Do Macroeconomic Factors Effects CARAMELS Financial Soundness Indicators? A Context of Non-Life Insurance Industry in Pakistan

Saghir Pervaiz Ghauri*, Nadir Ali**, Zahid Ali Chanar***, Shahid Obaid****

Abstract

The research is carried out to find out the relationship of macroeconomic factors with the financial soundness indicators of CARAMELS framework for the non-life insurance industry, by using a panel data set of 22 non-life insurance companies of Pakistan from the year 2007 to 2016. The study is established on the most applicable panel data technique (random-effects model). The Hausman test proves that the random-effects model is suitable for the macroeconomic factors' study. Based on the highest number of relationships among the variables, the results of the random-effects model indicate that macroeconomic factors (inflation and economic growth) have insignificant relation with the CARAMELS financial soundness indicators. According to the author's best knowledge, it is the first study that identifies the relationship of macroeconomic factors with the CARAMELS financial soundness indicators, which will assist the scholars, managers and policymakers of the non-life insurance industry of Pakistan to consider the significant factors.

Keywords: *Macroeconomic factors; CARAMELS FSIs; financial soundness; non-life insurance industry*

JEL Classification*: E00, E23*

INTRODUCTION

The non-life insurance companies facilitate mobilization of funds, risk-sharing, savings and investment in the economy which leads towards economic development. The well-established insurance industry is beneficial for economic growth, for instance, it delivers long term reserves for economic progress. Over the last decade, factors which affect the profitability of non-life insurance companies have remained under attention in many pieces of research that the effects of the macroeconomic factors on financial performance (i.e. return on assets) of the non-life

Correspondence:

* Associate Professor, Jinnah University for Women, Karachi, Pakistan. saghir.ghauri@gmail.com

** OS-II, Summit Bank Limited - Head Office, Pakistan.

*** Dean, Department of Business Administration, Sindh Madressatul Islam University, Pakistan

**** Lecturer, Department of Business Administration, Sindh Madressatul Islam University, Pakistan

Corresponding author's e-mail: ch.nadirali80@gmail.com

insurance companies and numerous empirical studies have been conducted by the preceding scholars (Almajali, Alamro & Al-Soub, 2012; Ana-Maria & Ghiorghe, 2014; Ćurak, Pepur & Poposki, 2011; Doumpos, Gaganis & Pasiouras, 2012; Kozak, 2011; Pervan & Pavić, 2010; Saeed & Khurram, 2015). However, research by Dar and Thaku, 2015 indicated that the insurance companies' performance can be measured by numerous indicators and they used three financial soundness indicators (FSIs) which are Earnings & Profitability, Liquidity and Management Soundness out of the CARAMELS core set of FSIs to analyze the insurance companies' financial performance. Athawale and Fernandes (2016) also conducted empirical research on the insurance industry and pointed out that the performance can be estimated by using CARAMELS ratios.

CARAMELS Framework

CARAMELS framework had proposed by Das et al., (2003) and then it was duly endorsed by the IMF for the adoption of the supervisory and regulatory body as an individual parameter. It is a ratio-based model for assessing the financial performance of the insurance industry. Aimed at the measurement of non-life insurance industry's financial soundness, as well as the separate insurers, the suggested financial soundness indicators have been categorized into two sets on the basis of data availability, significance and requirements. These two sets of financial soundness indicators were established in comparison with the cumulative risks of the non-life insurance industry, which are known as the 'core set' and the 'encouraged set'. Table – 1 (Description of Variables) presents the core set of indicators which are considered as compulsory for sufficient surveillance of the non-life insurance companies are selected in this study. It shields those features which have a dynamic status for measuring the non-life insurance companies' financial soundness and its data are voluntarily obtainable. However, two ratios of CARAMELS' asset quality = "(real estate+ unquoted equities +debtors)/total assets" and "receivables / (gross premium+ reinsurance recoveries)", one ratio of CARAMELS' reinsurance and actuarial issues = net technical reserve / last 3 years avg. net claim paid, one ratio of CARAMELS' sensitivity-to-market risk = (net open foreign exchange position/ capital) and one ratio of CARAMELS' liquidity = liquid assets/ current liabilities have been omitted in this paper, caused by the unavailability of the required data. According to the IMF researchers, these financial soundness indicators are valuable and the non-life insurance companies must relate these ratios for the purposes of performance analysis with their peers. The contributing factors that disrupt the non-life insurance industry's financial soundness have become an immense business research concern in Pakistan. In this regard, the macroeconomic factors that broadly affects non-life insurance industry's financial soundness are segregated below.

