How Much Do We Save If We Move From Commercial to Social Insurance?

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Abstract

Commercial insurance system acts like a memoryless system in a way that the premiums paid by the policyholders in one accounting period will be of no avail to them during subsequent periods. Here, we argue that if the insurance scheme is implemented as a not-for-profit trust fund (social insurance) instead of a for-profit limited liability company (commercial insurance) then it will effectively and less expensively hedge against unforeseen losses. If the profit of the insurance company is retained instead of being distributed to the stockholders and there is no agency commission then after a certain number of years, all upcoming claims can be addressed from the interest income of the accumulated profit and the policyholders do not need to pay any premium afterwards. Here, we algebraically calculate the time period required to achieve such a perpetual insurance system as the policyholders after a certain period of time, do no longer need to pay any premium in order to get coverage from losses. In the next step, we empirically calculate the required time period to attain a perpetual zero premium insurance scheme for some 20 (twenty) general insurance companies incorporated in Bangladesh.

1 Introduction and Birth of the Insurance

History of insurance as a risk management technique dates back to the beginning of the Bronze Age (4th Millennium BC) when the Babylonian traders widely used the so called bottomry contract [1]. In bottomry contract, loans were given to the merchants by taking the ship and the cargo within it as security and loans would only be repaid if the ship returned after a successful voyage. Which means, if the ship capsized into the sea then loans were not paid back. The bottomry contracts were known to the ancient Greeks and the Hindus of the Iron Age (1st millennium BC) [1]. Chinese traders of the early to middle Bronze Age (3rd millennium BC) used to redistribute their maritime

damages across many vessels in order to keep the losses in a reasonable proportion for each sailor [2]. Similar techniques had been applied by the Babylonians in as early as middle to late Bronze age (2nd millennium BC) and was inscribed along with other 282 laws into the famous Code of Hammurabi by the 6th Babylonian king Hammurabi. The maritime law of general average was invented and practiced by the Rhodians during the Iron Age (1st millennium BC) where all the stakeholders proportionately shared the total maritime losses. Rhodes, being a small, seafaring nation of southern europe, established trading colonies along the cost of Italy, France and Spain. As venturing through the seas became their main course of business they developed the first set of ancient maritime laws of dispute settlement which was inscribed in Lex Rhodia which is popularly known as the ancestor of all maritime laws [3]. Lex Rhodia, as a set of maritime laws, had been eventually adopted by the Roman empire into its constitution as can be seen from the Digest of Justinian, compiled by the order of Eastern Roman emperor of the 6th century Justinian-I [4]. The concept of group insurance tended to evolve in the ancient Roman empire when merchants and craftsmen formed associations/guilds of their own for mutual benefits and for the furtherance of their professional interest. Guilds formed in the Roman era eventually fell with the Roman empire [5] and the practice invigorated again in the medieval Europe. Confraternities of craftsmen including masons, carpenters, carvers were formed in Europe during the middle ages [6] which served the common interest of the craftsmen, gave them substantial bargaining power, protected them from catastrophe and stored wealth in the coffers which acted as a cushion against risk. However, the first specimen of insurance as a separate contract was drafted in Genoa, Italy on Februray 13, 1343 [7]. The great fire of London in 1666 which destroyed nearly 13,200 houses accelerated the growth of modern fire insurance and the first company of its kind to offer fire insurance for the properties came into existence in 1681 under the name 'Insurance Office for Houses'. The development of modern marine insurance is tied to Edward Lloyd, a Welshman who opened a coffee house in Tower Street, London. Lloyd's coffee house in Tower Street became a vibrant meeting place for sailors, traders and underwriters which, after a successful metamorphosis, turned into Lloyd's of London [8], [9] London's premier insurance and reinsurance market. The first company to offer life insurance was formed in London in 1706 by William Talbot and Sir Thomas Allen [10], [11]. So far, insurance companies formed in Europe during the enlightenment era were privately incorporated with no government involvement. However, as the concept of welfare state evolved in Europe during the late nineteenth century, government began to take part in insurance market with a view to ensure economic and social welfare of its citizens. It was the conservative German chancellor, Otto Von Bismarck who took the

