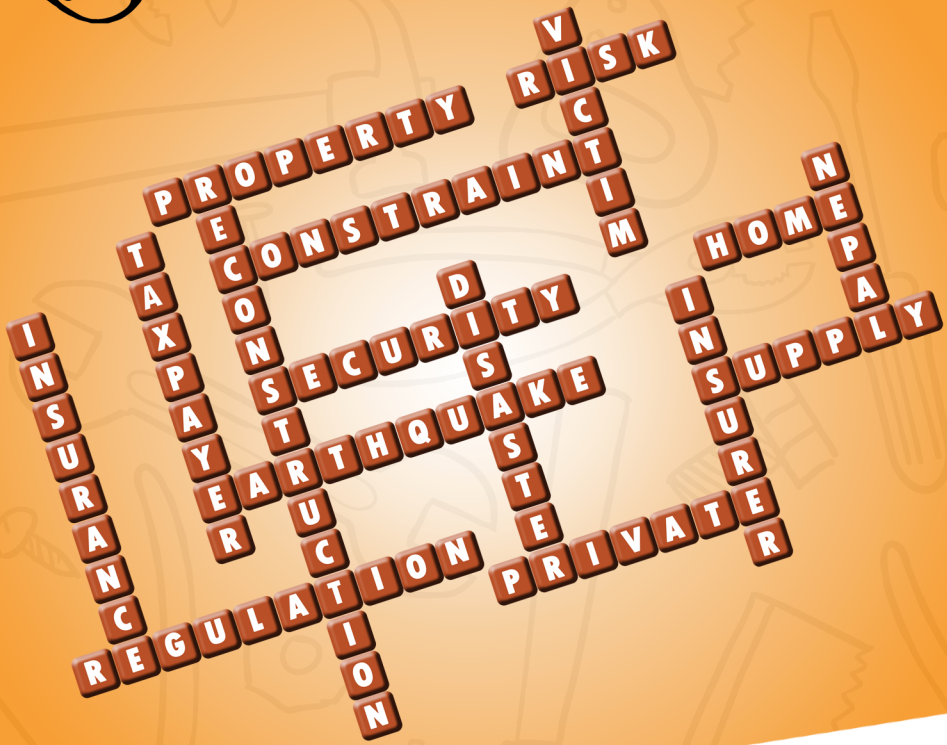
#rebuildnepal2016



Disaster Under-Insurance in Nepal

A look into supply side constraints in the Insurance Industry in Nepal

Dinesh Karki and Serene Khatiwada

Published by

SAMRIDDHI FOUNDATION

#rebuildnepal2016

Disaster Under-Insurance in Nepal

A look into supply side constraints in the Insurance Industry in Nepal

Dinesh Karki and Serene Khatiwada

Published by

Samriddhi Foundation

Contents

About the Authors

Dinesh Karki

Dinesh Karki is a Research Assistant at Samriddhi Foundation. He joined the organization in September 2015. He holds a BSc. Economics (Hons) degree from International Business School Suzhou (IBSS) at Xi'an Jiaotong-Liverpool University, China. His research interests are macroeconomics, financial markets and monetary economics. He is also interested in economic and financial data analysis.

Serene Khatiwada

Serene Khatiwada is a Research Assistant at Samriddhi Foundation where his focus areas are petroleum trade, agriculture and hydropower policies. He frequently blogs and writes articles based on the findings on the policy research he conducts in these areas. He holds a B.A Honors in Economics from Hansraj College, University of Delhi. He is currently pursuing Masters in Economics in Indira Gandhi Institute of Development Research.

Acknowledgements

We take this opportunity to acknowledge various parties who have made this research a success. Firstly, we would like to express our sincere gratitude to the experts, bureaucrats and businesses who have helped us with their valuable inputs. We are extremely grateful to the fellow researchers and colleagues at Samriddhi Foundation for their support and guidance during the course of this research. Lastly, a special thank you to the Foundation for reviewing, proofreading and providing timely feedback in the final stages of the paper.

Dinesh Karki and Serene Khatiwada
April, 2016

Preface

Following the devastating earthquake of April 25, 2015, Samriddhi Foundation put together efforts to help with immediate relief operations by matching relief seekers with relief providers through online and offline communication. Few weeks later, we also brought together 63 experts and around 800 civil society leaders in a two-day conference to bring together Ideas for Rebuilding Nepal, resulting in a publication of the same name. Reconstruction and rehabilitation is not Samriddhi's primary forte. Yet, as concerned Nepalese living in a seismically active zone, preparedness has to be our priority. Especially because, in a developing economy like Nepal, reconstruction and rehabilitation after a disaster often translates to diverting scarce resources from other equally important tasks.

The Government of Nepal (GoN) came up with estimates of reconstruction through its 'Post Disaster Needs Assessment' (PDNA) after the earthquake, and as a policy institute working in the field of economic policies, we wondered how we would foot the bill. This led us to examining alternative measures to spending taxpayers' money on reconstruction, which further led to examining the market for non-life private insurance in Nepal. This paper is our first attempt in making sense of the insurance market.

Nepal's post-disaster insurance claims and settlement data following April, 2015 shows that Nepalese in general, are severely under-insured. This paper probes this phenomenon both from a demand and supply perspective, although it focuses more on the supply side constraints. The paper takes into account affordability; market access and depth of the product market and examines the various services that are provided by the insurance companies of Nepal today. It uses Kunreuther (1984)'s framework to analyze Nepal's institutional arrangements in the insurance market and incorporates the 'Consumer decision making' model developed by Engel, Kollat and Blackwell (1968).

One of the primary areas of our concern was what hindered the private insurers from offering more extensive disaster insurance in Nepal. Our research points to severe problems in the non-life insurance market at the policy level

whereby, actuarial evaluation methods are overlooked, and our insurance policies fall dangerously below international best practices and standards set out by International Association of Insurance Supervisors (IAIS).

This research also led us to identify larger problems that plague the insurance sector in Nepal. An often-overlooked issue as a 'technical' problem, we have attempted to bring back under-insurance to public discourse through this paper. This research is definitely limited in its scope of examining a particular kind of insurance market. However, we hope that this will initiate wider discourse on disaster preparedness as well as on the issue of how we can better insure ourselves, and our properties in Nepal.

List of Abbreviations

ASEAN	Association of South East Asian Nations
ASM	Available Solvency Margin
BFI	Banks and Financial Institutions
CBS	Central Bureau of Statistics
CDP	Consumer Decision Process
EU	European Union
FY	Fiscal Year
GDP	Gross Domestic Product
GIROJ	General Insurance Rating Organisation of Japan
GoN	Government of Nepal
HMG	His Majesty's Government
IAIS	International Association of Insurance Supervisors
IBN	Insurance Board of Nepal
ICP	Insurance Core Principles
MoFA	Ministry of Foreign Affairs
NPC	Nepal Planning Commission
NPR	Nepalese Rupees
NRB	Nepal Rastra Bank
NRRF	National Reconstruction and Rehabilitation Fund
PDNA	Post Disaster Needs Assessment
RBC	Risk-Based Capital
RBS	Rastriya Beema Sansthan
RoE	Return on Equity
RSM	Required Solvency Margin
SST	Swiss Solvency Test
US	United States

List of Tables

List of Charts

1. Introduction

Most natural disasters such as earthquakes are events with low probability but severe consequences. Experts usually disagree on the probabilities of occurrence and the potential consequences of such events, and general people have unrealistic perceptions — even when experts have consensus — as they lack direct experience with the risks (Camerer and Kunreuther, 1989). Thus, it is challenging for policymakers to deal with such uncertain but highly catastrophic disasters. Particularly, under-insurance against natural catastrophe risks is a global challenge (Swiss Re, 2015). Voluntary adoption of cost-effective protection measures such as insurance is limited prior to a disaster in many disaster-prone areas. Prior to a disaster, homeowners do not invest in preventive measures like buying an insurance policy or reinforcing their house. But in the aftermath of a disaster, they regret that they did not voluntarily adopt any protective measures. Moreover, the insurance companies do not actively promote disaster insurance policies owing to the uncertain risks involved and regulatory bottlenecks. For instance, the 1971 earthquake in San Francisco caused a damage of USD 500 million, of which insurance covered only USD 32

Nepal Earthquake 2015

A 7.6 magnitude earthquake struck Nepal on April 25, 2015 — the epicenter was the district of Gorkha, which is 76 kilometers northwest of Kathmandu. There were more than 400 aftershocks equal to or greater than a magnitude of 4 on the Richter scale between April and October (National Seismological Centre, 2015). The most notable aftershock, in terms of scale and damage, rattled Nepal on May 12 with a magnitude of 6.8 with epicenter near Mount Everest. The casualties recorded during these series of earthquakes were over 8,790 and the injuries sustained were above 22,300. Thirty-one of the 75 districts were affected by the earthquake among which 14 districts were declared 'crisis hit'. Post Disaster Needs Assessment (PDNA) conducted by the National Planning Commission (NPC) estimated that the earthquake affected more than one third of the population of Nepal resulting in damages and losses of about one third of the Gross Domestic Product (GDP) in financial year (FY) 2013/14. Private property such as residential buildings, commercial buildings, farmland, and livestock made up majority of the losses and damages. There were severely hit areas where entire settlements were destroyed by landslides and avalanches triggered by the earthquake (National Planning Commission, 2015).

million (Kunreuther, 1984). After a natural disaster, policymakers in hazard-prone areas usually face a situation explained as natural disaster syndrome by Camerer and Kunreuther in 1989. Thus, natural disaster syndrome is essentially a post-disaster response of the governments providing costly disaster assistance at the expense of taxpayers' funds even if they had no intention to do so prior to the event (Kunreuther, 1996). This held true for the Government of Nepal (GoN) after the devastating earthquakes of April and May as well. Natural disaster syndrome can be attributed to the institutional arrangements as well as decision processes of home-owners regarding disaster insurance.

