



How do insurer specific indicators and macroeconomic factors affect the profitability of insurance business? A panel data analysis on the Philippine Non-life Insurance market

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Abstract: The current study examined the association between Insurer-specific indicators and macroeconomics on profitability in Philippine non-life insurance market utilizing the panel data over the period of 2008 through 2012. Return on assets (ROA) and operating ratio were used for profitability. The empirical underpinning revealed that underwriting risk, reinsurance utilization, firm size, financial leverage and input cost significantly affect profitability both in ROA and operating ratio. However, there is no evidence found in the Gross Domestic Product (GDP) and inflation rate on profitability in both ROA and operating ratio. Implications of the findings to the regulating bodies, shareholders and management were discussed.

Key Words: Non-life insurance, insurer specific indicators, macroeconomic factors, profitability

1. INTRODUCTION

In 2015, ASEAN integration will affect almost all of the industries in the Philippines. The aim of this ASEAN integration is to have a free movement of goods, services and investments in the ten (10) member countries of ASEAN nations. There would have a zero tariff for the in the ASEAN Free Trade Areas (AFTA). It was revealed that banks and financial institutions are not yet prepared for the tougher competition (philstar.com, 2014). The need to delve on the ASEAN economic integration indicators in specific industries is important to know the preparedness of company. Determinants of profitability in financial institutions such as insurance company would be one of the useful tools in formulating strategies to formulate a policy. A

sound financial standing in insurance company will still build up the confidence level of the consumer market despite the stiff competition and still penetrate the market.

Insurance company financial soundness plays a pivotal role in the insurance depot consumers and as well as to the company stockholders since this will enable to protect the policyholders against any possible default and determine the volume of policies an insurance company writes. Considering that there is a rigid market rivalry in insurance operations and loosens financial regulations, several Non-life insurance companies invest cash income to refuge underwriting loss from investment profit derived from cash-flow underwriting. This policy is effective especially when the investment environ is stable. However, insurance companies may be caught in a

dilemma of crunching profit coming from underwriting and investment when the investment environment is changing and adversely pressing the interests of shareholders and might be having trouble in off-setting the obligations. Hence, it is a rule of thumb to reflect on the fundamental drivers of value creation such as financial footprints of the level of profitability since environment is ever-changing (Hancock, Huber and Koch, 2001 & Lee, C. Y., 2014).

Well-built profitability margin does not only suffice the regulatory frameworks but also boost the confidence level of shareholders to supply funds and attract policyholders to purchase insurance products. In addition, earning reasonable profit is one of the rationales of the government in regulating insurance business. Therefore in assessing the profitability model, measure of insurer specific ratios and macroeconomic dynamics cannot be discounted.

Various empirical underpinnings deal with the coefficients of profitability focusing on banking sectors (Lee, 2014; Williams, 2003; Vejzavic and Zarafat, 2014). Nonetheless, there is still a limited literature traces conducted on the Non-life insurance industry. Apart from previous research studies in profitability, this study will utilize panel data analysis of Philippine Non-life insurance industry from 2008-2012 to measure the insurance indicators and macroeconomic factors on profitability of Non-life insurance sector. The researcher hypothesized that insurance indicators and macroeconomic variables will have a significant effect on the profitability of non-life insurers. Also, this paper will provide research on profitability determinants applicable to Philippine insurance market. In that same way, it will enable Non-life insurers a reference for formulating a business policies.

2. LITERATURE REVIEW

2.1 Insurer specific indicators and Profitability

Much of extensive variables have found to be significant with insurance companies' profitability (Cummins, J. D. and Nini, G. P. 2002). The size of the firm is significantly related with insurer profitability. Empirically speaking, larger firms are more efficient in cost and revenue allocation and can

generate a greater return (Adams, M. and Buckle, M., 2003). Lee C.-H. (2014) asserted that underwriting risk, reinsurance usage, return on investment and input cost and financial holding groups significantly influence financial performance. Insurers that assume higher leverage can expect a better profitability as compared with those who have lower leverage firms (Lee, H. H. and Lee, C. Y., 2012). While Choi and Weiss (2005) argue that to alleviate exposure to underwriting losses and increase operational profits, the insurers must have more risky business, diversify underwriting risks and better claims handling. The profitability of insurance sector was also linked with the expenses ratio, inflation (Pervan, M. and Pavvic, K. T., 2010), capital allocation (Malik, 2011; Chen, J. S., Chen, M.C., Liao, W.J. and Chen, T.H., 2009), reinsurance, underwriting risks, liquidity ratio and return on investment (Lee and Lee, 2012; Lee, C.-H., 2014; Sabvasim and Ayele, 2013). However, volume of capital, size and liquidity are the most significant determinants of insurance profitability but growth, size and volume of capital are positively related but liquidity ratio and inversely significant.