Macroeconomic Factors

Macroeconomic factors are the external factors which affect the financial soundness and these factors are uncontrollable for the non-life insurers. A total of two macroeconomic factors are included in the study which includes economic growth (EG) and inflation (IR). Both of these variables included in the study were carefully taken into account on the bases of available quantitative data as well as depending upon the existing literature. Descriptions of these variables and their effects on the financial soundness of the non-life insurance industry are explained in the study. Most of the empirical studies pertaining to the non-life insurance companies are focusing on ROA, for the performance measurement (Almajali, et al., 2012;

Ana-Maria & Ghiorghe, 2014; Ćurak, et al., 2011; Doumpos, et al., 2012; Kozak, 2011; Pervan & Pavić, 2010; Saeed & Khurram, 2015) prescribed CARAMELS framework for assessing the insurance companies' financial soundness. Empirical studies on the insurance industry (Dar and Thaku, 2015; Athawale and Fernandes, 2016) indicated that performance can be estimated using traditional financial ratios such as CARAMELS. In this regard, only a small number of existing studies are available to pertain to the non-life insurance industry in Pakistan as well as CARAMELS FSIs. This empirical study observes the uncontrollable factors of the non-life insurance industry, which affects the financial soundness. The study mainly contributes by starting comprehensive research on the macroeconomic factors which effects the CARAMELS framework's financial soundness indicators. The research has not been conducted before in Pakistan and consequently, it will fulfil the research gap in the literature.

The prosperous set-up of insurance companies can establish verve for economic growth in the country. Therefore, the industry is anticipated to be financially resilient. According to Das et al., 2003, CARAMELS framework indicators are considered as some of the most significant financial soundness indicators. Many types of research have recognized a number of macroeconomic factors that affect non-life insurance industry' financial performance or profitability (Hailegebreal, 2016; Almajali et al., 2012). However, whether these macroeconomic factors' effects on the CARAMELS financial soundness indicators is an important business researchable area and put forward the researcher to examine the effects. Hence, to identify the macroeconomic factors' effects on the CARAMELS FSIs of the non-life insurance industry of Pakistan is the problem which needs to be examined.

The literature review demonstrates that most of the researches that pertain to the non-life insurance have been conducted by considering the return on assets(ROA) as a financial performance (or profitability) indicator of the scholars' respective countries (Hailegebreal, 2016; Almajali et al., 2012). However, according to the author's best knowledge, there is no study that identifies the relations of macroeconomic factors with the CARAMELS financial soundness indicators. In view of that, this study is designed to fulfil the gap and motivate researchers towards this research area. Therefore, the study aims to identify the factors which affect the financial soundness indicators of CARAMELS Framework and it will also assist the managers and policymakers of the non-life insurance industry of Pakistan to consider the significant factors.

Precisely, the research is designed to evaluate the effects of macroeconomic factors on the financial soundness of non-life insurance industry of Pakistan and to deliver recommendations which pertain to the fundamental drivers of the financial soundness, on the basis of the empirical findings. The research work is based on the macroeconomic factors which affect the financial soundness of the industry in Pakistan. According to the statistics of the Insurance Association of Pakistan (IAP), there are 28 non-life insurance companies as of December 31st, 2016. However, subject to the availability of the required data, 22 companies are incorporated in the study, from the year 2007 to 2016.

LITERATURE REVIEW

The existing literature indicates no proof of similar studies in Pakistan or abroad which evaluates the effects of macroeconomic factors on the CARAMELS financial soundness

indicators (FSIs) of the non-life insurance companies. Conversely, the relevant literature covered by researchers has been summarized and identified a few macroeconomic factors which affect the profitability (or financial performance) of the non-life insurance companies (Ana-Maria & Ghiorghe, 2014; Chen-Ying Lee, 2014; Hailegebreal, 2016; Mwangi & Murigu, 2015). However, Dar and Thaku, 2015, indicated that the insurance companies' performance can be measured by numerous indicators and they used three financial soundness indicators which are Earnings & Profitability, Management Soundness and Liquidity from the CARAMELS framework (Core set of FSIs) to analyze insurance companies' financial performance.

Burca & Batrînca, 2014, have identified the factors which affect the Romanian insurance market's financial performance, by working on the 21 insurance companies' data from the year 2008 to 2012. In this regard, 13 variables have been tested which includes no. of years of operations in the Romanian market, gross written premiums growth, insurance financial leverage, company size, total market share, equity, underwriting risk, diversification, re-insurance dependence, investment ratio, GDP growth/capita, solvency margin and retained risk ratio. The return on assets ratio used as a financial performance indicator. The author exposed by relating particular panel data techniques that the Romanian insurance market's financial performance determinants are company size, insurance financial leverage, underwriting risk, gross written premiums growth, solvency margin and risk retention ratio.

Lee, (2014), conducted a study covering a decade from 1999 to 2009, mainly focusing on the effects of macroeconomic and firm-specific factors on the property-liability insurance companies' profitability in Taiwan. In the study, profitability is assessed through ROA and operating ratio. The results show profitability is significantly affected by reinsurance usage, underwriting risk, return on investment, input cost and a financial holdings group member. In addition, financial leverage is negatively and significantly associated with the ROA, while the market share has significant and negative effects on operating ratio. The outcomes demonstrate that the rate of economic growth has a significant relation with the operating ratio. Moreover, firm growth, firm size, inflation rates and diversification are not significantly correlated with profitability. Ana-Maria & Gheorghe, 2014, identified the determinants of Romanian insurance market's financial performance and found that solvency margin, gross written premiums growth, underwriting risk, financial leverage and company size are significant determinants of the insurance industry's profitability.