Insurance penetration and density in Nepal

A standard indicator for studying insurance demand is the insurance penetration rate — total insurance premiums as a percentage of GDP. Insurance Board of Nepal (IBN) data indicates that the rate of insurance penetration has been steadily rising for more than a decade in Nepal. Nevertheless, the current rate is still low compared to international standards. IBN's latest annual report shows an insurance penetration of 1.57 percentage of the GDP for the FY 2013/14 (Insurance Board, 2014) while the insurance penetration for emerging markets and Association of South East Asian Nations (ASEAN) stand higher at 2.71 percentage of GDP and 3.32 percentage of GDP respectively for the year 2014 (Swiss Re, 2015). Nepal's insurance penetration rate is 1.14 percentage points below the emerging markets standard. In fact, the insurance penetration rate of India stands higher than Nepal at 3.3 (estimated) percentage of GDP (Swiss Re, 2015).

Table 1: Top 10 Performers in Terms of Insurance Penetration

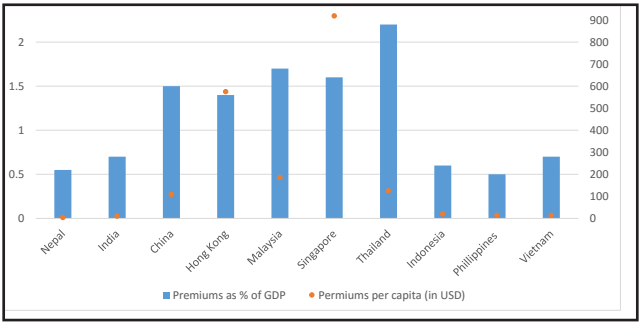
Country	Insurance Premiums % as of GDP
Taiwan	18.9
Hong Kong	14.2+
South Africa	14*
South Korea	11.3
Netherlands	11
Finland	10.9*
Japan	10.8*
UK	10.6*
Denmark	9.6*
Switzerland	9.2*

*+provisional * estimated*
Source: Sigma, 2015, Swiss Re

Another indicator for comparison is the insurance density — premiums per capita. The insurance density of Nepal for 2014 stands at USD 11.43[1] . Insurance densities for emerging markets (USD 135), ASEAN (USD 131) and Africa (61.3) are much higher than Nepal. Insurance densities of our neighbors India (USD 55) and Sri Lanka (USD 40) are higher as well (Swiss Re, 2015). Chart 1 compares Nepal's non-life insurance penetration and density with emerging markets in Asia:

[1] *Insurance Density: (USD 302.81 million/26.49 million) = USD 11.43, where total premium for 2013/14 is USD 302.81 million and population of Nepal according to 2011 census is 26.49 million. (Data Source: Annual Report (2071), Insurance Board of Nepal; Statistical Pocket Book of Nepal (2014), Central Bureau of Statistics)*

Chart 1: Non-life Insurance Penetration and Density in Emerging Asia



Source: Sigma, 2015, Swiss Re

When we look at Nepal's non-life insurance sector alone, the penetration rate stands at 0.552 percentage of GDP and insurance density stands at USD 3.99 per capita in FY 2013/14. Non-life penetration is low as well when compared to emerging markets (1.4 percentage), Asia (1.7 percentage) and the world (2.6 percentage) (Swiss Re, 2015). Therefore, one of the primary purposes of this paper is to examine factors that contribute to low insurance penetration in Nepal, focusing on insurance against earthquakes.

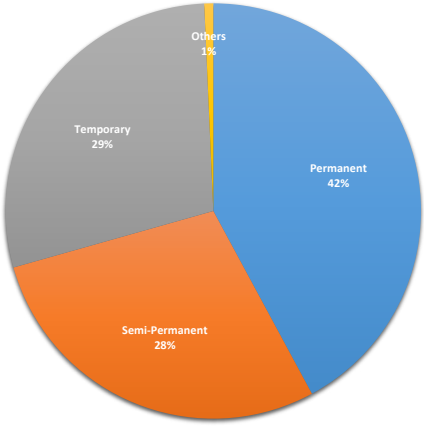
Housing in Nepal

Department of Survey, under the Ministry of Land Reform and Management, has classified housing units in Nepal into four categories based on the construction materials used in walls and roofs: permanent, semi-permanent, temporary and others. According to the national census data of 2001, around 42 percentage of houses are permanent, 28.5 percentage are semi-permanent and 28.7 percentage are temporary (Nepal Hazard Risk Assessment, n.d.). As per the Annual Household Survey 2012-13, around 29.8 percentage of the houses in Nepal have

[2] *Non-life insurance penetration: (NPR 10.5642 billion/NPR 1928.50 billion) *100% = 0.5477%, where total non-life insurance premium is NPR 10.5642 billion and GDP is NPR 1928.50 billion. (Data Source: Annual Report 2071, Insurance Board of Nepal)*

walls constructed with cement-bonded brick and stone, 16.5 percentage have pillar bonded foundation and 23 percentage have roof made of concrete —these structures can withstand seismic risks to a certain magnitude. About 50 percentage of the housing units have mud-bonded brick or stone walls and mud-bonded foundations (CBS, 2014); most of the structures that were destroyed by the April earthquake fall under this category

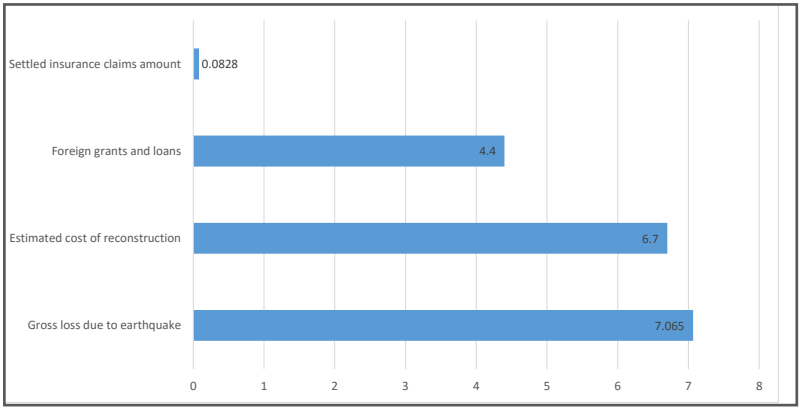
Chart 2: Types of Housing in Nepal



Source: CBS, 2001

We can deduce from above that there is a dire need for some form of disaster insurance for most of the built structures in Nepal. However, the data on penetration rates and the settled claims after earthquake suggests that most structures are not insured. NPC (2015) estimate of the gross loss due to the mentioned recent earthquake amounts to USD 7.065 billion out of which housing and human settlements sustains majority of the loss of USD 3.51 billion. IBN's claims settlement data post-earthquake indicates that a mere USD 82.8 million of losses and damages is covered by insurance. This indicates that less than 1 percentage of the estimated losses due to earthquake is covered by insurance. When we compare with New Zealand for instance, insurance covered 73 percentage of the losses from the series of earthquakes in 2010/11 (Swiss Re, 2015).

Chart 3: Protection Gap of Nepal earthquake 2015 (Billion USD)



Source: NPC (2015), Insurance Board (2016), and Najar and Sharma (2015)

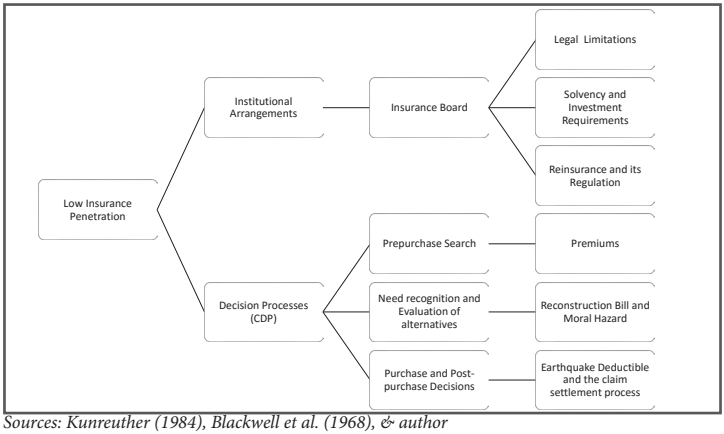
Owing to the inadequate preparedness for such disasters, the need for government assistance after the earthquake rose. The government has already dispatched about Nepalese Rupees (NPR) 15.4 billion from the Prime Minister's Disaster Relief Fund as of October 1, 2015 (Prime Minister's Office, 2015). Additionally, the government has allotted NPR 74 billion in the Fiscal Year (FY) 2015/16 for reconstruction (The Kathmandu Post, 2016). National Planning Commission (NPC) estimates the cost of reconstruction as high as USD 6.7 billion, about a third of Nepal's yearly output. Foreign governments and international donor agencies pledged an amount of USD 4.4 billion, which consists of grants and soft loans (Najar and Sharma, 2015). This implies that taxpayers are likely to face additional tax burden in future to recompense for the reconstruction expenses.

This paper also seeks to analyze means to reduce this tax burden in future through better preparedness and a means to insure such risks in case of another big disaster.

2. The Framework

This study is aimed at gaining a better understanding of the reasons behind underinsurance in Nepal in the non-life sector. A product's market analysis includes analyzing both demand and supply side constraints. This paper, while acknowledging the constraints faced on the demand side, will mostly focus on the supply constraints in the form of institutional arrangements in the insurance market of Nepal. A modified theoretical framework similar to that of Kunreuther (1984) will be used to analyze institutional provisions. The framework is set to enable us to analyze the behaviors of different stakeholders as per the prevalent institutional and legal arrangements. Kunreuther (1984) analyses the problem of underinsurance in two phases: the descriptive and the prescriptive phase. The descriptive phase analyses the institutional arrangements and decision processes while the prescriptive phase explores the formulation and evaluation of different strategies. However, for the purpose of our research, we have modified the descriptive phase to integrate the dynamics of consumer decision making. As a modification of the descriptive phase, we have incorporated Engel, Kollat and Blackwell's Consumer Decision Process (CDP) (1968) model with Kunreuther's conceptual framework.

