Determinants of profitability panel data evidence from insurance sector of Pakistan

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ABSTRACT

Current study is carried out to look at the deterinments of profitablity in insurance sector of Pakistan with a panel data set of 31 insurance firms (life insurance sector and no-life insurance) of Pakitan from 2006-2011. To investigete the deterinments of profitabiltiy two most applicable panel data teachniques (fixed effects and random effects models) are employed and then Hausman's specification test is applied to select the most effective model. This test proves that fixed effects model is the most appropriated model for this study. The outcomes of fixed effects model propose that leverage, size, earnings voalitiy and age of the firm are signficant determinants of profitablitiy while growth opportunities and liquidty are not significant determinants of peorfitabiltiy. Accordign to best knowledge of authors this is frist study that covers the whole fiancial sector and emoply the appropriate models on the panel data. This study is very handy for the mangement of insurance sector of Pakistan in regarding their profitabilty decsions and stakeholders of insurance sector.

Introduction

Main concern of any firm is to earn more and more profit and enhancing the wealth of its stakeholders (Gitman, 2007). But due to challenges in internal and external environment most of the firms are unable to meet their goals. The internal factors that become the hurdle in order to meet the goals of profitability in firm include agency problem, labor unions and lack of latest technology. The external factors which are beyond the control of management which badly effect profitability include natural disasters, political instability, energy crisis and terrorism. In this study profitability of insurance firms of Pakistan and its main determinants are measured.

The insurance sector of any country can take major part in the economic growth and development (Brainard, 2008; Ward & Zurbruegg, 2000). But this sector in developing countries has an inactive role in the economic growth and development. Pakistan as a developing country has a significant less number of insurance companies as compared to the other Asian countries like Sir Lanka and India (SBP, 2005). According to insurance association of Pakistan (IAP), now Pakistan's insurance sector consists of 32 non-life insurance firms and 6 life insurance firms (IAP, 2011). But unfortunately now a day's insurance sector of Pakistan is facing multiple external challenges like political uncertainty, floods, terrorist attacks and severe energy crisis. All these external factors badly effects profitability and premiums of insurance firms are reduced by 6% in 2011 from 2010 (BMA Capital, 2011). So in current scenario it is very useful to explore the factors that are still determinants of the profitability of insurance companies.

The core objective to conduct this is to investigate the most important determinants of profitability in the insurance sector of Pakistan. According to the best knowledge of authors there is no single study which covers the whole insurance sector of Pakistan. There is only one study being conducting on the performance of life insurance sector in Pakistan (Ahmed, Ahmed, & Usman, 2011). The remaining structure of paper methodology, section 4 on empirical results, section 5 provides discussion on results while last section is based on conclusion of the study.

Review of Literature:

In this part authors review the most relevant literature in corporate finance on determinants of profitability from last two decades. Earlier studies on determinants of profitability were mainly focused on banking sector in financial sector (Bourke, 1989; Short, 1979). Short (1979) conducted a study on 60 banks and investigated the association between profit rates and concentration in domestic banking sector of each bank. He claimed that higher concentration would lead towards greater profit rates. Bourke (1989) studied on determinants of profitability of banks in 12 different countries and dissected the inside and outside determinants of profitability. His findings were corresponding with US concentration and profitability studies on banks and also give support to Edwards-Heggestad-Mingo risk prevention hypothesis. By following to these pioneer studies several studies have been conducted to investigate the most important determinants of profitability. Following studies had investigated the internal as well as external determinants of profitability but these studies were focusing on single country (Anbar & Alper, 2011; Angbazo, 1997; Athanasoglou, Brissimis, & Delis, 2008; Barajas, Steiner, & Salazar, 1999; Berger, 1995; Guru, Staunton, & Balashanmugam, 2002; Kosmidou, 2008; Kosmidou, Tanna, & Pasiouras, 2005; Mamatzakis & Remoundos, 2003; Naceur, 2003; Olutunla & Obamuyi, 2008). While several studies on internal and external determinants of profitability of banks had also been conducting with a panel of multiple countries (Abreu & Mendes, 2001; Demirgüç-Kunt & Huizinga, 1999; Hassan & Bashir, 2003; Molyneux & Thornton, 1992; Pasiouras & Kosmidou, 2007; C. Staikouras & Wood, 2003; C. K. Staikouras & Wood, 2011). Authors discussed the most relevant studies on the determinants of profitability on banking sector and insurance sector.