Doumpos et al. (2012) assessed the performance of non-life insurance companies and found that the macroeconomic variables which include inequality of income, inflation and GDP growth effects on the performance of the firm. Pervan and Pavić (2010) have examined the profitability determinants of non-life insurance companies in Croatia, from the year 2003 to 2009. The selected explanatory variables (profitability determinants) include macroeconomic, industry-specific and insurance-specific variables. The research outcomes indicate inflation, ownership and expense ratio have a significant and negative influence on the profitability. The preceding empirical studies (Ćurak et al., 2011; Pervan & Pevic, 2010) tested the impacts of macroeconomic, firm-specific and industry-specific factors on the composite insurance companies' financial performance in Croatia. The outcomes indicate that inflation has a significant relationship with the financial performance of composite insurance companies. The additional possible determinant of profitability is the GDP growth rate in the insurance industry, it has been identified in Poland that GDP growth rate contributes positively to the

insurance companies' profitability (Kozak, 2011).

Bilal, Khan, Tufail and Ul-Sehar (2013) identified the profitability determinants in Pakistan, using the 31 insurance companies' panel data, from the year 2006 to 2011 and demonstrated that the significant determinants of profitability are earning volatility, leverage, age of the company and size. However, liquidity and growth opportunities are non-significant profitability determinants. Malik, 2011, has conducted a study on the insurance companies' profitability determinants in Pakistan, by using 34 insurance companies' data from the year 2005 to 2009. The outcomes of the empirical study indicated that the size of the company and the volume of capital are significantly and positively associated with the profitability. The leverage and loss ratio shows an inverse and significant relation with profitability. However, the study doesn't found evidence for the relationship between profitability and age of the company.

The existing literature pertains to the non-life companies' financial performance generally expressed that return on assets(ROA) is an important sign of financial performance or profitability. Conversely, Das et al., 2003, proposed the CARAMELS Financial Soundness Indicators (FSIs) which is a ratio based indicators of assessing the insurance companies' financial soundness and financial performance. Insurance industry's quantitative soundness indicators can be accessible within the CARAMELS [Capital adequacy; Asset quality; Reinsurance & Actuarial issues; Management soundness; Earnings & profitability; Liquidity & Sensitivity to market risk] framework. Dar and Thaku, 2015, indicated that the insurance companies' performance can be measured by numerous indicators and they used three financial soundness indicators which are Earnings & Profitability, Management Soundness and Liquidity from the CARAMELS framework (Core set of FSIs) to analyze the insurance companies' financial performance. He concluded for the first indicator of "earnings and profitability" that the first three ratios (claim ratio, expenses ratio and combined ratio) are considered to be minimal for the prolonging and positive insurance companies' performance. Whereas the other two ratios (investment income ratio and ROE ratio) are preferred to be on the lower side. The second indicator is "Management Soundness" under which ratio of operational expenditure to gross premium has been analyzed which is again preferred to be on the lower side. The last indicator is "Liquidity" under which the ratio of quick assets to current liabilities has been statistically analyzed which is always preferred to be on the higher side. Alamelu, 2011, studied Indian life insurance companies' financial soundness by using the CARAMELS FSIs. The author found that the Indian insurance sector was ruled by the state-owned Life Insurance Corporation (LIC) and General Insurance Corporation (GIC).

Chakraborty, 2016, assessed the financial efficiencies of 04 general insurance companies of the Indian public sector, in contradiction of the conditions of the US financial crisis of the year 2007-08. Based on CARAMELS FSIs and by using data from the year 2008-09 to 2014-15, the author has concluded that the United India general insurance company is a top-performing company among other general insurance companies of Indian public sector. Ghimire (2013) conducted an Empirical Study on the non-life insurance industry's financial efficiency in Nepal, by using data from the year of 2006 to 2011, to assess the non-life insurers' financial soundness of private sector, on the basis of CARAMELS model as recommended by the IMF researchers (Das et al., 2003). The author used "capital adequacy"; "asset quality"; "reinsurance and actuarial Issues"; "management efficiency"; "earnings and profitability"; and "liquidity"; indicators. The empirical outcomes indicate non-life insurance companies' financial soundness has been

improving gradually in Nepal. Jansirani and Muthusamy (2019) also conducted a study on four public sector non-life insurance companies' financial performance in India, by using the data of five years from 2012-13 to 2016-17. They evaluated the financial efficiency of these companies by using the ratios of CARAMEL model. They concluded that the risk retention ratio of these companies is in good progress and they are more towards asset base but on the contrary, the management efficiency, as well as risk retention norms, are towards downwards trend. However, they are using the advances and loans in order to meet the losses of underwriting.