Chart 4: The Conceptual Framework



Sources: Kunreuther (1984), Blackwell et al. (1968), & author

Under the institutional framework, we are going to study the organizational structures, legal restrictions and flow of information between the stakeholders. Specifically, we will examine the regulatory restrictions that have constrained the growth of non-life insurance industry: legal limitations, solvency and investment requirements and provision of reinsurance and its regulation. Likewise, the consumer decision process is divided into pre-purchase search, need recognition & evaluation of alternatives, and purchase, and post-purchase decisions in order to study how consumers purchasing a disaster insurance policy respond to the available information. This process is a narrowed down version of the five stages of the Engel, Kollat and Blackwell's CDP model (Blackwell et al. 1968). In this section we will be analyzing the factors that make disaster insurance unattractive to homeowners — issues related to insurance premiums, reconstruction assistance and claim settlement.

3. An Overview of the Insurance Market in Nepal

Before we delve into the analysis of the various components of our conceptual framework, we present a brief description of the existing insurance market in Nepal.

3.1 Market size and growth

During the reform and liberalization of the financial sector in 1990s, the insurance industry experienced some expansion. This not only fostered the private insurers but also triggered foreign capital inflows in the insurance sector of Nepal — American and Indian insurance companies also entered the insurance market (Insurance Board, 2012). Table 2 lists the insurance companies operating in Nepal:

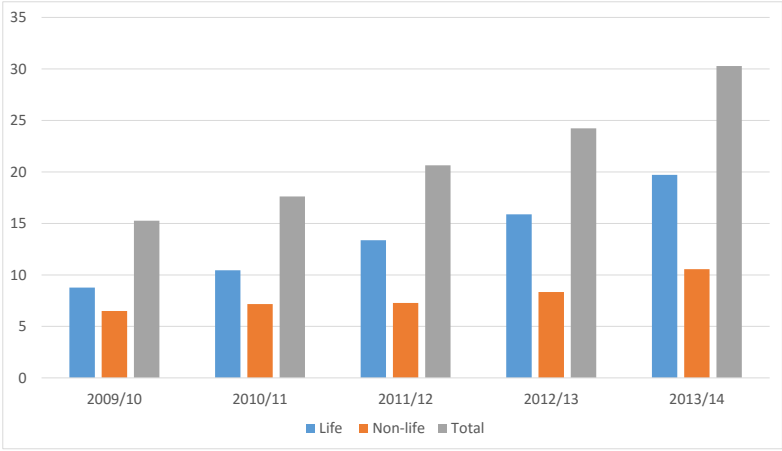
Table 2: Insurance Companies Operating in Nepal

Ownership	Non-life	Life	Both	Total
Public	-	-	1	1
Private	13	6	-	19
Foreign	2	1	-	3
Joint Venture	1	1	-	2
Total	16	8	1	25

Source: Insurance Board, 2014

There are a total of 25 companies, including Rastriya Beema Sansthan (RBS), operating in the insurance sector. Among them, 16 companies provide non-life insurance services. The total premium volume for both life and non-life business amounted to NPR 30.28 billion in the FY 2013/14. The premium volumes for life business and non-life business separately amount to NPR 19.72 billion and NPR 10.56 billion respectively in the FY 2013/14. Chart 5 shows premium volumes for the last five fiscal years:

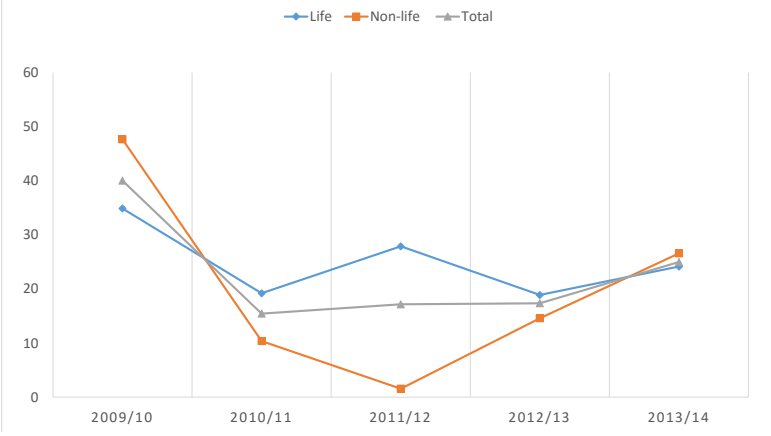
Chart 5: Premium Volume (in Billion NPR)



Source: Annual Report (2014), Insurance Board of Nepal

Similarly, Chart 6 depicts the trend of premium growth for life, non-life and total business in the last five fiscal years:

Chart 6: Premium Growth (in %)



Source: Annual Report (2014), Insurance Board of Nepal

Insurance companies contribute about 13.51 percentage of the total market capitalization in the Nepalese stock market. The market capitalization of insurance companies approximately amounts to USD1.34 billion in terms of their capital base[3] (Nepal Stock Exchange Limited, 2015). The insurance sector made a total profit of NPR 2.4 billion in the FY 2013/14 of which the profit for non-life insurance category amounts to NPR 1.46 billion. Table 3 shows the profits earned by life and non-life insurers in the last five fiscal years.

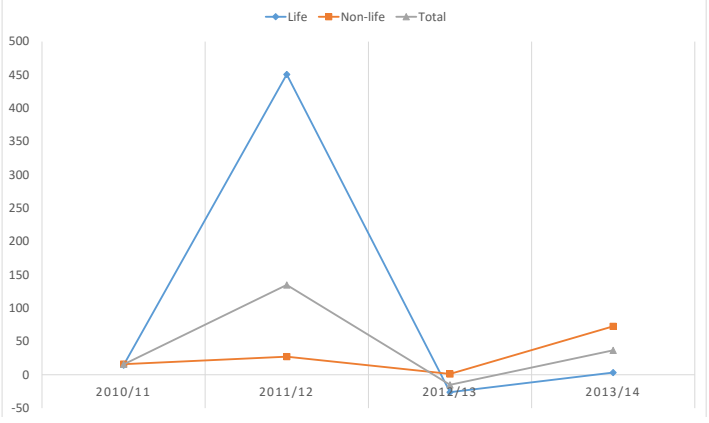
Table 3: Profits Earned by Insurance Companies (in Million NPR)

Category	2009/10	2010/11	2011/12	2012/13	2013/14
Life	195.5	223.6	1231.2	909.2	938.9
Non-life	565.9	656.5	835.1	845.8	1460.8
Total	761.4	880.1	2066.3	1755	2399.7

Source: Annual Report (2014), Insurance Board of Nepal

Likewise, Chart 7 illustrates the trend of profit growth (in percentage compared to last FY) for insurances companies in the last four financial years.

Chart 7: Profit Growth (in %)

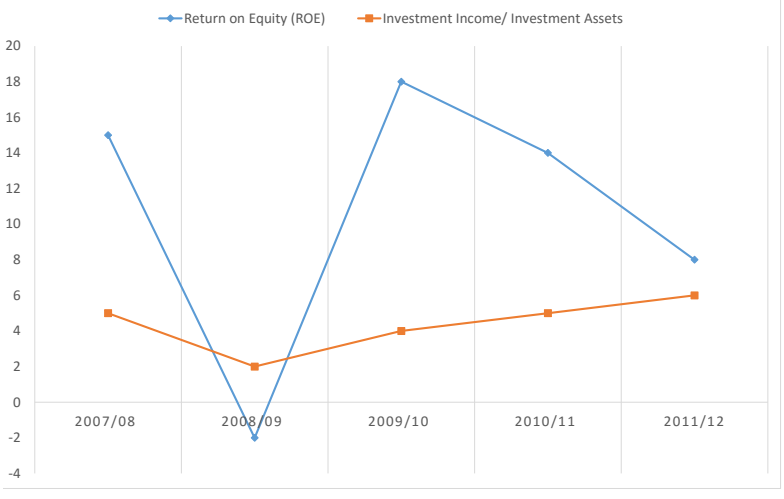


Source: Annual Report (2071), Insurance Board of Nepal

[3] Sum of total number of shares in market value of all insurance companies (Source: Annual Trading Report (2014/15), Nepal Stock Exchange Limited)

Return on Equity (RoE)[4] is a standard indicator to compare profitability among financial services firms (Damodaran, 2009 and Nissim, 2010). The averageRoEof life insurance companies for the FY 2010/11 was 14 percent[5] . Likewise, the average RoE of non-life insurance for the same FY was 16 percent[6]. The trend of RoE for life insurers highly fluctuated over the study period from FY 2007/08 to 2011/12, reaching as high as 18 percentage in FY 2009/10 and plunging to 8 percentage in 2011/12 (Ghimire and Kumar, 2014). The RoE for non-life insurers increased from FY 2006/07 till 2008/09 and remained constant for two years till FY 2010/11 (Ghimire, 2013). The RoEs of insurance companies can be compared with that of Banks and Financial Institutions (BFIs) from the Chart 8 and Chart 9 below, though the RoE data for the same periods are not available for BFIs. Similarly, we can also compare RoEs of BFIs and insurance companies with government bond yield. Government bond yield ranged from 5-9.5 percentage in FY 2012/13 and 3.25-9.5 in FY 2013/14 (Nepal Rastra Bank, 2015).

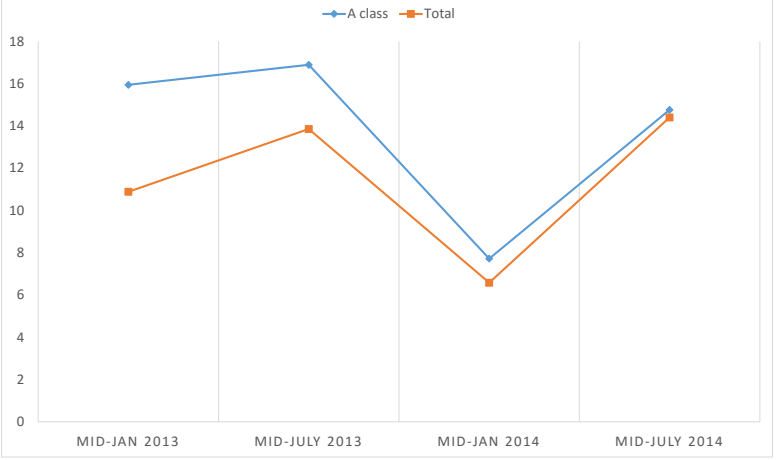
Chart 8: Trend of Financial Indicators for Life Insurance Companies



Source: Ghimire and Kumar, 2014

[4] *Return on Equity (ROE) = Net profit after tax/ Shareholders funds. (Ghimire, 2013).*
[5] *Based on annual reports of 8 life insurance companies. (Ghimire and Kumar, 2014).*
[6] *Based on annual reports of 16 non-life insurance companies. (Ghimire, 2013).*

Chart 9: RoE Trend of BFIs



Source: Financial Stability Reports (2013 and 2014), Nepal Rastra Bank

Though nominal profits and premiums are growing over time, RoE for both life and non-life sector seems to be fluctuating over time. A study of financial efficiency of life insurance companies by Ghimire and Kumar (2014) concludes that investment in life insurance companies is not very profitable for shareholders. Similarly, a study of financial efficiency of non-life insurance companies by Ghimire (2013) suggests that the non-life sector experienced 'a sluggish growth' and 'low rate of return' over the study period. In the following sections, this paper will discuss certain didactical regulatory requirements — such as the investment portfolio requirement — which could be the plausible causes of slow growth and low rate of return in the insurance sector.