The most significant studies on determinants of profitability in commercial banking sector is reviwed from 1992 to 2003. Molyneux and Thornton (1992) reviewed the factors affecting the performance of banks through a panel of 18 Euorpean countries detreminants from 1996-1989. They replicated the methodology of Bourke (1989) and found alike results with US concentration and some other studies but unable to suuport the Edwards-Heggestad-Mingo hypothesis. After this Demirgüç-Kunt and Huizinga (1999) had conducted a study on a panel of 80 countries banks for the period 1988-1995. Their study was principally focused on finding the impact of different interest margins and profitability on multiple determinants like bank level attributes macroeconomic indicators, regulations, taxation policies, financial structure and fundamental legal and institutional factors. They concluded that in developing countries domestic banks were earning lesser margins and profit as compared to foreign banks operated in those countries. Abreu and Mendes (2001) by following Demirgüç-Kunt and Huizinga (1999) conducted study on bank panel of four European countries (German Portugal, France and Spain) for the period of 1986-1999. They found that two ratios: equity to assets and loan to assets had direct relationship with interest margins and profitability of banks. Among external factors inflation has an impact on profitability and interest margins of the banks while exchange rates do not influence the profitability. C. Staikouras and Wood (2003) studied the panel of banks working in 13 different European countries to investigate the performance of these banks. They concluded that internal factors mostly influence the performance of banks and banks which have greater levels of equity are more profitable. From external factors, growth of GDP and interest rates had indirect relationship with profitability of banks while levels of interest rates had direct relationship with profitability. After 2003 a little work on the main determinants of profitability was also done on insurance sector.

But very few studies had been on determinants of profitability on insurance sector. Greene and Segal (2004) investigated the impact of cost ineffiency on profitanblity of US life insurnce sector and found an inverse realtionship between profitability and cost ineffciency of US life insurace sector. Al-Shami (2008) conducted a study on determinants profitability on a panel of 25 insurance companies over the period of 2006-2007 listed on UAE stock market. His selected determinants of profitability include age of the firm, leverage, volume of capital, risk or loss ratio and firm size. He concluded that firm size had a direct and significant relationship with profitability, volume of capital had a direct but insignificant relationship with profitability, age of the firm did not have any relationship with profitability while last two variables leverage and loss ratio had inverse and significant relationship with profitability. In Pakistan, few studies are conducted on Insurance sector of Pakistan. Ahmed et al. (2011) investigated the determinants of performance in life insurance sector of Pakistan by using panel data of five insurance companies from 2001-2007. They exploreed the realtionship between firm level attributes (leverage, growth, size, age, liquidity, risk and tangibility) and performance of insurance firms, and observed that leverage, size of the firm and risk were significant determinants of perfromance. On the other hand growth, tangibility, age of the firm and liqudiity did not have any significant association with performance of life insurance firms.

Determinants of Profitabiliy:

All the variables i.e. dependent and independent, used in the study and their expexted realtionship are provided in Table 1. In lietature most of the studies had taken the profitablity ratios as dependent variable. The most commonly used profitability ratios are net profit margin, restrun on assest (ROA) and retrun on equity. In most of the previous studies on insurance sector, retrun on assest (ROA) is being used as a proxy of prfoitability (Ahmed et al., 2011; Al-Shami, 2008). While the proxy used here for profitability is characterize by net profit margin and calualted by net income divided by net premium of the insurance company.

Table 1: Variables and their Expected Realtionship

Variables	Proxies / Definition	Expected Sign
Profitability (PROF$_{it}$)	This is represented by net profit margin, calculated as net income before tax divided by net premium	
Leverage (LEV$_{it}$)	The leverage is taken by debt ratio, which is total liabilities divided by total assets of the insurance company	-
Growth Opportunities (GROW$_{it}$)	Growth opportunities is measured through ratio of sales growth to total assets growth of the insurance company	+
Size (SIZE$_{it}$)	Size is basically a natural log of premiums of the insurance company	+
Liquidity (LIQ$_{it}$)	Liquidity of the insurance firm is measured current assets divided by current liabilities	-
Age (AGE$_{it}$)	Age of insurance company is measured by taking difference of observation year and establishment year of the company	+
Earning Volatility (EVOL$_{it}$)	This is measured by taking absolute difference between percentage change in earnings before interest and tax (EBIT) and then average of this change over sample period	-

The determinats of profitability amily includes leverage, growth opportunities, size, liquidity, age and earnings volatility. The breief description of all these varaibles and their realtionship with profitability is as follow:

1. Leverage was taken as most important and significant determinanits of profitabiliy in previous studies. Al-Shami (2008) calculated it by using the debt to equity ratio. Ahmed et al. (2011) measured it as total debts divided by total liabilities. The proxy used is this study for leverage is debt ratio. Previous reasrech findings show inverse assoiation between leverage and profitablity of the firm.