Hypotheses

H_1: There is a relation between the macroeconomic factors and capital adequacy (CA1) of the non-life insurance industry.

H_2: There is a relation between the macroeconomic factors and capital adequacy (CA2) of the non-life insurance industry.

H_3: There is a relation between the macroeconomic factors and asset quality (AQ) of the non-life insurance industry.

H_4: There is a relation between the macroeconomic factors and reinsurance & actuarial issues (RA) of the non-life insurance industry.

H_5: There is a relation between the macroeconomic factors and management soundness (MS1) of the non-life insurance industry.

H_6: There is a relation between the macroeconomic factors and management soundness (MS2) of the non-life insurance industry.

H_7: There is a relation between the macroeconomic factors and earnings & profitability (EP1) of the non-life insurance industry.

H_8: There is a relation between the macroeconomic factors and earnings & profitability (EP2) of the non-life insurance industry.

H_9: There is a relation between the macroeconomic factors and earnings & profitability (EP3) of the non-life insurance industry.

H_{10}: There is a relation between the macroeconomic factors and earnings & profitability (EP4) of the non-life insurance industry.

H_{11}: There is a relation between the macroeconomic factors and earnings & profitability (EP5) of the non-life insurance industry.

METHODOLOGY

The study primarily employed quantitative research approach, based on the secondary data and entails the use of multiple regression method to test the hypotheses. In addition, panel data analysis has been conducted by using E-Views 7 for concluding the results.
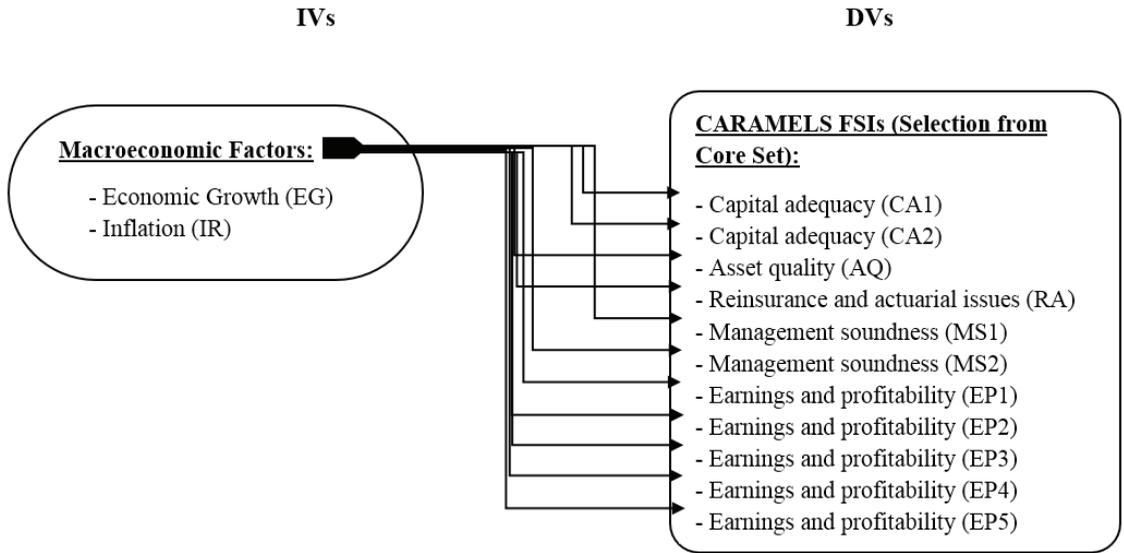
Figure 1:

Depiction of Variables

Table 1: Depiction of Variables

Variables		Measurements	Source
		$(CA\ 1) = \dfrac{\textit{Net premium}}{\textit{Capital}}$	
	Capital adequacy	$(CA\ 2) = \dfrac{\textit{Capital}|}{\textit{total assests}}$	
	Asset quality	$(AQ) = \dfrac{\textit{equities}}{\textit{total assests}}$	
	Reinsurance and actuarial issues	(RA) Risk retention ratio $= \dfrac{\textit{net premium}}{\textit{gross premium}}$	
Dependent variables (CARAMELS Financial Soundness Indicators)	*Management soundness*	$(MS1) = \dfrac{\textit{gross premium}}{\textit{no. of employees}}$	*Das et al., 2003; World Bank, 2005*
		(MS2) assets per employee $= \dfrac{\textit{total asset}}{\textit{no. of employees}}$	
		$(EP\ 1) =$ Loss ratio $= \dfrac{\textit{net claims}}{\textit{net premium}}$	
	Earnings & profitability	(EP 2) Expense ratio $= \dfrac{\textit{expense}}{\textit{net premium}}$	
		(EP 3) Combined ratio $=$ expense ratio+ loss ratio	
		$(EP\ 4) = \dfrac{\textit{investment income}}{\textit{net premium}}$	
		$(EP\ 5) =$ Return on equity (ROE)	

Independent variables (Macro-economic)	Inflation 1	$(IR) = \dfrac{CPI_n - CPI_{(n-1)}}{CPI_{(n-1)}}$	Doumpos et al.,2012
	Economic Growth 2	$(EG) = \dfrac{GDP_n - GDP_{(n-1)}}{GDP_{(n-1)}}$	Hailegebreal, 2016

Note: Compiled by the Scholar Based on Previous Studies.