4. Institutional Arrangements

4.1. Lack of Actuarial Evaluation

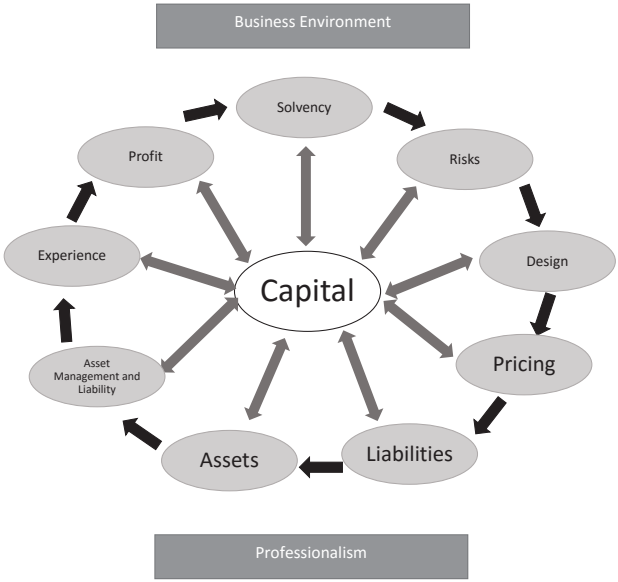
The legal provisions for non-life sector are not on par with that of life-insurance sector. The non-life sector in Nepal has been operating without any actuarial evaluation. Chapter 4, clause 26 of the Insurance Act, 1992 quotes, "The insurer, who deals with the life insurance business, shall have to assess the financial position and the valuation of liabilities by an actuary once in every three years. The insurer shall submit a copy of the reports submitted by the actuary." However, there is no such specification for the non-life sector. Countries such as Australia, Singapore, Hong Kong and India require actuarial certification of policy liabilities. Appointed actuaries determine the required reserves for policy liabilities in India using actuarial principles following the 'Guideline Notes' issued by the Actuarial Society of India (Baker and Tucci, 2005). 'Insurance Core Principles (ICP)', formulated by International Association of Insurance Supervisors (IAIS) of which Nepal is also a member, requires the insurers to have an effective actuarial function that is capable of conducting and periodically reporting actuarial evaluations such as adequacy of technical provisions, liabilities and the solvency position of the insurer to the supervisor (International Association of Insurance Supervisors, 2013).

The role of actuaries within an insurance business varies from technical roles like designing new insurance products, forecasting expected rates of loss, setting premium rates or calculating liabilities to policyholders, to management positions like product line management or senior executive roles. Furthermore, the role of actuaries can involve a wide array of factors that affect an insurer's performance as shown in the actuarial control cycle in Chart 10 below (Hafeman, 2009).

In addition, the regulator should review and analyze actuarial reports and audit reports of insurers (International Association of Insurance Supervisors, 2013). Unfortunately, none of these provisions for a healthy insurance market are applied in Nepal. The IBN operates without any actuarial staff and chartered accountants (Insurance Board, 2012). It is important that regulators have access

to actuarial experts as they help in interpreting the reports from insurers' actuaries as well as assessing the quality of their reports (Hafeman, 2009)[7].

Chart 10: Actuarial Control Cycle



Source: Hafeman, 2009

4.2. Solvency Requirements

IBN has specified certain capital requirements to ensure solvency of the insurance companies. Traditionally, regulators worldwide try to justify such solvency regulation as a prudential tool to protect consumers from a company defaulting on its liabilities. Insolvency of an insurance company has the potential to jeopardize the economic well-being of not only the policyholders but also the whole economy (Holzmuller, 2009). Solvency regulations are thus aimed at increasing the capacity to absorb uncertain losses by insurers, and consequently, decreasing the probability of default of the firm. Nevertheless, such rigid capital requirements are usually intrusive and constrain the

[7] *The Institute of Actuaries of Australia originally described the actuarial control cycle (Hafeman, 2009)*

insurance companies from managing their own risks (Baltensperger et al. 2008). Moreover, such regulation can distort decisions of insurers further by creating inefficiencies — and consequently leading to lower safety and higher premiums (Cummins et al.,1995.as cited in Holzmuller, 2009)

The IBN uses the provision of solvency ratios as a tool of solvency regulation in Nepal. "Solvency ratio" means the ratio of the Available Solvency Margin (ASM) to the amount of Required Solvency Margin (RSM) (Solvency Margin Directive, 2071 For General Insurer, Insurance Board Nepal).

$$Solvency\ Ratio = \frac{Available\ Solvency\ Margin\ (ASM)}{Required\ Solveny\ Margin(RSM)}$$

"Available Solvency Margin" means the excess of the total adjusted assets over the total adjusted liabilities. As per the existing law, "Required Solvency Margin" shall be not less than the highest of the following:

(a) NPR 250 million

(b) A sum equivalent to 20% of net premium; or

(c) A sum equivalent to 40% of the average net outstanding claim for the three years immediately preceding the current year.

The IBN also prescribes solvency control levels and their consequent corrective actions as shown in Table 4 below.

For Solvency Ratio (ASM/RSM):

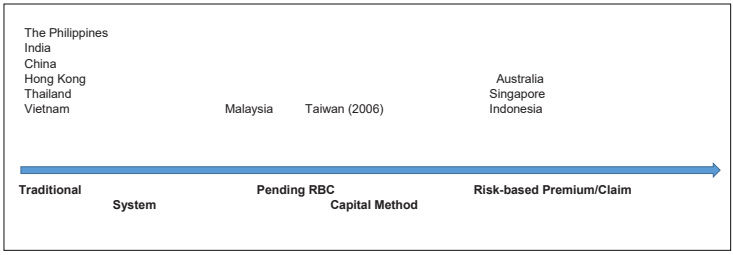
Table 4: Corrective Regulatory Actions

Level	Margin	Corrective Action
Green	Greater than 1.5	Routince Action
Yellow	Greater than 1 but less than 1.5	Greater supervision with on-site intervention
Red	Less than 1	Enforcement Action/Capital Injection

Source: Solvency Margin Directive, 2071 for General Insurer, Insurance Board Nepal

Evidently, the solvency controls are uniform rule-based requirements without incorporating the risks undertaken by the insurers. Capital and solvency requirements in many countries are based on 'simplistic premium and claim formulae' without taking into consideration an insurer's specific circumstances. As illustrated below in Chart 11, only a few countries have made provisions of Risk-Based Capital (RBC) requirements (Baker and Tucci, 2005).

Chart 11: Types of Solvency Regulation in the Asia Pacific Region



Source: Baker and Tucci (2005)

The lack of provision of RBC leads to inappropriate requirements that the insurers are forced to meet even when the riskiness of their portfolio is low. Such rigid requirements can stifle product development, innovation and competition. There is empirical evidence from property-liability insurance industry that capital and risk have a positive relationship. In other words, insurers choose the level of capitalization and risks to attain certain solvency risk targets, which implies that higher risk firms choose to hold more capital (Cummins and Sommer, 1996). Thus, there is an increasing trend on using less intrusive risk-based solvency control around the world. For instance, the three important risk-based systems frequently discussed in the literature are United States (US) Risk-Based Capital (RBC) system, the European Union's Solvency II directive and Switzerland's Swiss Solvency Test (SST).

According to Cummins and Phillips (2009), SST and Solvency II are principle-based dynamic systems that incorporate market values of assets and liabilities, while US's RBC is a rule-based static system that only uses accounting values. Moreover, RBC system in the US is a ratio-based uniform requirement for all insurers, whereas Solvency II and SST can incorporate individual

characteristics of insurers. Further, it does not incorporate operational and catastrophe risks. In fact, several empirical evidence suggest that US's RBC cannot accurately predict insurer's insolvency (Cummins and Phillips, 2009).

Solvency II moves away from simple capital requirements to a solvency capital aligned with insurer's particular risk profile. This provides an incentive for the insurers to improve their risk management. It is based on a three pillar framework: quantitative requirements, supervisor review and disclosure requirements. There are evidences that suggest European Union (EU)'s principle-based Solvency II is more successful in making the insurance sector financially sound than US's rule-based regulation (Eling et al. 2009).

Similarly, the SST has a provision for determining a 'target capital' that is viewed as necessary to survive the riskiness of an insurer's portfolio. Such 'target capital' is compared to the actual available 'risk bearing capital,' where the portfolio and risks are evaluated at market values. SST is just a set of fundamental principles and it does not prescribe a fixed model for risk evaluation. Insurers themselves can devise a model for risk evaluation and calculation of target capital with regulator's approval (Baltensperger et al. 2008). It is an advantage compared to US's RBC which only permits standard models. In fact, the SST field test in 2005 suggests that 'participants found internal risk models to be excellent management tools' (Eling et al. 2008).

