

Actuarial Risk Management Practices and Financial Performance of Property and Casualty Insurance Firms: Identification of a Moderating Variable

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Abstract

The purpose of the study was to establish, through literature review, the factors that moderate the relationship between actuarial risk management practices and financial performance of property and casualty insurance underwriters. Three theories that are considered useful in the identification of possible moderating variables were briefly reviewed. These are expected utility theory, credibility theory and ruin theory or collective risk theory. The findings revealed that various firm specific factors moderate this relationship. They include growth rate, size, and age of the firms, and in addition soundness of company management.

Keywords: Actuarial Risk Management Practices, Financial Performance, Moderating Variable, Property and Casualty Insurance Firms

Introduction

Insurance companies play an important role in the financial services sector of most countries by lowering total risk, contributing to economic growth and efficient resource allocation, reducing transaction costs, creating liquidity, facilitating economies of scale and spreading financial losses. They do this through underwriting of risks inherent in most sectors of the economy and provide a sense of peace to most economic entities. Consequently, the financial performance of insurers is of major importance to various stakeholders such as shareholders, policyholders, agents and policymakers (Duompos et.al, 2012; Charumathi, 2012; Udaibir, *et.al*, 2003).

Property and casualty (P & C) insurers assume various kinds of risks in the process of providing insurance and other financial services. Among these is actuarial risk (also known as insurance risk) which stems from the very nature of the insurance business. It is the risk that the assumptions that actuaries incorporate into a model to price or make a decision on a specific insurance policy may turn out wrong or somewhat inaccurate (Actuarial Education Company, 2014; IERMP, 2013). However, not all of these risks will crystallize into liabilities. Insurance liabilities are usually estimated by using actuarial or statistical techniques, which are based on probability theory using past experience and making assumptions about the future. If these calculations are incorrect, the consequences for the insurer may be adverse; premiums may be insufficient and/or liabilities may be understated. Such conditions would distort the insurer's true financial situation which could result in both solvency and liquidity problems (Udaibir, *et.al*, 2003).

Actuarial risk includes: under-pricing risk which occurs when premiums are too low to cover claims and insurer's expenses (Santomero and Babbel, 1997); underwriting losses (premiums less claims) risk, where actual losses may be in excess of those projected due to faulty assumptions on the frequency and severity of losses; reinsurance risk, which occurs when there is insufficient or inappropriate reinsurance coverage (Grondinet.al, 2001; Fernandez, 2009) and; catastrophe risk like major earthquakes, floods or hurricanes, severe market disruption, severe mortality etc. affecting the financial and economic stability of countries (Udaibir, *et.al*, 2003).

The risks contained in the products offered to customers to protect against actuarial risk are not all borne directly by the insurer itself. Proper management of these exposures helps insurers be prepared for such risks by defining, measuring and reducing exposure to acceptable levels (Santomero&Babbel; 1997). Ashby *et.al*, (2013) note that these measures include a combination of a robust underwriting process, pricing that is sufficient for profitability, correctly evaluated and fair claims management that is in line with pricing and a reinsurance process that is entirely appropriate for the portfolio.

Underwriting involves measuring risk exposure and determining the premium that needs to be charged to insure that risk. This is carried out by grouping risks based on similar characteristics and adjustment made for experience, loading for expenses, uncertainty and inflation. Claims management involves claim processing, cost monitoring role, servicing aspect as well as the role of people handling the claim. Good claims management should result in dealing with claimants courteously, payment of legitimate claims, accurate reserving, avoidance/reduction of protracted litigation and reduction in the insurer's expense. Reinsurers provide both expertise and underwriting capacity and are often systemically important to the primary insurance market. Disciplined adherence to underwriting controls and implementation of an integrated reinsurance programme are all important elements of strong catastrophe risk management (Yusuf & Dansu, 2014; Berger & Udel, 1993; Cummins & Trainar, 2009).

Financial performance (FP) is a measure of a firm's overall financial health over a given period of time. It can be measured from various perspectives including: solvency, profitability, and liquidity. Solvency measures the amount of borrowed capital used by the business relative to the amount of owner's equity capital invested in the business. For insurers, profitability is the excess of revenues from underwriting activities over the costs incurred in generating them. (Liquidity measures the ability of the business to meet its financial obligations as and when they fall due without disrupting normal operations (Ross *et.al*. 2009; Zender, 2004; Almajali, *et.al*, 2012).