2.2 Macroeconomic factor and Profitability

Numerous empirical researches take into account the evidence of the link of macroeconomic coefficients and profitability across industry performance. As identified by Grace, M. F. & Hotchkiss, J. L. (1995), the real Gross Domestic Product (GDP) exhibited inverse relationship with premiums and interest rates meanwhile, having reverse effects on the underwriting profits. Research findings asserting the relationship between macroeconomic factors and premium receipt in the life insurance industry showed a positive significance (Chen, T. J. and Huang, M. H., 2001; Browne, M. J., Carson, J. M. & Hoyt, R. E., 2001; Akinlo, T. and Apansile, O. T., 2014; Haiss, P. and Sumegi, K., 2008). Macroeconomic indicators (e.g. GDP growth, inflation and income disparity) impacted the performance of Non-life insurance companies (Doupou, M. and Gaganis, C., 2012).

3. METHODOLOGY

3.1. Research design

The current study employed data panel set analysis in answering the research questions. In gaging the profitability, operating ratio and return on assets (ROA) was utilized. Specifically, the descriptive section will delineates the mean of operating ratio, return on assets and growth rate from 2008 to 2012. Thence, the company might be profitable in core business.

3.2. Data collection

Sixty nine non-life insurance companies were selected through purposive sampling technique. Purposive sampling technique is a non-probability sampling technique which selection is based on the criteria defined by the researcher to reflect the specific purpose of the study (Wooldridge, 2013). The criteria selection includes all the existing companies in all years 2008 through 2012. Data was gathered from Insurance Commission. Consent was sent to Insurance Commission before obtaining a data.

3.3. Data analysis

Operating ratio and ROA was employed to measure the profitability. Operating ratio specifies income/loss before tax operating income from underwriting and investment activities devised as loss ratio plus expense ratio less investment income ratio (Elango and Pope, 2008; Lee, 2014). The current study prefers this formulation since combined ratio discount the investment income. It is a rule of thumb that operating ratio fluctuates below 100% denotes profitable in core business (BarNiv and McDonald, 1992; Jonghag, 2001). Meanwhile, ROA was defined as income/loss before tax divided by average assets. It depicts how efficient the profit earned per dollar of assets generates profit in utilizing the real investment resources (Liebenberg and Sommer, 2008; Chen, J. S., Chen, M. C., Liao and Chen, T. H., 2009). These constructs are affected by the independent variables divulged in Table 1.

Table 1. Definition of variables

Variables	Formulation
Operating ratio (OR)	(Loss ratio + expense ratio) – (investment income ÷ net written

Return on Assets (ROA)	premium) (Net income ÷ loss before tax) ÷ Average assets
Firm size (FS)	Natural logarithm of total assets
Financial leverage (FL)	Total liabilities ÷ total assets
Underwriting risk (UR)	Annual losses incurred (net of loss adjustment expenses) divided by annual written premium
Reinsurance (Re)	The ratio of reinsurance premium ceded to direct business written plus reinsurance assumed ((Investment income of current year) ÷ (assets at the beginning of year + assets at the end of year - net investment income of current year)) ÷ 2
Return on investment (ROI)	Gross written premium ÷ total market gross written premium
Market share (MS)	1 - Line-of-business Herfindahl index
Diversification (Di)	Expense ÷ gross written premium
Input cost (IC)	
Gross Domestic Product (GDP) growth	(GDP _t - GDP _{t-1}) ÷ GDP _{t-1}
Inflation rate (IR)	(CPI _t - CPI _{t-1}) ÷ CPI _{t-1}

Ordinary least square model, fixed effect model and random effect model was used for the analysis of panel data to scrutinize the insurer specific indicators and macroeconomic factors on profitability of non-life insurers. The regression model below was derived from the related literature:

$$\text{Operating ratio} = \alpha + \beta_1 FS_{it} + \beta_2 FL_{it} + \beta_3 UR_{it} + \beta_4 Re_{it} + \beta_5 ROI_{it} + \beta_6 MS_{it} + \beta_7 Di_{it} + \beta_8 IC_{it} + \beta_9 GDP_{it} + \beta_{10} IR_{it} + \epsilon_{it}$$

$$\text{ROA} = \alpha + \beta_1 FS_{it} + \beta_2 FL_{it} + \beta_3 UR_{it} + \beta_4 Re_{it} + \beta_5 ROI_{it} + \beta_6 MS_{it} + \beta_7 Di_{it} + \beta_8 IC_{it} + \beta_9 GDP_{it} + \beta_{10} IR_{it} + \epsilon_{it}$$

where i and t subscript stands for firm i in year t; α is the intercept; β_n is the projected coefficient of

independent variables where $n=1, 2, 3, \dots, 10$; and ϵ as the error term.