4.3. Regulation of Investment Portfolio

In addition to the capital requirements in the form of solvency ratio as discussed above, the IBN further regulates the investment portfolio of the insurance companies with an aim to prevent insolvencies due to unforeseen losses. The IBN has laid out some quantitative investment requirements on different asset classes. There is a requirement that a total of 65 percentage (minimum) of the insurer's investment should be retained in government securities, treasury bills, fixed or short term deposits of commercial banks, fixed deposits of development banks and Citizen Investment Trust's funds. Promoter's shares, loan certificates, fixed deposits and debentures of banks, and financial institutions can constitute at most 20% of total investments. Ordinary shares of Public Limited Companies and investments in the productive sector

like hydropower, health, education, tourism or agriculture can constitute at most 15% of total investments *(Refer to 'Appendix A' for the detailed investment requirements)*. Besides, there is a provision that the insurer should take prior approval of the IBN to invest in sectors other than that specified by the board[8] .

Apparently, the regulation is designed to direct investment mostly in asset classes issued by the government or banks and financial institutions. In fact, the requirements are so restrictive that only 16.4% of the actual investments made by non-life insurers fall under the unregulated category as per IBN's latest statistics (Insurance Board, 2016).

'Insurance Core Principles (ICP)', formulated by International Association of Insurance Supervisors (IAIS) states that investment requirements can be rule-based or principle-based. Rule-based requirements, for example, can set quantitative limits on the type of assets an insurer invests in. Principle-based requirements, however, have no specific requirement on the asset portfolio as long as they stick to the principle. It is clear that Nepal's investment requirements are rule-based. ICP also states that rule-based requirements may suppress innovation and limit insurers from choosing assets that they believe are appropriate for meeting their requirements. Such provisions may also prevent insurers from developing innovative contracts that meet the needs of the policyholders. Furthermore, a uniform rule-based requirement on investment applicable to all insurers may discourage them from developing their own risk management strategies (International Association of Insurance Supervisors, 2013). The restrictive requirements to invest in particular forms of assets can be detrimental as this limits diversification and may actually further increase the risk of insolvency (Baltensperger et al. 2008). Above all, if there is a provision of a less intrusive risk-based solvency regulation, there is no additional need for such restrictive quantitative investment requirements.

4.4. Reinsurance and its Regulation

Reinsurance sector plays a vital role in the redistribution of risks in the insurance industry and consequently provides incentives to the insurers while promoting disaster insurance policies. The IBN regulates the reinsurance portfolio of non-life insurers in the name of diversification. Non-life insurers

[8] *Article 12, Chapter 3 of Insurance Regulation, 1993*

have to submit their reinsurance policy for each FY to the IBN 30 days before the end of the FY. Insurers are allowed to reinsure with domestic or foreign reinsurers. Nevertheless, they are not allowed to reinsure with reinsurers rated lower than BBB by Credit Rating Agencies in case of the reinsurer that is listed as 'Leader' in their reinsurance policy. The leading reinsurer (BBB rated) can reinsure up to 40 percentage of the total reinsurance portfolio while others can reinsure up to 20 percentage each. However, if other reinsurers have the same rating as the 'leader' they can constitute the same share of the total reinsurance as the 'leader'. Besides, if the reinsurer has a rating of AAA, they can reinsure up to 60 percentage of the total reinsurance regardless of the previous provisions. Additionally, in case of 'catastrophe' and 'facultative' reinsurance, insurers can reinsure with a single reinsurer[9] .

The first reinsurance company in Nepal was established under a Public Private Partnership (PPP) model only in 2014 with a paid-up capital of NPR 2.1 billion and authorized capital of NPR 5 billion, converting the insurance pool set up in 2003 with 50 percent government equity to cover terrorism related damages. Seventeen non-life insurers have 55 percent stake in Nepal Re-Insurance Co. LTD while the rest is owned by the government. Nepali insurers relied on foreign reinsurers in India, Singapore, Malaysia and African countries before this (Khanal, 2014). Indian state-owned reinsurer General Insurance Corporation Re is the largest reinsurer in Nepali market with stake of about a quarter of the total market share (Sinha, 2015).

The reinsurance sector is also highly regulated as the insurance sector. The reinsurance companies are required to keep the amount deposited during their operation for at least five years without distributing it in the form of profits. Moreover, there are quantitative investment requirements to be retained in different asset classes exactly like in the case of insurance companies. A total of 65% of the total investments have to be held in government securities, treasury bills, fixed or short term deposits of commercial banks, fixed deposits of development banks and Citizen Investment Trust's funds. Even reinsurance companies are only allowed to invest at most 15% of the total investments in asset classes like ordinary shares of Public Limited Companies and investments in the productive sector like hydropower, health, education, tourism or agriculture. Such tight regulatory requirement in the reinsurance sector is

[9] *Non-life Insurance Related Reinsurance Directive, 2065 (2008)*

going to further constrain the non-life insurance industry and may potentially become a barrier to entry. *(Refer to Appendix A for detailed investment requirements)*

5. Decision Processes

5.1. Price Setting of Premium rates

Premiums, as the price of the insurance policies, determine supply as well as demand. Consumer surveys around the world suggest that half of the consumers make their final purchase decisions based on the price of the insurance. Moreover, low-income households may not be able to afford insurance due to their budget constraint (Swiss Re, 2015).

Earthquake insurance in Nepal is set under the heading of Fire Insurance in Nepal. The premium charged for different categories of property is set by the Insurance Tariff Advisory Committee, according to the Insurance Act, 1992. Insurers are obliged to charge the premium prices as per the tariff of the premium rates set by the committee. Insurers are not allowed to charge different tariffs of insurance premium other than the rate determined by IBN[10] . In case the insurers charge other rates, they will either be completely or partially banned or their business will be cancelled and transferred to another insurer[11]. Chart 12 below shows the composition of the Insurance Tariff Advisory Committee that recommends tariff rates for insurance policies sold in Nepal.

Chart 12: Composition of the Insurance Tariff Advisory Committee:

1. The Nepal Government may constitute an Insurance Tariff Advisory Committee to provide necessary advice and recommendation to the Board relating to the determination of the tariff of the Insurance Business consisting the members as follows: (a) Chairperson, Insurance Board – Chairperson (b) Three persons from among the Chief of Insurers as nominated by the Nepal Government – Member (c) Secretary, Insurance Board – Member-Secretary 2. The procedures regarding to the meeting of the Advisory Committee shall be as determined by the Committee itself. 3. The functions, duties and powers of the Advisory Committee shall be as prescribed.

Source: Insurance Act, 1992

[10] *Sub-rule 2, Article 18, Chapter 3 of Insurance Regulation, 1993*

[11] *Sub-rule 3, Article 18, Chapter 3 of Insurance Regulation, 1993*

Such regulatory price fixing affects market coordination of prices and further distorts the supply as well as demand for earthquake insurance policies. The distortion could be in the form of shortage if the price is too low or in the form of surplus if the price is too high. More importantly, this kind of price setting by the regulatory authority can give rise to a 'cartel-type market arrangement' while imposing high costs to the market and consumers (Baltensperger et al., 2008). Further, tampering with the price system distorts the market mechanism precluding even the willing consumers from purchasing insurance. On the other hand, regulatory price fixing also distorts insurers' incentive mechanism as they would not be able to charge different prices through product differentiation.

5.1.1 A Case for Risk-Based Premiums

The premium rates are determined by a committee without applying actuarial methods. The tariff rates are differentiated on the basis of different tiers of housing: first tier, second tier and third tier[12] . Moreover, certain tariff rates are higher in Nepal when compared to rates in Japan.

Though Nepal is not considered as a high risk zone as Japan, the comparative rates of premiums appear to be higher in Nepal. The rates are higher in Nepal when First Tier building in Nepal and Class A buildings in Japan are compared[13]. Nepal has differentiated the degree of premiums for different coverage and tiers of housing but the differentiation has not been justified by any study. Moreover, the degree of differentiation can be highly dubious as the data shows a very low adoption of earthquake insurance.

Another important issue is that the provision of actuarially fair premium calculation is apparently absent in Nepal. For instance, when we look at the policies in Japan, premiums are determined through a flowchart system. Moreover, Japan has a provision of charging different premium rates

[12] *Refer to Appendix B for details about different tiers of housing*

[13] *The rate for First Tier buildings in Nepal is NPR 1.08 per 1000 NPR while the rates for Class A buildings in Japan are NPR 0.63, NPR 0.82 and NPR 1.96 (per 1000 Yen) for zones 1, 2 and 3 respectively. Apparently for zones 1 and 2 rates are lower than in Nepal. (Exchange rate: 1 Japanese Yen= 0.97 NPR; Source: Nepal Rastra Bank) (Refer to Appendix B and Appendix C).*

for different risk zones[14]. This is subject to various factors and has a scientific method behind it. There are various discount rates available based on seismic isolation, earthquake resistance capacity, seismic resistance capacity and age of the building (General Insurance Rating Organisation of Japan, 2014). Nepal's tariff rates do not incorporate these aspects when determining the premium rates. Nepal does differentiate premium rates as per geographical seismic rating. These flaws in our system lead to premiums that may not always be actuarially fair — which further may cause low risk homeowners to pay high premium and high ones to pay low premium.

In consequence, uniform premiums and tariff rates give rise to the classic problem of adverse selection. When different risks are pooled together and treated equally, such policies become more attractive to high-risk consumers and less attractive to low-risk consumers. The basic principle of insurance is such that equal risks must be treated equally and unequal risks must be treated differently. Thus insurers must develop cost effective and reliable indicators to differentiate risks based on actuarial principles. Subsequently, risk-based premiums should be determined based on these indicators (Baltensperger et al., 2008).

5.2 Reconstruction Bill and Moral Hazard

Kunreuther (1984) finds that people rely on past experience rather than cost-benefit analysis while they choose to buy disaster insurance policy. As we discussed above, governments in hazard-prone countries have been time and again compelled to pledge some form of costly assistance to the victims in the form of immediate relief or reconstruction grants and loans. Such assistance is indeed an extra burden on the government's budget which will be passed on to the taxpayers' in the future. The public as rational agents, while drawing inference from past experience, would expect such assistance again in case a disaster occurs if a government has provided assistance in the past after a disaster. Thus, there is an incentive for the public not to voluntarily adopt protection measures such as building disaster-resistant structures, reinforcing existing structures or buying an insurance policy. As a result, this gives rise to the problem of moral hazard. The public may be willing to take more risks by not

[14] *Refer to Appendix C*

voluntarily protecting themselves, if there is existence of a strong assumption that the government will come to the rescue in case such disasters occur.

