$$

Here, **ROE** = Return on equity measured with dividing net income by total Capital that proxies the profitability of non-life insurance companies in Bangladesh.

**ROE(t-1)** = One year lagged Return on equity adopted as endogenous variable due to the correlation with past and present error term of the model.

**∑X** = all explanatory insurance industry specific variables adopted in the models such as **X1**=Profit/loss transferred from consolidated revenue account TO total assets,**X2**=Ratio of Total premium TO total assets, **X3**=Ratio of Total operating income considering the summation of profit/loss transferred from consolidated revenue account, profit on sale of assets and sundry income TO total assets, **X4**=Ratio of Operating cost TO total asset, **X5**=Ratio of Debt TO equity, **X6**=Size of the firm measured with natural log of total assets and **X7**=Ratio of Debt TO total assets

**εit**= error term / within entity error

**αit** = constant

**uit**= between entity error

We have adopted Fixed-effect method to estimate the coefficients from equation number 01 showing the causation between ROE and several insurance industry specific factors mentioned as predictors in the aforesaid model exploring the relationship between these predictors and outcome variable (ROE) within an entity (Insurance company). When we use Fixed effect, we presume that something within the individual may affect or bias the predictor or outcome variable and we need to control in this regard so that this is the rationale behind the assumption of the correlation between entity’s error term and predictor variable followed by notation corr(ui, Xb). In addition, we have also adopted Pooled OLS standing for Ordinary least square and cross sectional GLS standing for Generalized Least square Method to estimate the coefficients included under equation number 01 in order to compare the outcomes among these three models.

Apart from fixed effect, we have also adopted Random-effect model to estimate the coefficients included in equation number 02 revealing the causation between ROE and other predictors as described earlier under ∑X. The reason of using random effect method is the assumption of variation across entities (insurance companies) assumed to be random or stochastic and uncorrelated with the predictors or explanatory variables included in the model.

In addition, we have adopted Arellano-Bond Panel dynamic Data method to estimate the coefficients included under equation number 03 considering the GMM standing for generalized methods of moments approach for addressing certain endogeneity problem causing a circumstance when explanatory variables are correlated with error terms of the model.

The summary statistics of all variables included in the aforesaid models is given below:

**Table 01: Summary statistics of all variables included in the models**



Source: Output developed by STATA 12.0

The summary statistics of the data looks consistent with very lower values of standard deviation and lower gaps in ranges (measured by minimum and maximum values).

**5.0 Empirical results and Discussion:**

According to the coefficients estimated by Radom-effect GLS (generalized least square) method mentioned under following table, all the variables except operating cost to total asset ratio are found statistically significant at either 5% or 1% or 0.1% level of significance in explaining the variation of dependent variable being measured with ROE standing for Return on Equity used as a proxy to estimate the profitability of non-life insurance companies in Bangladesh. Profit or loss transferred from revenue account to total asset ratio measuring the proportion of profit or loss on total asset is positively affecting profitability of insurance companies as higher earnings will accelerate the return on assets and vice versa. In addition, Premium to total assets showing the proportion of premium generated by deploying assets is also affecting ROE with a positive direction holding the assumption of Ceteris-Paribas as more premiums will boost up the probability of generating high net income and therefore increase the ROE measuring the profitability of insurance companies. In contrast, operating income to total assets ratio is found inversely related with ROE which is not expected according to the predetermined signed of the coefficient as more operating income will increase the operational efficiency of the company and thereby increase the measure of ROE or profitability of insurance companies which means that the expected sign of the coefficient of this variable (operating income to total asset) should have been positive. The reason of this negative coefficient is because of the problem of multicollinearity as the correlation between operating income to total asset and operating cost to total asset is found very high depicted from the table of collinearity divulging the correlation among the explanatory variables or regressors of the said model estimated by Random-effect GLS method. Another variable titled with Debt to equity ratio is found positively related with ROE of the model as the higher proportion of debt compared to equity capital will bring a tax shield benefit for the firm and it’s been used in productive sector such as investing in lucrative earning assets that will bring regular high return for the firm and thereby increase the profitability measured with ROE of the insurance companies. Moreover, Size of the firm measured with natural log of total asset has been found positively related with ROE as larger business will be reckless in investing in a portfolio of high risky assets that will bring higher return for the firm and thereby increase the profitability of the firm. On the contrary, the last variable titled with Debt to total asset is found inversely related with ROE as the higher amount of debt will increase the operating cost of the firm and thereby lessen the profitability of the insurance companies measured with ROE in the model. The Chi-square value of 4889.6142 under Random effect GLS method shows the overall or joint significance of regressors included in the model in explaining the variation of dependent variable measured with ROE at 0.1% level of significance. In other words, all the explanatory variables such as profit or loss to total assets, premium to total assets, operating income to total assets, operating cost to total assets, debt to equity ratio, size of the firm and debt to total asset ratio are found statistically significant in affecting the profitability of Insurance companies in Bangladesh.