According to the insurance association of Pakistan (IAP), there are 28 non-life insurance companies listed as of December 31st, 2016. All of these insurance companies are selected in the study, from the year 2007 to 2016. However, the total of 6 companies having missing data because of constitutional reason or their commencement after 2007 or some other reason has been omitted in the study. Quantitative secondary data is used in the research work, whereas, macroeconomic factors which include Inflation Rate (IR) and Economic Growth (EG) are collected from the World Bank's database. However, the financial soundness (selected CARAMELS framework indicators) of the non-life insurance industry is calculated by using the available data on the statistics of Insurance Association of Pakistan (IAP), the data received from the Securities and Exchange Commission of Pakistan (SECP) and the respective annual reports. Models of multiple regression are used to identify the effects of macroeconomic (Economic Growth (EG) and Inflation (IR)) factors on the financial soundness (selected CARAMELS framework indicators) of the non-life insurance industry in Pakistan, by following the below mentioned regression equation:

$$y = \beta_0 + \beta_1\, EG_{n,t} + \beta_2 IR_{n,t} + \varepsilon_{n,t}$$

Here,

β_0 = Constant

$\varepsilon_{n,t}$ = Error factor for the company n at year t

$\beta_{1,2,3,\dots,12}$ = Parameters for estimation

n = number of company from 1 to 22

t = number of year from 2007 (i.e. 1) to 2016(i.e. 10)

y = CARAMELS FSIs:
- Capital Adequacy (CA)
- Asset Quality (AQ)
- Reinsurance & Actuarial issues (RA)
- Management Soundness (MS)
- Earnings & Profitability (EP)

1. *Inflation (IR) is measured by the rate of Consumer Price Index (CPI).*
2. *Economic Growth (EG) is measured by the rate of Gross Domestic Product (GDP).*
3. *The World Bank Data Retrieved from https://data.worldbank.org/country/pakistan (accessed on 01/10/2017)*

All of the variables were organized in a panel database of E-Views 7 and the models are analyzed by applying random effects, referring to the Hausman test results. The data consist of multiple observations of each selected non - life insurance company and the estimations are based on the panel data.

Empirical Analysis

Using E-Views 7, the study highlights the outcomes of specific analyses methods of the panel data for identifying macroeconomic factors' effects on the financial soundness of Pakistan's non-life insurance industry. At the first step, the unit root (stationarity) of all factors is tested by using the Levin, Lin & Chu category test. However, the inflation (INF) and economic growth (EG) are the same for all companies, so, the Augmented Dickey-Fuller (ADF) category test is suitable. The perspective of economics is, stationary time series' astonishments are short-term and with the passage of time, the astonishments effects will be absorbed. At the significance level of 5%, the unit root deficiency is estimated for the data of all factors.

Table 2: Stationarity Test (Unit Root)

Based on the data of 22 non-life insurance companies of Pakistan, from the year 2007 to the year 2016, the results of the unit root test demonstrate in table-2 that series in the analyses are stationary. Table-3 represents Hausman test results by using the panel data of 22 non - life insurers from the year 2007 to the year 2016, the null hypothesis under which the appropriate model is a random effect.

Variables	Factor	Test Type	Prob.
Inflation (INF)	*Macroeconomic*	*Augmented Dickey-Fuller*	*0.0000*
Economic Growth (EG)	*Macroeconomic*	*Augmented Dickey-Fuller*	*0.0000*
Capital Adequacy (CA1)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Capital Adequacy (CA2)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Asset Quality (AQ)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Reinsurance and Actuarial Issues (RA)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Management Soundness (MS1)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Management Soundness (MS2)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Earnings and Profitability (EP1)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0001*
Earnings and Profitability (EP2)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0016*
Earnings and Profitability (EP3)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0003*
Earnings and Profitability (EP4)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*
Earnings and Profitability (EP5)	*CARAMELS FSIs*	*Levin, Lin & Chu*	*0.0000*

Note: Results computed by using panel data on eviews7.