According to Kunreuther (1984), if the government provides disaster relief assistance, there would be no financial incentive for people buy disaster insurance. In addition, such pervasive expectation of post-disaster assistance crowds out private sector solutions (Swiss Re, 2015). Kousky et al (2013), as cited in Swiss Re (2015), reveal that "an increase in average aid grants reduces average insurance coverage by more than the amount of aid."

5.2.1 Anecdotal Evidence for Moral Hazard

From the humanitarian aspect, it is appropriate to provide disaster relief assistance to meet the immediate needs of the victims. However, when the reconstruction assistance is provided as outright grants and low-interest loans, it acts as a substitute to disaster insurance, though unintended. As a result, this reduces the 'cost of carelessness' for homeowners as they feel fully insured by the government. Subsequently, the low insurance penetration can be attributed to moral hazardous behavior as they have no financial incentive to adopt protective measures. Moreover, when the cost of reconstruction is shifted to taxpayers or donors, even people who do not need to or would have chosen not to rebuild would be encouraged to do so.

The past earthquakes in Nepal which were followed by some form of reconstruction and rehabilitation programs are historical testimonies for the case of moral hazard. The then King established an Earthquake Relief Fund following the earthquake of magnitude 8.4 in 1934 which offered loans to those affected. Likewise, following the earthquake of 1988, Reconstruction and Rehabilitation Committee was formed under the Ministry of Housing and Physical Planning which launched a reconstruction and rehabilitation project with the assistance of UNDP/UNCHS (Habitat). The loans offered to different categories of settlement are shown in Chart 13 below:

Chart 13: Earthquake Rehabilitation and Reconstruction Plan 1988

Rural areas: A maximum loan of NPR 10,000/- with one percent interest for the first NPR 5000/ and 10 percent for the next NPR 5000 will be provided for each totally damaged or seriously cracked buildings. Capital repayment will be made in six installments from the third year to the eighth year.
District Headquarters: A maximum loan of NPR 20,000/- with one percent interest for the first 5000 rupees and 10 percent for the remaining NPR 15,000 will be provided for each house. Repayment of the capital will be made from the third year to the eighth year.
Urban Areas (Nagar Panchayat): A loan up to NPR 50,000 will be provided at 10 percent interest rate. An additional amount not exceeding NPR 50,000 could be borrowed at current interest rates. Capital repayment will be made in six installments from the third to the eighth year.
Cash grant: A cash grant of NPR 600 will be provided for each house on the condition that sulov latrine has been constructed. In district headquarters, sulov latrines are made mandatory and NPR 600 will be provided after the construction of the latrine.

Source: Earthquake Rehabilitation and Reconstruction Plan 1988 – Dr. Jibgar Joshi

According to the World Bank report, the project benefited 53,000 households in the form of concessional loans. The then His Majesty's Government (HMG) preferred loans over grants, nevertheless, it converted the loans of NPR 5000 into grants and waived the repayment of the first NPR 5000 for those with loans up to NPR 10000 in 1992. In addition, the World Bank points out that the repayment of the outstanding loans by the time of writing their report was extremely poor.

Another important aspect of such reconstruction assistance is the behavior of rent seeking from different interest groups. More importantly, politicians are driven by incentives for securing their vote banks. Healy and Malhotra (2009), as cited in Swiss Re (2015), found that "voters reward the incumbent presidential party for delivering disaster relief spending." Evidently, the World Bank points out that the borrowers lobbied the government for total loan forgiveness. The commercial banks suffered a lot as they had to hold large amounts of non-performing assets. The HMG thus continued to be compelled to make further concessions to address the demands of the borrowers (Psacharopoulos, 1997).

Similarly, the lawmakers have passed a Reconstruction Bill for rebuilding the destroyed and damaged structures after the recent earthquakes. Besides, the government has already set up National Reconstruction and Rehabilitation Fund (NRRF) and has transferred USD 200.00 million to the fund as seed

money. Similarly, as we mentioned above, the international community has pledged USD 4.4 billion. The government has pledged a grant of NPR 25,000 as maintenance costs per family. Additionally, those who wish to rebuild their houses will get a relief assistance of NPR 200,000. In addition, under "Earthquake Victim Special Loan" scheme, they can get a concessional loan up to NPR 2.5 million in the Kathmandu valley and NPR 1.5 million outside the valley at just 2 percent interest rate. The government has already distributed corrugated sheets or NPR 15000 to the victims (Ministry of Foreign Affairs, 2015). Therefore, in such a repeated game situation, the government of Nepal has been time and again providing reconstruction assistance after a disaster, which as explained above, reduces the incentive for Nepalese to buy insurance.

5.3 Purchase and Post-Purchase Decision: Earthquake Deductible as a Disincentive

One of the most significant disincentives for people while buying insurance policies is the case of not being eligible for compensation. According to The Himalayan Times, at least 20% of the claims related to earthquake damages and destruction are either ineligible or withdrawn by the homeowners. IBN data shows that out of 17, 686 claims made, 4641 fall under the category of 'no claim'. One reason for the case of 'no claim' is because the claims are either equal or lower than the amount that insurers are allowed to deduct while reimbursing the compensation amount (The Himalayan Times, 2015). The compensation amount that the insurer needs to pay in case of a valid claim according to Chapter 2 Clause 12 of the Fire Insurance Policy formulated by IBN is as follows:

$$Compensation\ Amount = \frac{Amount\ Insured\ of\ Property\ Damaged/Loss}{Market\ Price\ of\ Property\ Damaged/Loss} \times Actual\ Loss$$

(Fire Insurance Policy, Insurance Board Nepal)

Additionally, Chapter 3, Clause 8 of the same policy indicates the following:

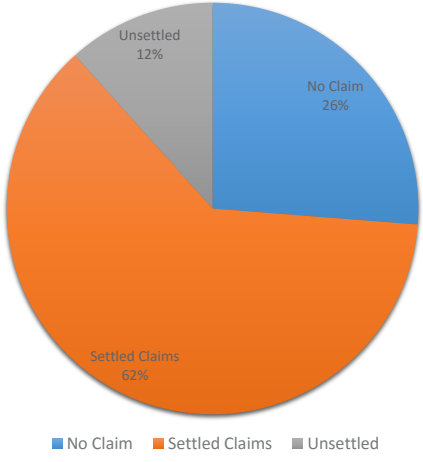
> "The insurer is not responsible for 2.5% of the Insured amount or NPR 1, 000,000 whichever is less, in case of loss due to earthquake." (Unofficial Translation)

This indicates that there is an additional deductible in case of an earthquake loss in addition to the appointed formulae to calculate the compensation. In Japan for example, 100% of the total loss is paid by the insurer (GIROJ, 2014). Besides, Nepal's system determines the compensation amount without considering the risk in case of an earthquake; it does not take into account the type of the house, in addition to other factors that may affect the property in case of an earthquake.

5.4 Purchase and Post Purchase Decision: Ineffective Claim Settlement Process:

The effectiveness of claim settlement process is a major factor while consumers make insurance purchase decisions. "People want to know not only that they are paying a fair price but also that insurers are reliable in paying out claims" (Swiss Re, 2015). Nepal's insurance claim settlement data does not provide much confidence to consumers as depicted. Chart 14 shows that about 62 percentage of total number of claims have been settled as of March 24, 2016.

Chart 14: Post-Earthquake Claim Settlement



Source: Insurance Board

The amount claimed is NPR 18.067 billion and total disbursed claims amount is NPR 8.286 billion as of February 24 2016 (Insurance Board, 2016). This gives a Non-Life claims ratio of 1.49 percentage (disbursed claims amount as percentage of premiums written) in the Non-Life sector even after the earthquake in 2015[15] (as of February 24, 2016). This is very less compared to the claims ratio of other countries. For instance, the claims ratio for the year 2011 for Spain (63.4%), Germany (71.7%), Brazil (58.7%) and Japan (71.4 %) are much higher than Nepal's post-earthquake claims ratio (Capgemini and Efma, 2013). In addition to the claims ratio, another important indicator is claims settlement ratio. The claims settlement ratio as of February 24, 2016 is 45.86 percentage[16] (disbursed claims amount as a percentage of filed claims amount) (Insurance Board, 2016).

It is also important to calculate the probability of insurance claims being settled on the basis of claims rejected during the claims settlement process. The number of claims filed post-earthquake was 17,686 as of March 24, 2016. The cases in which surveyors were employed stand at 15710 and the cases from which the reports from surveyors were received stand at 13752. The cases in which the final settlement was procured stand at 10988. Please refer to the Table 4 below for detailed calculation of probability (as of March 24, 2016) (Insurance Board of Nepal 2016). (Refer to Appendix D for sectoral distribution of claims)

Table 5: Probabilities of Claim Settlement Post-Earthquake

S.no	Type of Probability	Number reported by Insurance board	Probability
1	Probability that a claim was evaluated by a surveyor post-earthquake	15710	88.8 %
2	Probability of No claim	4641	26.24%
3	Probability that the surveyor will forward report	13752	77.75%
4	Probability of finally receiving some insurance	10988	62.12%

Authors' calculation based on The Insurance Board data.

[15] *Claims ratio = (Disbursed claims amount/ Premiums) *100 = (8.286 bn/555.01 bn) *100 = 1.49%*

[16] *Claims settlement ratio = (Disbursed claims amount/ Filed claims amount) *100 = (8.286 bn/18.067bn) *100 = 45.86%*

1. The probability of an insurance being evaluated by a surveyor and the probability being forwarded to the insurance company: 0.888*0.7775=0.6904 or 69.04%
2. Probability that an insurance will receive some insurance after the evaluation and forward for the surveyor: 0.6904*0.6212=0.4288 or 42.88%

A very low probability of a claim being settled is a huge discouragement to homeowners who want to purchase disaster insurance policies or continue them.