2. Variable gorwth opportunites was also tested as a determinants of profitability in litaertature. The proxy used in previous study for this variable was slaes growth (percentage change in premiums) of insurance companeis (Ahmed et al., 2011). While the proxy here for this variable is ratio between sales growth (percentage change in premiums) and total assests growth (percentage change in total assets) of insurance companies. Direct realtionship is being expected between growth opportunities and profitability of firm.

3. Size is another important determinats of profitablity in corporate finace literature. Its proxy normally is natural log of sales or total assests (Al-Shami (2008). While the proxy for size in curretn study is same as was in previous studies on insurance sector of Pakistan (Ahmed et al., 2011). A postive realtioship between size of the insurance firm and profitablity of the company is assumed in this reaserch.

4. Liquidity of the firm is an important factor that inflence the profitability of the firm. It is usually measured through current ratio or qucik ratio. The proxy used here for liquidty is current ratio (cuurent assets divided by current liabilities) is inline with

the previous study (Ahmed et al., 2011). An inverse realtionship is present bewteen liqiudity and profiablity of the firm (Eljelly, 2004).

5. Another significant determinants of profitablity is age of the firm in most of studies. The proxy used for age in this study is same as used in recent studies on insurance sector (Ahmed et al., 2011; Al-Shami, 2008). Age of the firm has a direct realtionship with firm's profitablity.

6. Variable risk or eanrings volaliity is also a determinants of profitablity of insurance sector. Ahmed et al. (2011); Al-Shami (2008) had used the same proxy of risk loss ratio of the insurance firm. While the proxy used in curretn study is difference of percentage change in earnings before interest and tax (EBIT) and average of this change over sample period. There is a negative relationship between the risk and profitability of the firm.

Data and Methodology:

Current study primarily focuses on the investigation of the main factors that drive financial performance of Pakistani Insurance sector. Therefore, a random sample of 31 insurance firms (general insurance and life insurance) is selected from total 39 insurance firms. Current study excludes the remaining insurance firms as they do not have sufficient data for analysis and also those which are established after 2006. Simple random sampling approach utilizes because this approach provides equal opportunity for selection to every firm, keep away from sampling error and at last it facilitates in inferring conclusion from whole population (Castillo, 2009).

So, final sample of the study includes a strongly balanced panel data of 31 same insurance firms covering from same time period from 2006 to 2011. Out of these 31 insurance firms 27 insurance firms are fit in general insurance segment and rest of the 4 belong to life insurance segment of insurance sector of Pakistan. All these 31 insurance firms are members of Insurance Association of Pakistan (IAP) from 2006 to 2011. Data of these insurance firms are collected from the publications of IAP's mainly from IAP's year book and firm's official websites.

As current study employing the panel data which contains same cross-sectional units (firms) over a same time period (Wooldridge, 2009). So, panel data is a blend of both times series and cross-section data. In econometrics there are lots of techniques for conducting analysis with panel data but the two most important and widely used techniques are fixed effects model and random affects model. In literature different authors provided different justifications for adopting these techniques. The most appropriate usage of fixed effects model and random effects model in case of random sample is provided in figure 1. Figure 1 portrays the whole procedure to decide effectively the most appropriate panel data model either fixed effects or random effects or use pooled OLS in case when we draw a random sample. Dougherty (2007) recommended a criteria for choosing a regression model in panel data, if authors choose random sample from population then they must utilize both panel data approaches fixed effects model and random effects model. After applying the both panel data approaches authors must run Hausman's specification test, if this test provides significant result then they should reject the following null hypothesis, "difference in coefficients not systematic" and chose most appropriate model i.e. fixed effects model and stop further processing. If the result of the Hausman's specification test gives an insignificant result then it is more appropriate to use random effects model instead of fixed effects model and also go

for further testing. When authors select random effects model then they must apply further appropriate test like Breusch Pagan Lagrange multiplier test. If this test produces significant results then authors reject the following null hypothesis "no random effects" and most appropriate model is random effects model. On the other hand, if this test fails to give the significant results thaen most appropriate model for analysis is pooled Ordinary Least Square (OLS) regression.