first attempt to promote healthcare for the underprevileged through Sickness Insurance Law of 1883. The bill was intended to protect the German industrial workers from various health hazards by drawing periodic contribution from both the employers and the employees. The bill was first one in a row which was followed by Accident Insurance Law of 1884 and Old Age and Disability Insurance Law of 1889. The waves of welfare oriented thinking in Germany crossed national boarder and reached the mind of the British politicians which resulted into passage the The National Insurance Act 1911 in the parliament which provided the British workers and their dependents the first contributory system of insurance against illness and unemployment [12]. Government funded insurance program or the social insurance became a common phenomenon in the health care sector of twenteith century Europe and universal health care system has been implemented in many European countries including Sweden (1955)[13], Iceland (1956)[14], Norway (1956)[15], Denmark (1961)[16], Finland (1964)[17] and the list continues to grow. So far, the concept of social insurance has also been heavily used in USA in Social Security, Medicare, the Pension Benefit Guaranty Corporation program, the Railroad Retirement Board program and state-sponsored unemployment insurance programs [18]. Here, we argue that the social insurance program can serve as a more affordable means of risk mitigation than the commercial insurances. If the profit of the insurance company is retained instead of being distributed to the stockholders and if we can escape the agency commission by making the subcription to the scheme mandatory then after a certain number of years, all upcoming claims can be addressed from the interest income of the accumulated profit and the policyholders do not need to pay any premium afterwards. Here, we algebraically calculate the time period required to achieve such a perpetual insurance system as the policyholders after a certain period of time, do no longer need to pay any premium in order to get coverage from losses. Here, taking the empirical data of some 20 insurance companies in Bangladesh we have calculated the number of years it takes to achieve such a perpetual social insurance scheme where the claims can be settled from the investment income of all previous profits. The rest of the article is organized as follows. Section: 2 provides the formal definition of social insurance. In section: 3, we algebraically calculate the number of years required for the attainment of a perpetual social insurance by retaining the profits over the years. Section: 4 presents the methodology used for empirical estimation. Section: 5 presents the data and results of empirical analysis. Finally, section: 6 concludes the article.

2 The Social Insurance

Social insurance system is indeed an insurance scheme that are run and administered by the state itself. When a state attempts to protect its citizens from various economic and social hazards by risk pooling, a social insurance scheme is born. Social insurance scheme is achieved through compulsory contribution by all citizens of a country to a state-administered trust fund which is then used to fund disability and old age benefits, medical care and other social security programs. Dissecting the above definition of social insurance exposes its main characteristics:

- Social insurance is a government sponsored insurance program. Benefits, eligibility and coverage are often defined by statute.
- Unlike commercial insurance, premiums and claims are attributed to a not for profit trust fund. Excess premium receipt during an accounting period will retain with the fund and any shortage of fund will be addressed by the government from the general taxation revenue.
- Subscription to the scheme are often mandatory in order to compensate for adverse selection and moral hazards.

Social insurance slashes two cost heads associated with conventional commercial insurance:

- As the social insurance is a government sponsored program, every eligible citizen is mandated to contribute to a common fund managed by the government itself. Eligibility is often established through statute and as a result, there is no agency commission.
- Social insurance is usually implemented as a not for profit trust fund and all the income (premium receipt, interest income and other income) and expense (claim settlement, management and other expenses) are accounted for from this fund. The excess premium receipt, instead of being distributed to the stockholders, retains with the fund. So, there is no dividend expenditure.

3 Towards a Perpetual Zero Premium Insurance Scheme

To begin our analysis, let us assume that the total premium received and the total claim settled (or supposed to be settled) by an insurance company at any year are given by P

and C respectively. Apart from the claims, an insurance company may have additional expenses like salaries of its employees, rent of its premises, agency commission, utility expenses etcetera. Let, all the expenses other than claim settlement, dividend expense and agency commission be given by OE (Other Expenses). To proceed, we invoke the most general condition applied for economic analysis: Ceteris Paribus i.e., other things remain unchanged in the period under consideration. To be more precise, for the sake of algebraic analysis, here we assume that the premium, claim and other expenses of the insurance company will remain unchanged over the years under consideration. As the premium, claim and other expenses are given by P, C and OE, the accumulated profit (AP) of the insurance comopany after one year, is given by the following:

$$AP_1 = P - C - OE$$

Let us assume that the deposit interest rate in the same year be given by d. Hence, the profit accumulated after first year will entail profit at the rate of d. At the same time, new premiums will be received as well as new claims and other expenses will be settled during the second year. Hence, accumulated profit after two years, will be given by the following construct:

$$AP_2 = (P - C - OE) + (P - C - OE) \times (1 + d)$$

Proceeding in the above manner, we can get the total accumulated profit of the insurance company after n-th year which is given by the following:

$$AP_n = (P-C-OE)+(P-C-OE)\times(1+d)+(P-C-OE)\times(1+d)^2+.....+(P-C-OE)\times(1+d)^{n-1}$$

$$AP_n = (P - C - OE) \times [1 + (1 + d) + (1 + d)^2 + (1 + d)^3 + ... + (1 + d)^{n-1}]$$

$$AP_n = (P - C - OE) \times \left[\frac{(1 + d)^n - 1}{d}\right]$$

At terminal condition, total expense (claim + Other Expense) at year $(n+1)$ will be supported by the interest income of AP_n. So, we have:

$$
\begin{aligned}
C + OE &= AP_n \times d \\
&= (P - C - OE) \times \left[\frac{(1+d)^n - 1}{d}\right] \times d \\
&= (P - C - OE) \times [(1+d)^n - 1]
\end{aligned}
$$

$$
\begin{aligned}
C + OE &= (P - C - OE) \times (1+d)^n - P + C + OE \\
C + OE + P - C - OE &= (P - C - OE) \times (1+d)^n \\
P &= (P - C - OE) \times (1+d)^n \\
ln(P) &= ln(P - C - OE) + n \times ln(1+d) \\
n \times ln(1+d) &= ln(P) - ln(P - C - OE)
\end{aligned}
$$

$$
n = \frac{ln\left(\frac{P}{P-C-OE}\right)}{ln(1+d)} \tag{1}
$$

4 Methodology

We use equation: 1 to calculate the number of years n, required to attain a perpetual zero premium insurance scheme where all onward expenses can be met up by the interest income of accumulated profit upto year n. To do so, we collect annual data of net premium receipt, net claim settled and other expenses except agency commission from the balance sheet of different insurance companies. Then these values along with deposit interest rate offered by the banks are put into equation: 1 to calculate the value of n.

5 Data

Interest rate data is collected from World Bank data warehouse which is publicly available through the URL: `data.worldbank.org/indicator`. For micro data related to the insurance companies, we select some 20 (twenty) general insurance companies operating in Bangladesh. We collect annual reports of the insurance companies for the year 2017 from the websites of the respective companies. From the annual report, we collect the data regarding net premium, net claim settlement and other expenses. As the insurance

companies often seek to mitigate their risk exposure through reinsurance, the amount of net premium receipt is calculated by subtracting the premium paid for reinsurance from the gross premium receipt. The total amount of claim under policy is calculated by adding total amount paid for claim settlement during the year with the total outstanding claim at the end of the year and subtracting from it the total amount of outstanding claim at the end of the previous year. The amount of other expenses is calculated by taking all other expenses except agency commission, claim settlement and dividend expense. Data collected in the aforementioned manner are pictorially represented in figure:1 and 2. From figure: 1, 2, it is evident that claim settlement comprises a small portion of the net premium receipt. A greater portion of premium receipt are spent on agent commission which can be cut down by adopting the social insurance instead of a commercial one. From figure: 2, it can be seen that total claim settlement can be as low as 3.33% of total premium receipt (for City General Insurance Company Limited) while the lowest value of agency commission as percentage of net premium receipt is found to be 14.95% (for Northern General Insurance Company Limited). Agency commission in most of the cases is found to be substantially higher than the claim settlement. So, the emphasis is given on marketing activities rather than on claim settlement although the claim settlement is the main objective an insurance company is intended to serve. Apart from claim settlement, there is dividend expense where sponsors of the insurance company are paid according to their amount of share holding. We can get rid of agency commission and dividend expense if we move from commercial to social insurance. In social insurance scheme, capitals are accumulated over the years from the balances of income (premiums and other income) and expenses (claims and other expenses). This paradigm will allow us to build up reserves which, after a certain number of years, become sufficient to cover up all upcoming expenses from interest income. The years thus required (n) to attain a perpetual zero premium insurance scheme are then calculated using equation: 1 and the results are presented in figure: 3. From figure: 3, it is evident that the value of n varies from 12.08 (for Eastern Insurance Company Limited) to 27.92 (for Federal Insurance Company Limited).