6. Conclusion

Insurance can be a pragmatic way to reduce the fiscal burden of reconstruction on the Government (eventually to future tax payers) in case of a natural disaster like the earthquakes in 2015. However, we have also found that there exists a huge protection gap — the difference between losses covered by insurance and losses not covered by insurance — for most structures in Nepal. Moreover, the insurance penetration and density is much lower in Nepal compared to other countries even when more than half of the structures in Nepal cannot withstand seismic risk. Such disaster unpreparedness in Nepal prior to the earthquake has called for a huge reconstruction budget from the government as well as foreign grants and loans. Thus, this paper explored the plausible causes for underinsurance against catastrophe risks in Nepal. We analyzed the problem of underinsurance under the framework of institutional arrangements and consumer decision processes. We conclude that the various regulatory bottlenecks are a serious impediment to the growth of non-life insurance industry in Nepal and could be one of the primary causes behind under-insurance in Nepal.

It is evident that the non-life insurance industry is heavily regulated by the Insurance Board of Nepal. We found that there are rigid rule-based solvency and investment requirements in Nepal while there is an increasing trend of adopting principle-based requirements around the world. The Insurance Board has laid out solvency ratios and their consequent corrective actions. These solvency controls are uniform rule-based quantitative requirements without incorporating the risks undertaken by the insurers. The board has also laid out quantitative (mandatory minimum) requirements for investment in limited asset classes (for example, government securities, treasury bills, fixed or short term deposits of commercial banks, etc.) in the name of minimizing risks from uncertain losses. The investment portfolio of reinsurance companies is also regulated similarly. As per the recent IBN data, only 16.4% of the actual investments made by non-life insurers are under unregulated category. Moreover, the board also regulates the reinsurance portfolio of non-life insurers.

Another challenge leading to under-insurance is the practice of price fixing in insurance in Nepal. The Insurance Board fixes the tariffs of premiums for earthquake insurance. The premium rates, fixed in this way, are not based on any actuarial methodologies. They are not based on specific risks of the policyholder such as geographical seismic rating. As far as the purchase-decisions are concerned, one clear disincentive for people while buying insurance is not being eligible for compensation. In fact, more than 20 percentage of the claims related to earthquake were ineligible for compensation. Another disincentive for purchasing insurance is that policyholders are not reimbursed 100 percentage of the insured amount.

The other issue is the moral hazard problem associated with government disaster relief programs. Inference from history suggests that post-disaster government responses play the role of a substitute to disaster preparedness. For example, loans provided during the reconstruction and rehabilitation program after the earthquake of 1988 were later converted into grants. Further, lobbying for total loan forgiveness in the past is a testimony for rent-seeking and vote-bank-securing behavior from politicians and interest groups.

Removing these regulatory supply constraints will create room for the disaster insurance market to expand and thus cover more properties. This expansion will shift the risks of disasters like earthquakes to the homeowners themselves. The government will not have to redirect huge amounts of taxpayers' funds to rebuilding efforts. Such regulatory reforms will foster market-based solutions to uncertain and burdensome catastrophe risks but insuring properties in rural Nepal will take time. Deregulation of the premium prices in the insurance industry will promote competition and innovation giving more choices to consumers, thus covering more properties against disaster risks.

References

Baker, V., & Tucci, J. (2005, October). The development of non-life markets in Asia with a focus on China and India – Opportunities and risks for foreign investors. Paper presented at XVth General Insurance Seminar of the Institute of Actuaries of Australia, Sydney. Retrieved from http://actuaries.asn.au/Library/gipaper_baker-tucci0510.pdf

Baltensperger, E., Buomberger, P., Iuppa, A. A., Keller, B., & Wicki, A. (2008). Regulation and Intervention in the Insurance Industry: Fundamental Issues. Geneva Assoc..

Camerer, C. F., & Kunreuther, H. (1989). Decision processes for low probability events: Policy implications. Journal of Policy Analysis and Management, 8(4), 565-592.

Center, A. D. P. (n.d.). Nepal Hazard Risk Assessment.

Central Bureau of Statistics. (2014). Annual household survey 2012-13. Retrieved October 12, 2015 from Central Bureau of Statistics website: http://cbs.gov.np/image/data/Surveys/Annual%20Household%20Survey%202012-13/Annual%20Household%20Survey%202012-13.pdf

Cummins, J. D., & Phillips, R. D. (2009). Capital adequacy and insurance risk-based capital systems. Journal of Insurance Regulation, 28(1), 25-72.

Cummins, J. D., & Sommer, D. W. (1996). Capital and risk in property-liability insurance markets. Journal of Banking & Finance, 20(6), 1069-1092.

Damodaran, A. (2009). Valuing financial service firms. Stem Business School, New York Univ.

Eling, M., Gatzert, N., & Schmeiser, H. (2008). The Swiss Solvency Test and its market implications. The Geneva Papers on Risk and Insurance-Issues and Practice, 33(3), 418-439.

Eling, M., Klein, R. W., & Schmit, J. T. (2009). Insurance Regulation in the United States and the European Union: a comparison. The Independent Institute. ISBN, 13.

Engel, J. F., Kollat, D. T., & Blackwell, R. D. (1968). Consumer behavior. New York: Holt, Rinehart, and Winston.

General Insurance Rating Organization of Japan. (2014). Earthquake insurance in Japan (Chapter 2). Retrieved February 29, 2016 from General Insurance Rating Organization of Japan website: http://www.giroj.or.jp/english/pdf/Earthquake.pdf

Ghimire, R. (2013). Financial Efficiency of Non Life Insurance Industries in Nepal. Lumbini Journal of Business and Economics, 3(2).

Ghimire, R. (2013). Investment Portfolio of Insurance Companies: Empirical Study of Nepal. HermenuticS: A Biannual Refereed International Journal of Business and Social Studies, 3(2).

Ghimire, R., & Kumar, P. (2014). Testing of Financial Performance of Nepalese Life Insurance Companies by CARAMELS Parameters. Journal of Business and Management.

Holzmüller, I. (2009). The United States RBC standards, solvency II and the Swiss solvency test: a comparative assessment. The Geneva Papers on Risk and Insurance-Issues and Practice, 34(1), 56-77.

Insurance Board of Nepal. (1992). Insurance act. Retrieved March 7, 2016 from Insurance Board of Nepal website: http://www.bsib.org.np/images/download/7972_insurance-act.pdf

Insurance Board of Nepal. (1993). Insurance regulation 1993. Retrieved March 11, 2016 from Insurance Board of Nepal website: http://www.bsib.org.np/images/download/2565_Insurance%20Regulation,%20English.pdf

Insurance Board of Nepal. (2012). Existing insurance scenario of Nepalese insurance industry. Retrieved October 10, 2015 from Insurance Board of Nepal website: http://www.bsib.org.np/images/download/9245_Esisting%20Insurance%20Sceinario.pdf

Insurance Board of Nepal. (2014). Annual report 2071. Retrieved March 5, 2016 from Insurance Board of Nepal website: http://www.bsib.org.np/images/download/Annual%20Report%202071%20Final%20Approved.pdf

Insurance Board of Nepal. (2014). Solvency margin for general insurers 2071. Retrieved October 10, 2015 from Insurance Board of Nepal website: http://www.bsib.org.np/images/download/Solvency%20Margin%20for%20General%20insurer.pdf

Insurance Board of Nepal. (2016). Statistics: (*In Nepali*) Fourth Quarter Investment Report of Non-Life Insurance Companies. Retrieved on October 23, 2015 from http://www.bsib.org.np/images/stat/Investment%20non-life%202069-70.pdf

Insurance Board. (2016, March 30). Earthquake related notice. Retrieved April 5, 2016, from http://www.bsib.org.np/index.php?option=news&task=detail&id=57&newsId=27

International Association of Insurance Supervisors. (2013). Insurance Core Principles, Standards, Guidances and Assesment Methodology. Retrieved from : http://www.iaisweb.org/modules/icp/assets/files/Insurance_Core_Principles__Standards__Guidance_and_Assessment_Methodology__October_2011__revised_October_2013_.pdf.pdf

Joshi, J. (2015, October 31). Earthquake Rehabilitation and Reconstruction Plan 1988. Retrieved February 22, 2016 from http://jibgar.com/2015/10/31/earthquake-rehabilitation-and-reconstruction-plan-1988-dr-jibgar-joshi/

Kantipur Publications Pvt. Ltd. (2016, January 16). Rebuilding campaign set to kick-start today. The Kathmandu Post. Retrieved January 20, 2016 from http://kathmandupost.ekantipur.com/news/2016-01-16/rebuilding-campaign-set-to-kick-start-today.html

Khanal, R. (2014, December 1). Nepal gets its first reinsurer. The Kathmandu Post. Retrieved February 8, 2014 from http://kathmandupost.ekantipur.com/news/2014-12-01/nepal-gets-its-first-reinsurer.html

Kunreuther, H. (1984). Causes of underinsurance against natural disasters. Geneva Papers on Risk and Insurance, 206-220.

Ministry of Foreign Affairs. (2005, June 1). Post-Earthquake Relief, Rehabilitation and Reconstruction Measures Government of Nepal. Retrieved March 16, 2016, from https://www.mofa.gov.np/post-earthquake-relief-rehabilitation-and-reconstruction-measures-government-of-nepal/

Najar, N., & Sharma, B. (2015, June 25). Foreign donors pledge $3 billion to help rebuild quake-ravaged Nepal. The New York Times. Retrieved October 20, 2015 from http://www.nytimes.com/2015/06/26/world/asia/foreign-donors-pledge-3-billion-to-help-rebuild-quake-ravaged-nepal.html?_r=0

National Planning Commission. (2015). Post disaster needs assessment. Retrieved October 15, 2015 from National Planning Commission website: http://www.npc.gov.np/images/download/PDNA_Executive_Summary_rev0730.pdf

National Seismological Centre. (2015). Retrieved October 30, 2015 from http://www.seismonepal.gov.np/index.php?action=earthquakes&show=recent

Nepal Rastra Bank. (2013). Financial stability reports (Issue no. 3). Retrieved on March 14, 2016 from Nepal Rastra Bank website: http://nrb.org.np/red/publications/fin_stab_report/Financial_Stability_Report--Issue_No._3_%28July_2013%29.pdf

Nepal Rastra Bank. (2014). Financial stability report (Issue No. 5). Retrieved March 14, 2016 from Nepal Rastra Bank website: http://nrb.org.np/red/publications/fin_stab_report/Financial_Stability_Report--Issue_No._5_%28July_2014%29-new.pdf

Nepal Rastra Bank. (2015, April). National Summary Data Page. Retrieved

March 10, 2016, from http://nrb.org.np/red/gdds/nsdp/nsdp.htm

Nepal Stock Exchange Limited. (2015). Annual trading report 2014/15. Retrieved February 8, 2016 from Nepal Stock Exchange Limited website: http://www.nepalstock.com/uploads/files/reports/80f041bba22eeba58356736c06875924.pdf

Nissim, D. (2010). Analysis and valuation of insurance companies. CE| ASA (Center for Excellence in Accounting and Security Analysis) Industry Study, (2).