Apart from Random-effect GLS method, the coefficients estimated by Fixed-effect method mentioned under the following table postulate that all the variables except operating income to total asset ratio and debt to total asset ratio are statistically significant at either 5%, 1% or 0.1% level in explaining the changes in ROE being dependent variable. The R2 value of 0.9768 reveals that 97.68% variability in ROE has been explained by the fitted model estimated by Fixed-Effect method. Moreover, the F-value of 174.791 shows that all regressors such as profit or loss to total assets, premium to total assets, operating income to total assets, operating cost to total assets, debt to equity ratio, size of the firm and debt to total asset ratio are jointly statistically significant at 0.1% level of significance in explaining the changes in the profitability being measured with ROE of Insurance companies. The rho value also known as intra-class correlation value of 0.9740 reveals that 97.40% variability in ROE is explained by the differences across panels. Moreover, there is no strong evidence that the model suffers from endogenity problem as the correlation value between residual within groups followed by ui and the regressors (explanatory variables) is found -0.239 as per the output revealed by Fixed-Effect method referred to Appendix portion.

According to the coefficients estimated by pooled OLS (ordinary least square) and GLS (generalized least square) corresponding to cross-sectional time series FGLS regression model mentioned under the following table, all the explanatory variables except operating cost to total asset ratio are found statistically significant in the chosen level of significance which resemble the explanation of output estimated by Random-effect as well as Fixed-effect method as described earlier.

**Table 02: Comparative position of coefficients of the model estimated by different methods**



Source: Output developed by STATA 12.0

***5.1 Model Specification Test:***

This segment refers to the several model specification tests used to specify the model estimating the impact of industry specific factors affecting the profitability of non-life insurance companies in Bangladesh

* + 1. Using Hausman test (Random effect vs Fixed effect)

The output of Hausman test mentioned below to determine between fixed or random effects method, the null hypothesis is that the preferred model is fixed effect vs the alternative is random effect. In fact, it tests whether the unique errors followed by ui are correlated with regressors, the null hypothesis is they are not. As the Chi-square value of 66.14 is statistically significant at 0.1% level of significance, we can reject the null hypothesis and conclude that Random-effect model is more preferable to Fixed-effect model.

**Table 03: Output of Hausman Test**



Source: Output developed by STATA 12.0

* + 1. Breusch and Pagan Lagrangian multiplier test (Random Effect vs Pooled OLS or FGLS):

This LM test suggesting decide between a Random effect and Pooled OLS regression model has assumed the null hypothesis is that variance across estimates is zero which means there is no significant difference across units (i.e. no panel effect). According to the Chi-square value of 0.33 being statistically insignificant, we can’t reject the null hypothesis and deduce that there is no significant difference across the panels suggesting Pooled OLS or cross-sectional FGLS is better estimates than Random-effect model as per the following output:

**Table 04: Output of LM test**



Source: Output developed by STATA 12.0

***5.2 Test of Multicollinearity:***

Multicollinearity causes high pairwise correlation between the regressors of the model explaining the variation in dependent variable ROE measuring the profitability of non-life insurance companies in Bangladesh. According to the following table of pairwise correlation matrix among the explanatory variables, there is a high pairwise correlation value of 0.9373 found between operating income to total asset ratio and operating cost to total asset ratio. Moreover the correlation between debt to equity ratio and debt to total asset ratio is also found 0.9511 which espouse high collinearity between these two explanatory variables that cause multicollinearity problem in the said models.

**Table 05: Correlation Matrix**



Source: Output developed by STATA 12.0

***5.3 Test of Autocorrelation:***

For testing whether the models suffer from the problem of 1st order autocorrelation, we have adopted wooldridge(2002) test for checking the presence of autocorrelation problem in the aforesaid models considering the null hypothesis (Ho) being stated as there is no presence of 1st order autocorrelation in the panel data according to the output mentioned under following table:

**Table 06: Output of wooldridge (2002) test for autocorrelation**

|  |
| --- |
| wooldridge test for autocorrelation in Panel Data |
| Null hypothesis, Ho: There is no first order autocorrelation |
| F-value (1, 3) | 31.583 |
| P-value | 0.0111 |

 Source: Authors’ contribution based on output developed by STATA 12.0

As the F-value of 31.583 stated above is statistically significant at 5% level of significance, we can reject the null hypothesis and conclude that the panel data models suffer from the problem of 1st order autocorrelation.

***5.4 Test of Heteroscadasticity:***

According to the Chi-square value of 16.60 estimated by the modified wald test for groupwiseheteroscadasticity in fixed-effect model mentioned in the following table, we can reject the null hypothesis of holding constant error variance and deduce that the aforesaid fixed-effect model suffers from the problem of non-constant error variance.