Stata (Stata 12.0) was used to calculate for the mean, standard deviation, variance inflation factor (VIF), ordinary least square model (OLS) model, fixed effects model and random effects model.

4. EMPIRICAL RESULTS

4.1. Descriptive statistic

Table 2 illustrates the descriptive statistics and variance inflation factors (VIF) of variables. It depicts the mean of the operating ratio, return of assets (ROA) and firm size of sampled companies between 2008 and 2012 which are 27.40 and 6.22 correspondingly, showing stiff competition in the Non-life insurance market, wherein maximizing firm size was hard to achieve and profits were limited. It just demonstrates slow movement of profit margin of the Non-life insurance sector. In scrutinizing the effect of insurer specific factors and macroeconomics on profitability for Non-life insurance companies, Ordinary Least Square (OLS) regression model, fixed effect model (FEM) and random effect model (REM) are initially run and then employed Hausman test to determine the best fit model. Subsequently, Hausman test will verify between FEM and REM that best fit the study data. Low correlation between explanatory variables was found out upon running the correlation efficient analysis. VIF calculation was also performed for each explanatory variable and shown that market share and diversification are more than four, indicating a multicollinearity predicament (Wooldridge, 2013). Consequently, multicollinearity will not significantly affect the regression modeling. The present study examined the profitability construct with regression model based on operating ratio and ROA. The Hausman test also showed that FEM is a better estimator than REM in both model model.

Table 2. Basic statistics and VIF

Variables	Mean	SD	Min	Max	VIF
OR	27.4	22.1	-133.33	70.6	-
ROA	0.025	0.042	-0.16330	0.1767	-

FS	6.269	1.001	4.595	9.749	3.67
FL	0.396	0.206	0.02	0.98	2.09
UR	31.553	18.679	-116.42	73.69	1.36
Re	0.768	1.479	0.00	17.71	1.15
ROI	5.675	12.298	-62.65	143.27	1.10
MS	0.012	0.02	0.0001	0.164	14.33
PD	7.662	28.783	0.00	269.28	8.01
IC	1.349	1.439	0.41	15.43	1.12
GDP	0.044	0.022	0.011	0.073	1.06
IR	0.049	0.023	0.032	0.093	1.07

4.2. Insurer specific indicators and macroeconomic factors on profitability – operating ratio

Table 3 demonstrates assessment of the parameters from the FEM on operating ratio. The empirical underpinning shows that underwriting risk, reinsurance usage, input cost and inflation rate are significantly and positively correlated with operating ratio. An increase in underwriting risk elevates the operating ratio which can adversely affect the firm's profitability. This depicts that as Non-life insurers accepts risk, the management must maintain a better guidelines to reduce exposure prior to acceptance of risk. The findings were consistent with the study of (Gatzlaff, 2009; Adams and Buckle, 2003; Lee and Lee 2012; Lee, 2014). Reinsurance utilization shows a positive relationship with operating ratio ($p < 0.05$). Given that insurers that are reinsurance dependence cedes more business to reinsurers and keeps lower retention, they are more similar to operate like a reinsurance broker who only transfers risk lacking underwriting risk exposure which could generate less profit for a relatively high proportion of the premium received is ceded to reinsurers (Lee and Lee 2012; Lee, 2014). The positive correlation of input cost implying that higher

input cost increases firm's operating ratio causing decrease in firm's efficiency. Thus efficient firms most likely capture higher profit margin than competitors (Adams and Buckle, 2003; Gatzlaff, 2009; Pervan and Pavic, 2010; Lee, 2014). Positive significant correlation of inflation rate is due to its unanticipated rates affecting the projections of the company. Diversification will facilitate underwriting risks to mitigate exposure to underwriting losses ex-ante causing lower operating ratio and improve operational profits (Adams and Buckle, 2003). On the other hand, market share, financial leverage and firm size are negatively correlated with operating ratio. The present study finds that greater market share is positively related to lower operating ratio creating more profit and achieve optimal economies of scale since it has ability to boost market advantage and to set prices (Choi and Weiss, 2005). The negative correlation between financial leverage and operating ratio indicates that leveraging the firm will lower the capital required to operate the business, but highly financial leverage firm could result to lower market value, reducing firm's profit and later on leading to solvency issues (Adams and Buckle, 2003; Lee and Lee 2012; Malik, 2011; Sabvasim and Ayele, 2013). The significant and negative correlation between firm size and operating ratio was also found in this study. Larger firm are more cost efficient, which implies lower operating cost leading to greater premium growth (Cummins and Nini, 2002; Lee and Lee 2012; Sabvasim and Ayele, 2013). Other variables such as GDP was found to be positively correlated with operating ratio, while ROI exhibits negative correlation with operating ratio, but found no significant correlation in this study.