Figure I: Decision making criteria for the selection of Model
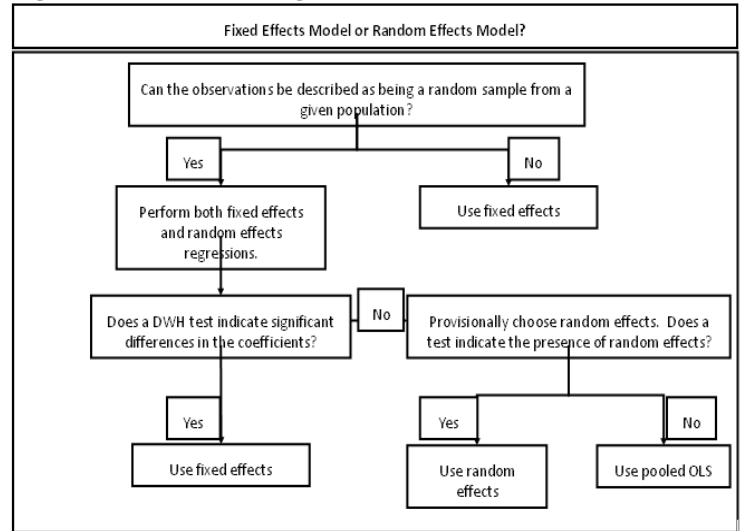
Source: Adapted from; (Dougherty, 2007)

As in current study authors have drawn a random sample of 31 same insurance firms over the same time period of 2006-2011. Along with recommended criteria for selecting an appropriate model, authors have utilized both panel data approaches fixed effects model and random effects model then run Hausaman's specification test to choose one most appropriate model from two models.

Fixed effects model is simply a model in which slope coefficients are constant while intercept varies across the cross-sectional unit in a panel. On the other hand random effects model is a model which treats cross-sectional unit as well as variation within cross-sectional unit in the model. Equations of both econometric techniques: fixed effects and random effects models are given below:

$$PROF_{it} = \beta_{0i} + \beta_1 LEV_{it} + \beta_2 GROw_{it} + \beta_3 SIZE_{it} + \beta_4 LIQ_{it} + \beta_5 AGE_{it} + \beta_6 EVOL_{it} + u_{it}$$

$$PROF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GROw_{it} + \beta_3 SIZE_{it} + \beta_4 LIQ_{it} + \beta_5 AGE_{it} + \beta_6 EVOL_{it} + u_{it} + e_{it}$$

Where;

$PROF_{it}$	=	Profitability of each firm i at time t
LEV_{it}	=	Tangibility of firm i at time t
$GROw_{it}$	=	Growth Opportunities of firm i at time t
$SIZE_{it}$	=	Size of of firm i at time t
LIQ_{it}	=	Liquidity of firm i at time t
AGE_{it}	=	Age of firm i at time t
$EVOL_{it}$	=	Earnings Volatility of firm i at time t
β_{0i}	=	y-intercept of firm i
u_{it}	=	Error Term of firm i at time tor between firms error
e_{it}	=	Within firms error

Empirical Results:

This part of study includes the descriptive statistics, Pearson correlation matrix and results of models. First of all the descriptive statistics is given in Table 2. This table contains the descriptive statistics of the panel for all variables. Number of

observation in the panel is 186 for all variables as this data contains a strongly balance panel of 31 insurance firms for 6 years from 2006 to 2011. Average value of dependent variable profitability is 12.05%. Standard deviation which is measure of dispersion shows that profitability of the firm in panel deviates from its mean around 27.10%. The least value of firm's profitability is -245% while highest value of profitability of the firm in panel is 85.8%. Likewise the average value, standard deviation, least value and highest value of each independent variable of panel is mentioned in this table.

Table 2: Descriptive Statistics

Variables	Observations	Mean	SD	Minimum	Maximum
$PROF_{it}$	186	12.0476	27.0985	-244.9986	85.7981
LEV_{it}	186	54.71374	23.0921	3.6142	99.3806
$GROW_{it}$	186	1.588075	11.5135	-75.7945	78.6926
$SIZE_{it}$	186	8.4668	0.8344	6.5378	10.4524
LIQ_{it}	186	2.3203	1.7245	-0.840	17.1000
AGE_{it}	186	38.0484	27.9993	3.000	140.000
$EVOL_{it}$	186	237.6165	517.0314	0.0602	5462.225

Pearson's correlation coefficient matrix is shown in Table 3. Before running the panel data models, it is essential to check the correlation between independent variables in order to confirm that there is no problem of multicollinearty present. The results in this table confirm that there is no chance of multicollinearty in the models as the values of correlation do not exceed from cut point 0.6.