**Table 07: Output of Wald test for Heteroskedasticity**

|  |
| --- |
| Modified Wald Test for group Heteroskedasticity in FE regression model |
| Null hypothesis, Ho: σ2i = σ2 for all i |
| Chi-square value | 16.60 |
| P-Value | 0.0023 |

Source: Authors’ contribution based on Output developed by STATA 12.0

***5.5 For Cross-sectional dependence Test:***

Cross sectional dependence is a problem for macro-panel data especially for long time series such as 20 or 30 years. However, we have adopted B-P/LM test of independence considering null hypothesis followed by Ho is that residuals across entities are not correlated and according to the output revealed by following table showing the chi-square value of 6.528 failed to reject the null hypothesis so that we can conclude that residuals are not correlated across the entities suggesting non-presence of cross-sectional dependence.

 **Table 08: Output of L/M test of independence**

|  |
| --- |
| Correlation Matrix of residuals |
|  | e1 | e2 | e3 | e4 |
| e1 | 1 |  |  |  |
| e2 | 0.1298 | 1 |  |  |
| e3 | 0.4155 | 0.4204 | 1 |  |
| e4 | 0.4056 | 0.3491 | -0.0134 | 1 |
| Breusch-Pagan LM test of independence based on 10 complete observations over panel units |
| Chi-square (6) Value = 6.528 |
| P-Value = 0.3667 |

Source: Authors’ contribution based on Output developed by STATA 12.0

***5.6 Unit root test:***

We have conducted LLC unit root test standing for Levin-Lin-Chu unit root test to know whether the mean, variance and covariance of series are stationary assuming the following hypothesis:

– H0: The series is non-stationary or it has a stochastic trend

– H1: The series is stationary or has a non-stochastic trend

We are going to reject H0 if the p-value of the said unit root tests is less than significance level. Otherwise, we do not reject H0. So, the adjusted t-value of -10.5595 mentioned in the following table is statistically significant at 0.1% level suggesting that we can reject the null hypothesis and conclude that the dependent variable ROE measuring profitability of non-life insurance companies in Bangladesh is stationary.

**Table 09: Output of LLC unit root test**

|  |
| --- |
| Levin-Lin-Chu unit-root test for ROE |
| Null Hypothesis, Ho= Panels contain unit root | Number of Panels = 4Number of Periods = 10Asymptotics: N/T – 0 |
| Alternative Hypothesis, H1= Panels are stationary |
| AR parameter: Common |
| Panels means: IncludedTime trend: Not IncludedADF Regressions: 1 lagLR variance: Bartlett Kernel, 6.00 lags average (chosen by LLC) |
|  | Statistic | P-Value |
| Unadjusted t value | -10.9930 |  |
| Adjusted t value | -10.5595 | 0.0000 |

 Source: Authors’ contribution based on Output developed by STATA 12.0

***5.7 Dynamic Panel Data Estimation:***

According to the coefficients estimated by Arellano-Bond Panel Data approach using Generalized Methods of Moments popularly known as GMM revealed under following table, all the explanatory variables except one year lagged values of dependent variable being measured with ROE, operating cost to total asset ratio and debt to total asset ratio are statistically significant at chosen level of significance in explaining the changes in profitability of non-life insurance companies in Bangladesh. When we checked the robustness of the model, the one year lagged values of ROE is found statistically significant at 0.1% level with positive direction in explaining the changes of current year’s profit measured with ROE as the profit of current year has an impact on generating profit consecutively for next year and so on. All other explanatory variables except operating cost to total asset ratio and debt to total asset ratio are statistically significant in explaining the variation or changes in ROE of general insurance companies selected for this paper. The chi-square value showing overall or joint significance of all explanatory variables is also statistically significant at 0.1% level of significance in explaining the variation in ROE measuring profitability of non-life insurance companies in Bangladesh.

**Table 10: Summary of Dynamic Panel Data Estimation for equation number 03 using Arellano-Bond Approach**



Source: Output developed by STATA 12.0

**6.0 Concluding words:**

This paper has accomplished the objective set at earlier stage by revealing how the changes in several insurance industry specific factors can affect the profitability of non-life insurance firms considering the empirical models estimating the coefficients of the corresponding predictors explaining the changes in ROE being dependent variable. Among several estimation approaches we have adopted in revealing the causation between ROE and other industry specific factors as mentioned earlier, Pooled OLS and Cross sectional FGLS have provided the best outcomes as per the model specification test as well as several diagnostic checks. In addition, the Dynamic panel data model adopted by Arellano-Bond Panel Data estimation approach to avoid the problem of endogeneity divulges that profit or loss transferred from revenue account to total assets ratio, premium to total asset ratio, operating income to total asset ratio, debt to equity ratio and size of the firm are significantly affecting the ROE position measuring profitability of non-life insurance firms in Bangladesh. We further deduce that the long term relationship between ROE and these industry-specific factors of insurance firms can be better depicted by constructing a Dynamic fixed effect regression model estimated with error correction approach considering a large volume of data.

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