The financial performance of an insurance company depends on many other factors, some of which are difficult to quantify, including the quality of its management, organizational structure and systems and controls in place. An assessment of financial soundness thus needs to take into account both quantitative and qualitative indicators to achieve an acceptable degree of reliability (Udaibir, *et.al*, 2003)

Various authors have asserted that risk management (RM) often leads to enhanced financial performance. Proper and efficient RM by firms is essential to the survival of most organizations and will generally influence their financial performance. A structured RM approach is therefore essential for achievement of better organizational results (Ashby *et.al*, 2013; Banks, 2004; Babbel & Santomero, 1996).

Research Problem

The insurance sector is important as it helps in the management of the total risk that economies face. Consequently, insurance underwriters have incentives to measure and manage the risks to which they are themselves exposed, as well as promote risk mitigation activities for others by adopting a structured RM approach (Duomposet.*al*, 2012; Udaibir, *et. al*, 2003). This would enable them achieve better results at a reduced cost. According to Ashby *et.al* (2013), proper and efficient Actuarial Risk Management Practices (ARMP) by P & C firms is essential to their survival and will often enable them save on costs, which in turn would lead to enhanced financial performance.

A general perception is that the insurance industry, even though regarded as being an industry that exists to spread risk, is way behind other financial institutions in analyzing and controlling its own risks (Thomas *et. al*; 2001; Grondinet. *al*. 2001). Santomero and Babbel (1997) note that the past decade has seen a dramatic rise in the number of insolvent insurers the world over. The ostensible causes of these insolvencies were myriad, including mispricing of insurance policies, natural catastrophes and "churning" of policies by unscrupulous sales agents and; malfeasance on the part of officers and directors of the insurance companies among others, pointing to inadequate ARMP. Various studies carried out on insurer financial performance have focused on factors that influence P & C insurers' FP (Mwangi and Iraya, 2014; Chen and Wong, 2004; Shiu, 2004; Adam and Buckle, 2003; and Adams, 1996). Similar studies cover life insurance companies: (Akoteyet.*al*, 2012; and Charumathi, 2012). Some other studies have tried to analyze the effect of RM on FP performance of P & C insurers (Muthoni, 2013; Omasete, 2014). Results from the various studies on P & C insurer FP are conflicting and inconclusive, probably due to the fact that the relationship between ARMP and FP has not been modeled to take into account the factors that moderate this relationship.

A moderator variable affects the relationship between the independent and dependent variables to the extent that subsets of the population have different predictor-criterion variables relationships (Baron & Kenny, 1986). These conflicting results may also be explained by the markets in which P & C insurers operate. Insurance industries of emerging nations generally lack skills in RM compared to their counterparts in the developed world and some aspects of the practices might be specific to each market (Waweru&Kisaka, 2012). This study therefore undertakes to answer the following research question: what factors moderate the relationship between ARMP and FP of P & C insurers? The objective of this study is therefore to theoretically establish the factors that can be expected to moderate the relationship between actuarial risk management practices and financial performance of property and casualty firms.

Methodology

The study adopted a conceptual and empirical literature review.

Results and Discussion

a) Theoretical Literature Review

This section examines theoretical literature on which the study is grounded and reviews literature on the expected relationship between ARMP, moderating variables and FP. Among the key theories reviewed are the Utility Theory, Credibility Theory, and Ruin Theory. Expected utility theory (EU) deals with choices that individuals make when the outcomes they face are uncertain (Neumann and Morgenstern, 1953). As Friedman and Savage (1948) notes the very existence of insurers can be explained by the expected utility model, where the choice among different degrees of risk is very prominent. In this model, an insured is a risk averse and rational decision maker, who by virtue of trying to maximize his utility is ready to pay more than the expected value of his claims just to be in a secure financial position (Kaaset.al, 2008).

According to David (2010), an individuals' risk aversion is a key component in insurance pricing, in that he is willing to pay the actuarially fair premium (AFP) i.e. the expected / average loss, or more than the AFP (known as risk premium) for an insurance policy to increase his welfare. Under the concept of diminishing marginal utility, this choice will be up to a point that does not go beyond the maximum premium the person is willing to pay. Insurance companies are aware of this behavior of risk-averse individuals hence they charge this risk premium in addition as they make no profit at the AFP. However, EU does not guarantee the expected utility in practice.

Credibility theory combines individual risk experience with class risk experience to calculate risk premiums. A typical group of purchasers of insurance is not homogeneous with each insured being different from all others in terms of habits and eccentricities. There will be both bad and good risks within the group which cannot be identified at the outset of the contract. However, subsequent experience and information will give an indication as to the degree of risk for each leading to adjustment of their premiums (Longley-Cook, 1962).