Table 3: Pearson Correlation Coefficient Matrix

Variables	LEV_{it}	$GROW_{it}$	$SIZE_{it}$	LIQ_{it}	AGE_{it}	$EVOL_{it}$
LEV_{it}	1.0000					
$GROW_{it}$	0.0732	1.0000				
	0.321					
$SIZE_{it}$	0.556	0.009	1.0000			
	0.000	0.905				
LIQ_{it}	-0.212	0.071	-0.207	1.0000		
	0.004	0.334	0.005			
AGE_{it}	-0.126	0.069	0.096	-0.082	1.0000	
	0.088	0.353	0.193	0.263		
$EVOL_{it}$	-0.371	0.005	-0.216	-0.086	0.034	1.0000
	0.000	0.947	0.003	0.243	0.645	

The next two tables depict the outcomes of both panel data approaches. Table 4 describes the results of fixed effects model under this model leverage, size of firm, age of firm and earnings volatility are significant while growth opportunities and liquidity of firm are not significant. Out of all significant variables three variables (leverage, age of firm and earnings volatility) are significant at 5% level of significance while variable size of the firm is significant at 10% level of significance. The within R^2 of this model is 34.79%, between R^2 is 7.38% while overall R^2 of panel is 4.13%. Within R^2 means that independent variables explain 34.79% variations in the profitability in this panel from year to year like 2006 to 2005. Between R^2 meant that independent variables explain the 7.38% variations in profitability from firm (cross-sectional unit) to other firm. While overall R^2 shows that independent variables explains 4.13% variations in the whole panel. Model is a good fit as F test 13.17 is significant at 1% level of significance.

Table 4: Fixed Effects Model

Variables	Coefficient	Std. Error	t	P-Value
LEV_{it}	-0.5509	0.1439	-3.83	0.000*
$GROW_{it}$	0.1616	0.1455	1.11	0.268
$SIZE_{it}$	16.7319	9.3068	1.80	0.074***
LIQ_{it}	1.5718	1.1915	1.32	0.189
AGE_{it}	-4.2900	1.1587	-3.70	0.000*
$EVOL_{it}$	-0.0309	0.0043	-7.20	0.000*
C	67.1949	62.9867	1.07	0.288

Notes: R-square within = 0.3479, between = 0.0738, and overall = 0.0413

F statistics = 13.17, and Prob. >F = 0.000
Variable is significant at * 1%, ** 5%, and * **10% level of significance (two-tailed).

Results of random effects model is provided in table 5. Variables size of firm, age of firm and earnings volatility are significant in this model while leverage, growth opportunities and liquidity of firm are not significant. Variable earning volatility is significant at 1% level of significance; variable size of the firm is significant at 5% level of significance while variable age of firm is significant at 10% level of significance. The within R^2 of this model is 27.06%, between R^2 is 18.51% while overall R^2 of panel is 21.43%. This model is also significant as its Wald chi^2 55.09 is also significant at 1% level of significance. Within R^2 of fixed effects model is higher as compared to random effects model, alternatively between R^2 and overall R^2 of random effects model are greater than fixed effects model.

Table 5: Random Effects Model

Variables	Coefficient	Std. Err.	Z Stat.	P-Value
LEV_{it}	-.1805443	.1149153	-1.57	0.116
$GROW_{it}$	0.1163886	.1471629	0.79	0.429
$SIZE_{it}$	6.860327	3.328351	2.06	0.039**
LIQ_{it}	0.4742849	1.117415	0.42	0.671
AGE_{it}	-0.1758082	.0928671	-1.89	0.058*
$EVOL_{it}$	-0.0259156	.0039266	-6.60	0.000***
C	-24.59722	26.39936	-0.93	0.351

Notes: R-square within = 0.2706, between = 0.1851, and overall = 0.2143
Wald chi^2= 55.09, and Prob. >chi^2 = 0.000
Variable is significant at * 1%, ** 5%, and * **10% level of significance (two-tailed).

As both of the above model are significant at 1% level of significant it is very hard to choose which model is appropriate. To handle this problem authors run a Hausman's specification test in order to decide the 1 appropriate model from two possible options. The outcome of this table is provided in Table 6. This outcome suggest that most appropriate model is fixed effect model because Chi^2 value of this test 44.2 is significant at 1% level of significance according to the criteria of selecting a model describe earlier.