Prime Minister's Office. (2015). Prime minister disaster relief fund. Retrieved October 15, 2015 from Prime minister disaster relief fund website: http://pmrelief.opmcm.gov.np/contributors.aspx

Psacharopoulos, G. (1997). Nepal-Municipal Development and Earthquake Emergency Housing Reconstruction Project. Education and training series discussion paper; no. EDT 90.

Sinha, S. (2015, April 27). General Insurance Corporation Re set to reel under loss in Nepal over earthquake claims. The Economic Times. Retrieved October 19, 2015 from http://articles.economictimes.indiatimes.com/2015-04-27/news/61578221_1_earthquake-gic-re-nepal

Swiss Re. (2015). Sigma. World Insurance in 2014 : Back to Life. Swiss Re. Retrieved on December 10, 2015 from http://media.swissre.com/documents/sigma4_2015_en.pdf

The Himalayan Times. (2015, December 11). 20pc of quake claims require no compensation. The Himalayan Times. Retrieved December 13, 2015 from https://thehimalayantimes.com/business/20pc-of-quake-claims-require-no-compensation/

List of Appendices

Appendix A

Insurance Board Directive for Investment of Non-Life Insurance Companies (2014) and Reinsurance Companies

Category of Investment	Investment Area	Investment Ceiling	Remarks
Category 'A'	Saving Certificates and Bonds issued by the Government of Nepal and Saving Certificates and Bonds issued on the Guarantee of the Government of Nepal	In any circumstance a minimum of 20% of total investments must be maintained in this category	
Category 'B'	Fixed Deposit and Short Term Deposits of Commercial Banks	In any circumstance a minimum of 35% of total investments must be maintained in this category	At most 15% of the total investments can be in a commercial bank which is in operation of at least 5 years and which also has been proved by regular annual audit to be in a profit of more than 3 years, an insurance company can invest at most 5% of the total investments in a commercial bank which has not operated for more than 5 years.

	Fixed Deposits of Development Banks	Not more than 15% of the total investments	At most 5% of the total investments can be in a development bank which is in operation of at least 5 years and which also has been proved by regular annual audit to be in a profit of more than 3 years, an insurance company can invest at most 2% of the total investments in a development bank which has not operated for more than 5 years.
A+B	According to the above	At any circumstance there should be a total of 65% at a minimum of the total investments	
Category 'C'	Promoters Share (Which cannot be changed to ordinary shares), Loan Certificates, and Safe Debentures of Commercial Banks, Development Banks and Financial Companies	At most 10% of total investments	When investing in any Promoters Share (Which cannot be changed to ordinary shares), Loan Certificates, and Safe Debentures of Commercial Banks, Development Banks and Financial Companies the investment should be either at most 5% of the total investment or 10% of the total paid up capital of the bank or financial company – whichever is less.

	Fixed deposit of financial institution	At most 10% of the total investments	At most 3% of the total investments can be in a financial institution which is in operation of at least 5 years and which also has been proved by regular annual audit, an insurance company can invest at most 1% of the total investments in a development bank which has not operated for more than 5 years of a sole financial institution.
	Ordinary share of Public Limited Company	At most 10% of total investments	2% of the total investment in any public limited company or the total paid up capital of 10% of the public limited company whichever is less – not more than the same.
	Productive or Sector of National Importance	At most 5% of the total invested amount may be invested in productive or national importance sector (hydropower, health, education, tourism or agriculture) based public company's share	At most 5% of the total investments can be invested in the share of a public company which is in a productive sector or a sector of national importance

Additional Clauses

1. Excluding Saving Certificates and Bonds issued by the Government of Nepal and Saving Certificates and Bonds issued on the Guarantee of the Government of Nepal an Insurance cannot invest more than two years in a fixed deposit of financial institutions.

2. If Saving Certificates and Bonds issued by the Government of Nepal and Saving Certificates and Bonds issued on the Guarantee of the Government of Nepal are not available Insurance Companies may invest in fixed deposit of Commercial Banks but this must be informed to the Insurance Board before hand

3. If the investment took place before this directive came into action, this directive will not affect the investment; but after the term of the same investment is over this directive will juristic the investment of the Insurance Company.

4. New investments should follow this directive

5. The amount that can be invested in fixed deposits of banks should be set by also taking into account the interested accrued from the sum in respective deposits

6. Investments can only be made in banks and financial institutions whose paid up capitals are approved complete by Nepal Rastra Bank.

7. Any investments that are made by Insurance Companies that are otherwise and that are not in accordance with this directive in sector or percentage, should be first approved by the Insurance Board

8. When investing in seed capital under collective investment funds, the Company should take a preapproval from the Board.

Appendix B

Tariff rates in Nepal (based on the translation of the author from general rules for fire insurance rate, 2058, Insurance Board Nepal – document regarded as confidential above)

Type of Building	Earthquake, Fire and Shocks (NPR)*	Earthquake Shocks (NPR)*	Earthquake and Fire (NPR)*
First Tier	1.8	0.99	0.99
Second Tier	2.05	1.08	1.08
Third Tier	2.35	1.00	1.44

**per NRs 1000*

Explanation of the different tiers:

First Tier:

Wall: Made from baked brick, stones, cement or hollow bricks (thick in type), joined by cement, which is not easily inflammable.
Roof: RCC, RBC, Steel Beamed, tiled above truss, or similar material made roof but cannot use the slab of the room.
Floor: The floor should not consist of wood or any other inflammable object.

Second Tier:

Wall: Made from baked brick, stones, cement or hollow bricks (thick in type), joined by cement, which is not easily inflammable.
Roof: Tiled or slated on top of the slab made of wood, the roof can even be tinned – or any other method which is not easily inflammable

Third Tier:

Wall: raw bricks, wood or tin made
Roof: made of wood, slate or tile in the slab of wood or steel

Further Elaboration:

1. To insure against the risk of flooding due to the destruction of embankments of river, lakes or ponds one must pay a premium of additional 20% to the earthquake, fire and shocks insurance.

2. Notwithstanding anything said above, anything out in the open will be considered under the first tier regulations.

(Source: Insurance Board Directive for Insurance Tariff Rates, 2058)

Appendix C

	Class A buildings	Class B buildings
Zone 1	0.65 yen	1.06 yen
Zone 2	0.84 yen	1.65 yen
Zone 3	2.02 yen	3.26 yen

(Per single year insurance period and ¥1,000 of amount insured)

Zone 1	Iwate, Akita, Yamagata, Tochigi, Gunma, Toyama, Ishikawa, Fukui, Nagano, Shiga, Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Fukuoka, Saga, Nagasaki, Kumamoto, Kagoshima
Zone 2	Hokkaido, Aomori, Miyagi, Fukushima, Niigata, Yamanashi, Gifu, Kyoto, Hyogo, Nara, Kagawa, Oita, Miyazaki, Okinawa
Zone 3	Ibaraki, Saitama, Chiba, Tokyo, Kanagawa, Shizuoka, Aichi, Mie, Osaka, Wakayama, Tokushima, Ehime, Kochi

(Note 1)"Class A buildings" refer to fireproof buildings and semi-fireproof buildings, all other buildings are classified as "Class B buildings."
(Note 2) For Zone 2, premium rates are 0.65 for class A buildings and 1.30 for class B buildings in Fukushima

(Note 3) For Zone 3, premium rates for class A buildings are 1.18 in Ibaraki, Tokushima, Ehime and Kochi while 1.36 in Saitama and Osaka, premium rates for class B buildings are 2.44 in Ibaraki, Saitama, Osaka and Ehime while 2.79 in Tokushima and Kochi.

(Note 4) For buildings covered by existing earthquake insurance riders on fire insurance policies that were in place before the January 1, 2010 revision of the criteria for structural classification of buildings, the increase in premium rates due to reclassification from "class A buildings" to "class B buildings" based on the new criteria was capped at 30%

*There are various discount rates available based on seismic isolation, earthquake resistance capacity, seismic resistance capacity and age of the building.

Source: Chapter 2, Earthquake Insurance System in Japan, General Insurance Rating Organization of Japan, 2014

Appendix D

Table 1: Data in Insurance Board website as of March 24, 2016
(http://www.bsib.org.np/index.php?option=news&task=detail&id=57&newsId=27)

S. N.	A	B	Premiums Related to Earthquake										
			C	D	E	F	G	H	I	J	K	L	M
1	Fire	2,940,255.42	15,110	112,446.90	13,827	12,199	4,325	2,264.39	9,151	49,664.34	212	13,634.15	26,370.03
2	Motor	14,393.57	993	2,608.15	732	543	92	1.27	701	1,143.62	3	8.26	-
3	Engineering	1,136,310.29	153	30,760.91	134	52	30	7.65	41	1,000.26	11	3,887.76	-
4	Marine	18,524.53	4	11.62	4	2	-	-	3	4.83	-	-	-
5	Misc.	1,507,660.76	1,426	40,316.03	1,013	956	194	187.82	1,092	28,101.73	11	2,293.44	26,801.00
Total	5,617,144.57	17,686	186,143.61	15,710	13,752	4,641	2,461.13	10,988	79,914.78	237	19,823.61	19,823.61	53,171.03

A- Type of Insurance
B- Premium Paid, in Lakh NPR
C- Number of Claims
D- Forecasted Claim Amount, in Lakh NPR
E- Number of Claims in which Surveyors were employed
F- Claims evaluated by surveyors
G- No Claim
H- No Claims Amount
I- Final Settlement Number
J- Final Settlement Amount, in Lakh Rupees
K- Claims in which Advance were provided
L- Amount of Advance given, in Lakh Rupees
M- Amount received from Reinsurance Company