Table 3: Hausman Test for Macroeconomic Factors

Dependent variable (CARAMELS FSIs)	Independent Variables	Hypothesis	Chi-Sq. d.f.	Prob.
CA1	*Macroeconomic Factors*	*01*	*02*	*1.0000*
CA2	*Macroeconomic Factors*	*02*	*02*	*1.0000*
AQ	*Macroeconomic Factors*	*03*	*02*	*1.0000*

RA	*Macroeconomic Factors*	*04*	*02*	*1.0000*
MS1	*Macroeconomic Factors*	*05*	*02*	*1.0000*
MS2	*Macroeconomic Factors*	*06*	*02*	*1.0000*
EP1	*Macroeconomic Factors*	*07*	*02*	*1.0000*
EP2	*Macroeconomic Factors*	*08*	*02*	*1.0000*
EP3	*Macroeconomic Factors*	*09*	*02*	*1.0000*
EP4	*Macroeconomic Factors*	*10*	*02*	*1.0000*
EP5	*Macroeconomic Factors*	*11*	*02*	*1.0000*

Note: Results computed by using panel data on E-Views 7.

At 5% significance level, table - 3 shows Hausman test results for macroeconomic factors that we fail to reject the null hypothesis. Therefore, the random effect cross-section implicates in the multiple least square equations.

Hypotheses Testing

Hypotheses 1 to 11 shows the effects of macroeconomic factors on the CARAMELS financial soundness indicators by using the panel data of 22 non-life insurers from 2007 to 2016. The null hypotheses under which the macroeconomic factors have no relation with the CARAMELS FSIs of the non-life insurance industry in Pakistan.

H_1: There is a relation between the macroeconomic factors and capital adequacy (CA1) of the non-life insurance industry.

Table 4: Random Effects Model

Variables	Coeff.	Std. Err.	t -Stat.	Prob.
C	*0.228911*	*0.590524*	*0.38764*	*0.6987*
INF_?	*6.061925*	*2.234892*	*2.712402*	*0.0072*
EG_?	*16.03232*	*8.386903*	*1.91159*	*0.0572*
R –squared	*0.041246*			
Adjusted R –squared	*0.032409*			
F –statistic	*4.667705*			
Prob (F –statistic)	*0.010357*			

Table 4 explains random-effects model's results that inflation (INF) has a significant and positive relationship with the capital adequacy (CA1) at the significance level of 5%, and the economic growth (EG) has an insignificant and positive relationship with the capital adequacy (CA1). The R-squared value indicates that the independent variables describe 4.12% variations in the dependent variable (CA1). F-statistics indicates the model's validity, as the value 4.67 is greater than the Prob (F-statistics) value 0.01.

H_2: There is a relation between the macroeconomic factors and capital adequacy (CA2) of the non-life insurance industry.

Table 5: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.476972	0.095418	4.998747	0
INF_?	-0.601586	0.361002	-1.666434	0.0971
EG_?	-2.949767	1.354735	-2.177375	0.0305
R –squared	0.024218			
Adjusted R –squared	0.015225			
F –statistic	2.692881			
Prob (F- statistic)	0.069948			

Table 5 explains random-effects model's results that inflation (INF) has an insignificant and negative relation with the capital adequacy (CA2) and economic growth (EG) has a significant and negative relationship with the capital adequacy (CA2) at 5% significance level. The value of R –squared indicates that the independent variables describe 2.42% variations in the dependent variable (CA2). F - Statistics indicate the model's validity, as the value 2.69 is greater than the Prob (F - statistics) value 0.07.

> H_3: There is a relation between the macroeconomic factors and asset quality (AQ) of the non-life insurance industry.

Table 6: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.440257	0.069731	6.313647	0
INF_?	0.0152	0.264972	0.057364	0.9543
EG_?	0.570993	0.994365	0.574228	0.5664
R –squared	0.007623			
Adjusted R –squared	-0.001523			
F –statistic	0.833466			
Prob (F –statistic)	0.435927			

Table 6 explains random-effects model's results that inflation (INF) and economic growth (EG) have an insignificant and positive relationship with the asset quality (AQ), as the probability value associated to the respective variable is greater than 5% significance level. The R-squared value indicates that independent variables describe 0.76% variations in the dependent variable (AQ). F - Statistics indicates the model's validity, as the value 0.83 is greater than the Prob (F - statistics) value 0.43.

> H_4: There is a relation between the macroeconomic factors and reinsurance & actuarial issues (RA) of the non-life insurance industry.

Table 7: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.363845	0.080229	4.535099	0
INF_?	0.891301	0.310083	2.874397	0.0045
EG_?	2.768694	1.163651	2.379316	0.0182

R –squared	*0.038301*
Adjusted R –squared	*0.029437*
F –statistic	*4.321124*
Prob (F –statistic)	*0.014447*

Table-7 explains random-effects model's results that inflation (INF) and economic growth (EG) has a significant and positive relationship with the reinsurance and actuarial issues (RA), as the probability value associated to the respective variable is less than the significance level of 5%. The value of R-squared indicates that independent variables describe 3.83% variations in the dependent variable (RA). F - Statistics indicate the model's validity, as the value 4.32 is greater than the Prob (F - statistics) value 0.01.