Table 3. Operating ratio (FEM Model)

Variables	Coefficient	t-statistic	p value
Intercept	1.167	0.75	0.8
FS	-2.065	-3.02	0.053*
FL	17.076	6.79	0.0001***
UR	1.0195	59.02	0.001***
Re	-0.8669	-6.24	0.0001***

ROI	0.0342	1.54	0.232
MS	204.197	1.22	0.049**
PD	-0.1158	-1.00	0.132
IC	-1.37	-10.86	0.001***
GDP	-11.904	-0.22	0.298
IR	45.081	-0.02	0.1*
Obs		345	
Adj R ²		0.9394	

Note 1: *, **, *** level of significance at 10%, 5%, 1%.

Note 2: The Hausman test value in H0: REM vs. H1: FEM is 0.0415, significant, supporting FEM as the best fit model.

4.3. Insurer specific indicators and macroeconomic factors on profitability – FEM

Table 4 shows assessment of the parameters from FEM on ROA. The result suggest that apart from ROI indicative of negative significant correlation with ROA; firm size, financial leverage, underwriting risk, reinsurance utilization and input cost are consistent with the results of operating ratio, specifying consistency in the results of both tests. The negative correlation between ROI and ROA recommends that an insurance company with healthier ROI have some perks of competitive advantage, which could result in better profit (Lee and Lee 2012; Gatzlaff, 2009; Lee, 2014). Other variables such as market share and inflation are positively correlated with ROA. However, diversification, GDP and inflation rate exhibits negative correlation with ROA, but are not significantly different from zero.

Table 3. Operating ratio (FEM Model)

Variables	Coefficient	t-statistic	p value
Intercept	0.921	-2.09	0.921
FS	0.013	3.98	0.1*
FL	0.043	-3.84	0.034**



UR	-0.0003	-2.92	0.009***
Re	0.0004	0.87	0.091*
ROI	0.002	13.36	0.0001***
MS	-0.022	-0.09	0.615
PD	-0.0001	-0.54	0.553
IC	-0.002	-1.54	0.001*
GDP	-0.013	-0.16	0.85
IR	0.025	0.21	0.87
Obs		345	
Adj R ²		0.4491	

Note 1: *, **, *** level of significance at 10%, 5% and 1%.

Note 2: The Hausman test value in H0: REM vs. H1: FEM is 0.0001***, significant, following FEM as better estimator.

5. CONCLUSION AND IMPLICATION

The present study investigates the footprint of insurer specific indicators and macroeconomic factors on profitability using data gathered from Philippine Non-life insurance market over 2008 through 2012 time lapse. The empirical underpinning find that firm size, financial leverage, underwriting risk, reinsurance utilization and input cost have significant control on profitability in both operating ratio and ROA models, however macroeconomics variables have no significant effect on both models. The result suggests that low underwriting risk, low reinsurance utilization low input cost and smaller firm size fabricates positive effect on the profitability. In addition, highly financial leverage firm could have negative consequence on the profitability since it lowers the market value of the firm. Hence, Non-life insurers should conduct careful estimation and take into deliberation insurer specific indicators and macroeconomics factors have influence the profitability of the firm before implementing policies seeking for profit and competitiveness.

Given the observation discussed, the current

study emphasizes some important policy implications for Non-life insurance industry practitioners and regulating bodies. First, should the underwriting risks increases, underwriters must purchase more reinsurance to diversify risk and avoid insolvency problems. Thus, underwriters must have expertise on the trade-off between decreasing insolvency risk and reducing potential profitability (Lee, 2014). Second, many life insurance and other financial services company existed for several years operating under unexploited economies of scale manifested in higher input cost thereby reduces firm's profit (Hardwick, 1997). Herein, decision makers must consider the fact that higher input costs impacted the ability to earn higher returns over the competitors. Third, this will provide empirical footprints especially in reference to the 10 members of the ASEAN Economic Community (AEC). The Insurance Commission revealed that there are five to eight Non-life Insurance Companies for sale at the end of 2016. This basically comprises of the companies coming from small scale in size. The ASEAN Integration is pressing the industry players giving the need to delve on the predictors of profitability. Finally, an insurer specific indicator is associated with firm's profitability, however insignificant with the macroeconomic factors. Therefore, researchers can further delve on the explanatory power of macroeconomic factors in the firms' profitability and stretch the years in the future and can do prediction on the probability of the efficiency of the market using the same model.

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