Thus credibility theory is concerned with analyzing the past information's credence mainly to enable development of premium rates for the future (Kaas et.al, 2008). The indicated rate revisions so developed will usually be adjusted by rule or by judgment to avoid major variations in individual rates as they may have a number of side effects, such as cancellation and rewriting of a number of policies prior to expiration, leaving the insurer with only "bad" risks, an example of adverse selection (Promislow, 2011).

Ruin theory or collective risk theory is an area of actuarial science that uses mathematical models to describe an insurer's vulnerability to insolvency. The ruin model describes the stability of an insurer (Kaaset.al, 2008). It deals with questions like premium rates to charge so that there are enough reserves to cover the future claims, the expected amount of claims, their severity and / or frequency, how much of the company's reserves should be invested etc. (Constantinescu, 2003).

McGregor (2007) notes that ruin occurs if a company's income, given its initial wealth, fails to cover expenses. Consequently, companies will only offer non-life insurance if they can make a profit, or at least sustain themselves. The company therefore needs to establish if it will survive over a certain period of time and the theory helps it determine the probability that it will be bankrupt, or rather, hit ruin. According to Buhlmann, (1970) insurers would like their ruin probabilities to be near zero, and will adjust their models and consider competition accordingly to achieve this, perhaps by increasing the premiums they charge or adjusting their insured portfolio.

While optimal ARMP leads to positive insurer firm performance, the extent or direction of this relationship in turn is expected to be influenced by internal firm specific characteristics. One such factor is premium growth rate. Higher premium growth rates could be due to a possible relaxation of underwriting standards in order to attract more business (Udaibir, *et.al*, 2003; Choi, 2010; Barth and Eckles, 2009; Chen and Wong, 2004; D'Arcy and Gorvett, 2004;). FP therefore tends to be better when the institution is growing at a lower rate. Thus higher premium a collection does not necessarily equate to higher profits and the relationship therefore is expected to be negative. The relationship between FP and ARMP is therefore expected to be gentler at higher firm growth rates. The size of a firm denotes how large the institution is and is measured by, among others, total assets, gross premiums written and capital (Almajali, *et.al*, 2012; Chen and Wong, 2004). As a firm expands in size, the risks facing it also increases but with adequate resources at its disposal (due to its size) it is able to dedicate greater resources to RM as an independent process as it enjoys economies of scale and efficiency (Fernandez, 2009; (Yegonet.*al*, 2014). The relationship between ARMP and FP of P & C underwriters is therefore expected to be steeper at larger firms than in smaller ones.

Also, as a firm age, it acquires capabilities and skills over time, may not be prone to the liabilities of being new and can therefore enjoy superior performance (Shiu, 2004). Demirgüç-Kunt and Maksimovic, (1998) however note that older firms are prone to inertia, and bureaucracy and may have laxity in RM which may lead to an inverse relationship between age and profitability. The relationship between RM and financial performance of P & C firms should then be steeper for younger firms. The gradient decreases with age and could ultimately even turn to negative.

Sound management is also crucial for financial stability of insurers as it has a direct influence on the capacity of an insurer to identify and invest in profitable portfolios in order to increase investment income. Operational efficiency (measured by profit /number of professionals) is likely to be correlated with general management soundness which would be reflective of the ARM systems in place. According to Udaibir *et.al*, (2003) unsound efficiency indicators could flag potential problems in key areas including the management of insurance risks. As soundness of management increases, the positive relationship between RM and FP of P & C insurers becomes stronger.

There are factors, not being moderators that have an effect on financial performance of P & C insures. These include interest rates in an economy, liquidity and leverage of the insurer. Interest rate or the cost of borrowing money determines P & C firms' financial performance. Insurance companies invest much of the collected premiums, so the investment yield is highly dependent on interest rates. Declining interest rates usually equate to lower investment income growth, impacting on levels of profitability and FP and vice versa (Babbeland Santomero, 1996; Hoyt *et.al*, 2011).

Liquidity enables debt obligations to policyholders and other creditors coming due in the next twelve months to be paid from cash or near cash assets and reflects a company's viability (Black *et.al*, 1998). For insurers, liquidity may be affected by decline in premiums, increase in surrenders, or an outflow of funds through claims occasioned by some disaster, which might force them to sell assets at below market prices leading to inability to maintain cash flow. Thus the higher a company's liquidity ratio, the healthier it is and the better would be the FP (Adam and Buckle, 2003).