> H_5: There is a relation between the macroeconomic factors and management soundness (MS1) of the non-life insurance industry.

Table 8: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	10314.7	2344.629	4.399288	0
INF_?	-32967.29	9421.812	-3.499039	0.0006
EG_?	-46098.27	35357.34	-1.303782	0.1937
R –squared	0.136198			
Adjusted R –squared	0.128237			
F –statistic	17.10752			
Prob (F –statistic)	0			

Table 8 explains random-effects model's results that economic growth (EG) has an insignificant and negative relation with the management soundness (MS1). Inflation (INF) has a negative and significant relationship with the management soundness (MS1), as the probability value associated with the respective variable is less than the significance level of 5%. The value of R –squared indicates that independent variables describe 13.62% variations in the dependent variable (MS1). F - Statistics indicate the model's validity, as the value 17.11 is greater than the Prob (F - statistics) value 0.00.

> H_6: There is a relation between the macroeconomic factors and management soundness (MS2) of the non-life insurance industry.

Table 9: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	17418.45	10228.75	1.702891	0.09
INF_?	-27746.87	38160.44	-0.727111	0.4679
EG_?	15281.27	143205.1	0.106709	0.9151
R –squared	0.018844			
Adjusted R –squared	0.009801			
F –statistic	2.083796			
Prob (F –statistic)	0.12694			

Table 9 explains the results of the random-effects model that economic growth (EG) has an insignificant and positive relationship with the management soundness (MS2). Inflation (INF) has an insignificant and negative relation with the management soundness (MS2), as the probability value associated with the respective variable is greater than a 5% significance level. The R-squared value indicates that independent variables describe 1.88% variations in the dependent variable (MS2). F - Statistics indicate the model's validity, as the value 2.08 is greater than the Prob (F - statistics) value 0.13.

> H_7*:* There is a relation between the macroeconomic factors and earnings & profitability (EP1) of the non-life insurance industry.

Table 10: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.539334	0.152367	3.539693	0.0005
INF_?	-0.024813	0.621989	-0.039893	0.9682
EG_?	-1.51953	2.334146	-0.651	0.5157
R –squared	0.01053			
Adjusted R –squared	0.00141			
F –statistic	1.154632			
Prob (F –statistic)	0.317102			

Table 10 explains random-effects model's results that inflation (INF) and economic growth (EG) has an insignificant and negative relation with the earnings and profitability (EP1), as the probability value associated to the respective variable is greater than the significance level of 5%. The value of R – squared indicates that independent variables describe 1.05% variations in the dependent variable (EP1). F - Statistics indicate the model's validity, as the value 1.15 is greater than the Prob (F - statistics) value 0.32.

> H_8*:* There is a relation between the macroeconomic factors and earnings & profitability (EP2) of the non-life insurance industry.

Table 11: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.368879	0.252332	1.461881	0.1452
INF_?	0.580751	1.023476	0.567429	0.571
EG_?	3.200478	3.840811	0.833282	0.4056
R –squared	0.004248			
Adjusted R –squared	-0.004929			
F –statistic	0.462921			
Prob (F –statistic)	0.630063			

Table 11 explains the results of random effects model that inflation (INF) and economic growth (EG) has an insignificant and positive relation with the earnings and profitability (EP2), as the probability value associated to the respective variable is greater than the significance level of 5%. The R-squared value indicates that independent variables describe 0.42% variations in the dependent variable (EP2). F-statistics also shows the model is not good, as the value 0.46 is lower than the Prob (F - statistics) value 0.63.

H_9: There is a relation between the macroeconomic factors and earnings & profitability (EP3) of the non-life insurance industry.

Table 12: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.912802	0.280128	3.258522	0.0013
INF_?	0.536014	1.137696	0.47114	0.638
EG_?	1.601544	4.269443	0.375118	0.7079
R –squared	0.001109			
Adjusted R –squared	–0.008097			
F –statistic	0.120484			
Prob (F –statistic)	0.886551			

Table 12 explains the results of random effects model that inflation (INF) and economic growth (EG) has an insignificant and positive relation with the earnings and profitability (EP3), as the probability value associated to the respective variable is greater than the significance level of 5%. The R-squared value indicates that independent variables describe 0.11% variations in the dependent variable (EP3). F-statistics also shows the model is not good, as the value 0.12 is lower than the Prob (F - statistics) value 0.88.

H_{10}: There is a relation between the macroeconomic factors and earnings & profitability (EP4) of the non-life insurance industry.

Table 13: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	–7.581779	8.008172	–0.946755	0.3448
INF_?	28.91909	33.04143	0.875237	0.3824
EG_?	146.3498	123.995	1.180288	0.2392
R –squared	0.007536			
Adjusted R –squared	–0.001611			
F –statistic	0.823905			
Prob (F –statistic)	0.440083			

Table 13 explains the results of random effects model that inflation (INF) and economic growth (EG) has an insignificant and positive relation with the earnings and profitability (EP4), as the probability value associated to the respective variable is greater than the significance level of 5%. The R –squared value indicates that independent variables describe 0.75% variations in the dependent variable (EP4). F - Statistics indicate the model's validity, as the value 0.82 is greater than the Prob (F - statistics) value 0.44.