Table 6: Hausman Specification Test

Variables	Fixed	Random	Difference
LEV_{it}	-0.5509	-0.1805	-0.3704
$GROW_{it}$	0.1616	0.1164	0.0452
$SIZE_{it}$	16.7319	6.8603	9.8716
LIQ_{it}	1.5718	0.4743	1.0975
AGE_{it}	-4.2900	-0.1758	-4.1141
$EVOL_{it}$	-0.0309	-0.0259	-0.0050

Notes: chi^2 = 44.20, and Prob. >chi^2 = 0.0000

Discussion:

As Husaman's specification test suggests that fixed effects model is appropriate for this study. The fixed effects model has four significant variables which include age, leverage, size and earnings volatility of the firm while only two variables growth opportunities and liquidity are insignificant.

Leverage is a significant and important determinant of profitability and negative relationship is proved between leverage and profitability of the insurance firms in Pakistan. This result is in line with the previous study done by Ahmed et al. (2011) on life insurance sector of Pakistan. This negative relationship shows that if insurance companies of the Pakistan increase their debt then their profitability will be reduced significantly. Insurance companies in Pakistan have to rely more on stocks option when they want to raise their capital for investment. But issuing stock is another challenge for the

management of insurance companies due to the shaky nature of Pakistan stock market. So, the management of the insurance companies can utilize their internal sources efficiently and effectively and raise their capital only through internal sources.

Growth opportunities variable has a positive relationship with profitability but its impact profitability not significant. This shows that insurance companies are increasing their premiums and growing very rapidly but their growth does not produce any outcome to the insurance companies. There are number of factors that have become hurdle in this way. The foremost factor is terriorism in Pakistan this results in enhancing the early claims that significantly reduce the profit of the insurance companies. Other factors include highrer cost of operations and poverty in the Pakistan. The higher cost of operations due to very rapid inflation can significantly reduce the profit of the insurace companies. Majority of the people in Pakistan belong to poor family and all those people are unable to give the premiums agnist their insurance, so due to this majority of the people cannot purchase a life insurance policy and other insurance policies due to poverty ulitrmately results in decreasing the profit of insurance companies in Pakistan.

Size of the fiirm has proved a direct realtioship with profitability of insurance firms in Pakistan and this realalationship is satistically significant. This means that increased in premiums leads towards higher profit for the insurance companies in Pakistan that means this sector have gained attention after so many losses from terriorist attacks.

Liquidity of the firm has not proved as signifiant determinants of the insurance sector's profitabliity and has inverse realtionship with profitability. This invers realtionship means that insurance firms which have greater current ratios are lesser proiftable. This result is inline with the previous study done on life insurance sector of Pakistan (Ahmed et al., 2011).

Age of the firm is a significant deterimnants of profitability but has contradictory sign which shows an inverse realtionship between age of the firm and profitability. But this rsult is again inline with the previous stduy done on life insurance sector of Pakistan. This means that older insurance firms are not profitable due to higher challenging situations in Pakistan (Ahmed et al., 2011). Due to political instability, shaky nature of stock market and terriorirsm in Paksitan older insurance firms are also facing losses and early claims of insurance which will signifcantlty reduce their profit.

The risk or earnnings voalitiy is alse proved as significant determinants of peofitability and has negative realtionship with profitability of insurance firms in Pakistan. This means that higer the earnings volaitiality in Pakistan due to the terriorism will significant reduce the profits of the insurance comapies. Due to current challenges in Pakistan it is not possible even for larger and older firms in Pakistan to survive and earn profit.

Conclusion:

This study is conducted to explore the deterinmants of profitablity in insurance sector of Pakistan. A panel of 31 insurance firms from both life insurance sector and no-life insurance of Pakitan are selected for this study for the period of 2006-2011. Two most applicable panel data teachniques (fixed effects and random effects models) are utilized to investigate the determinants of profitability and Hausman's specification test recommended that fixed effects model is most appropriated model in this study. The results of fixed effects model suggest that leverage, size, earnings voalitiy and age of the firm are signfican determinants of profitablitiy while growth opportunities and liquidty are not significant determinants of peorfitabiltiy. This study has explored the six important determinants of inurance sector of Pakistan. The upcoming studies msut explore macroeconomic indicators of profitabilty along with these firm level charteristics or they may cover the whole finacial sector of Pakistan.

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