Insurance firms' leverage (debt to equity ratio) shows the degree to which a business is utilizing borrowed money and represents the potential impact on capital and surplus of deficiencies in reserves due to financial claims. It is expected that highly leveraged, companies should have better operational performance than lowly leveraged ones (Adams and Buckle, 2003; Akoteyet.*al*, 2012). However, companies that are highly leveraged may be at risk of bankruptcy if they are unable to make payments on their debt (Mwangi and Iraya, 2014). There is therefore no prior expectation on the direction of the relationship between performance and leverage of P & C firms.

Other possible external factors expected to be related to FP in the general insurance industry are; industry size and competition and macroeconomic variables such as inflation and GDP growth rate. GDP growth rate has been identified to contribute positively to insurers' profitability whereas competitive factors play an important part in the appraisal pricing objectives of the individual company (Duomposet.*al*, 2012; Shiu, 2004).

b. Empirical Literature Review

This section examines empirical literature on the relationship between FP and other factors such as RM and firm characteristics.

Several empirical studies have been carried out to determine how firm specific factors influence P & C insurer's FP. Mwangi and Iraya (2014) found that FP was positively related to earning assets and investment yield for Kenyan General insurers and that growth of premiums and size of underwriter were not significantly related to FP. Adams and Buckle (2003) confirm these findings on size and scope of activities.

Adams and Buckle's (2003) study in the Bermuda market examined the determinants of corporate FP and found that highly leveraged, lowly liquid companies had better operational performance than lowly leveraged, highly liquid companies and that performance was positively related to underwriting risk, suggesting that actuarial and operational risks are well managed. These results confirm those of Adams (1996) for the New Zealand market and Akoteyet.al, (2013) for the Ghanaian market. Charumathi (2012), Chen and Wong (2004) and Chen et al, (2009) however contradict these findings where they established that size is positively related to profitability while premium growth, leverage and equity capital are negatively related.

Shiu's (2004) study on the U.K. general insurance industry revealed that liquidity, unexpected inflation, interest rate level and underwriting profits were statistically significant determinants of the insurers' performance. Choi, (2010) also tested the relationship between firm size, age, and growth for the U.S. property and liability insurance industry, and found that that young firms grow faster than old firms during the sample periods thus impacting on their financial performance.

Empirical evidence from these studies reveals many and differing factors that determine the direction /strength of financial performance of P & C insurance companies. Some of these studies were inconclusive and most of them did not arrive at a common conclusion. The main limitation of these studies is that they offer only a partial assessment of FP, depending on the selected measure.

A research gap can be identified from some of the empirical studies reviewed. The main gap is that the studies have not attempted to improve the predictive power of the relationship between ARMP and FP by introducing appropriate moderating variables. There is need therefore to demonstrate the various sets of relationships between FP and ARMP by considering various firm characteristics that moderate this relationship, viz; size, premium growth, age and company management.

Conclusion

This paper has provided an overview of literature that covers the relationship between ARMP and financial performance of P & C insurers, as well as the effect of the moderating variable (firm specific characteristics) on this relationship. Actuarial risk emanates from underwriting and claims activities of the insurer and forms the bulk of the risks that P & C firms have to deal with. It encompasses risks inherent in the underwriting process, reinsurance, claims management and occurrence of catastrophic events.

A structured ARM approach by P & C insurers ensures realization of better organizational results at a reduced cost. This is achieved through having a sufficiently robust underwriting process, ensuring that pricing of products is sufficient for profitability, a claims management process that is fair and correctly evaluated and in line with pricing and underwriting assumptions, and a reinsurance process that is entirely appropriate for the portfolio. There should be appropriate risk categorization for use in underwriting, development of premium rates, and the decision to explore reinsurance.

Prior research on RM in general and insurer FP shows that there exists a relationship between them. The evidence is however mixed and conflicting, probably explained by the factors which moderate this relationship. The paper concludes that the relationship between ARMP and FP of P & C insurers is moderated by firm specific characteristics such as premium growth rates, size of the firm, age of the insurer and soundness of management.

It would therefore be important to undertake empirical studies to assess the influence of firm characteristics on the relationship between actuarial risk management practices and financial performance of P & C insurers. Such a study would shed more light on the moderating influence of these characteristics and may provide more conclusive results on the relationship between actuarial risk management practices and financial performance of property and casualty insurance underwriters.

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