H_{11}: There is a relation between the macroeconomic factors and earnings & profitability (EP5) of the non-life insurance industry.

Table 14: Random Effects Model

Variables	Coeff.	Std. Err.	t - Stat.	Prob.
C	0.032139	0.191425	0.167896	0.8668
INF_?	-0.747486	0.789886	-0.946321	0.345
EG_?	3.403732	2.964216	1.148274	0.2521
R –squared	0.105801			
Adjusted R –squared	0.09756			
F –statistic	12.83771			
Prob (F –statistic)	0.000005			

Table 14 explains random-effects model's results that the economic growth (EG) has an insignificant and positive relation with the earnings and profitability (EP5). Inflation (INF) has an insignificant and negative relationship with the earnings and profitability (EP5), as the probability value associated with the respective variable is greater than the significance level of 5%. The R - squared value indicates that independent variables describe 10.58% variations in the dependent variable (EP5). F - Statistics indicate the model's validity, as the value 12.84 is greater than the Prob (F - statistics) value 0.00.

Hypotheses Assessment Summary

Table 15 comprises the results of hypotheses 1 to 11 that pertains to the relationship of macroeconomic factors with the CARAMELS FSIs, under which the null hypothesis is no relationship of macroeconomic factors with the CARAMELS FSIs.

Table 15: Effects of Macroeconomic Factors on the CARAMELS FSIs

Hypotheses	CARAMELS FSIs	Significant	Insignificant
H_1	CA1	(INF)	(EG)
H_2	CA2	(EG)	(INF)
H_3	AQ		(INF)
			(EG)
H_4	RA	(INF)	
		(EG)	
H_5	MS1	(INF)	(EG)
H_6	MS2		(INF)
			(EG)
H_7	EP1		(INF)
			(EG)
H_8	EP2		(INF)
			(EG)
H_9	EP3		(INF)
			(EG)
H_{10}	EP4		(INF)
			(EG)

H_{11}	EP5	(INF)
		(EG)

At the significance level of 5%.

The result of hypothesis 4 shows that macroeconomic factors have a significant relationship with the RA of CARAMELS financial soundness indicators. The hypotheses 3, 6, 7, 8, 9, 10 and 11 shows that macroeconomic factors do not have a significant relationship with the AQ, MS2, EP1, EP2, EP3, EP4 and EP5 of CARAMELS financial soundness indicators. However, the hypotheses 1 and 5 shows that (INF) has significant and (EG) has an insignificant relation with CA1 and MS1. A hypothesis 2 indicates (EG) has significant and (INF) has insignificant relation CA2.

CONCLUSIONS

The hypotheses assessment summary shows the results' overview of the tested hypotheses. These results were indicating the combined independent variables' relationship with the individual CARAMELS financial soundness indicators. However, to have an accurate relation of each independent variable with the CARAMELS indicators, the author has reshaped these results of macroeconomic variables in the Table 16.

Table 16: Macroeconomic Factors Effects on CARAMELS FSIs

Macroeconomic Factors	Significant	Insignificant
(INF)	(CA1)	(CA2)
	(RA)	(AQ)
	(MS1)	(MS2)
		(EP1)
		(EP2)
		(EP3)
		(EP4)
		(EP5)
(EG)	(CA2)	(CA1)
	(RA)	(AQ)
		(MS1)
		(MS2)
		(EP1)
		(EP2)
		(EP3)
		(EP4)
		(EP5)

At the significance level of 5%.

Based on the highest number of relationships among the variables, the aforementioned table-16 indicates that the macroeconomic factors have an insignificant relationship with the CARAMELS financial soundness indicators.

Recommendations

The core set of CARAMELS FSIs for the non-life insurance companies' periodic monitoring has dynamic importance for assessing the financial soundness of the industry. The contributing factors that effects on the non-life insurance industry's financial soundness have statistically identified that Inflation (INF) and Economic Growth (EG) have insignificant relation with the CARAMELS financial soundness indicators. Therefore, in the context of Pakistan, the macroeconomic factors' effects on the financial soundness of the non-life insurance industry may well be acknowledged. Moreover, Das, et al. (2003) also suggest an encouraging set of indicators for the above categories with the intention to capture further scopes. It includes geographic and sectoral distribution of underwritten and investments business, risk-weighted capital ratio, derivative exposures, market-based indicators (price/ gross premium, price/ earnings, market/ book value) and group exposures (group companies total (Premium + claims) / business total (Premium + claims), group debts/ total assets). Therefore, it is recommended to the scholars, to work on the encouraging indicators of CARAMELS framework.

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