6 Conclusion

Social insurance scheme is a state-sponsored insurance program which requires mandatory contribution from all the eligible citizens of a country. As every citizen is mandated to subscribe to the scheme there is no marketing overhead. Moreover, unlike commercial insurance, social insurance does not pay dividend to its sponsors, i.e., the state. Hence,

adopting a social insurance scheme in place of a commercial one, entails lower premium which ensures greater welfare and more uniform distribution of wealth. Here, we argue that the amount of premium in excess of all costs can be retained with the insurance company to build up a reserve. The reserve thus built up can support all upcoming insurance claims without receiving any premium after a certain number of years. Here, in absence of any growth, we calculate the number of years n required to develop a reserve large enough to support all upcoming insurance claims from the interest income derived from that reserve.

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7 Figures

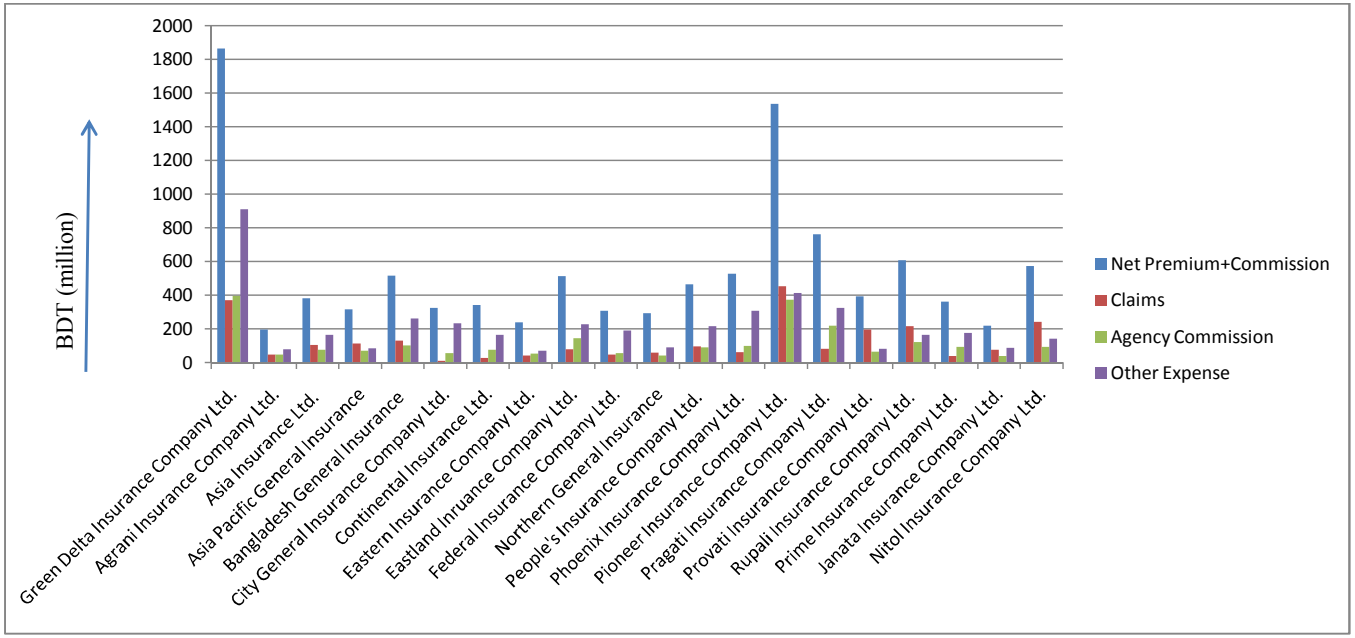

Figure 1: Net Premium, Total Claim, Agent Commission and Other Expense

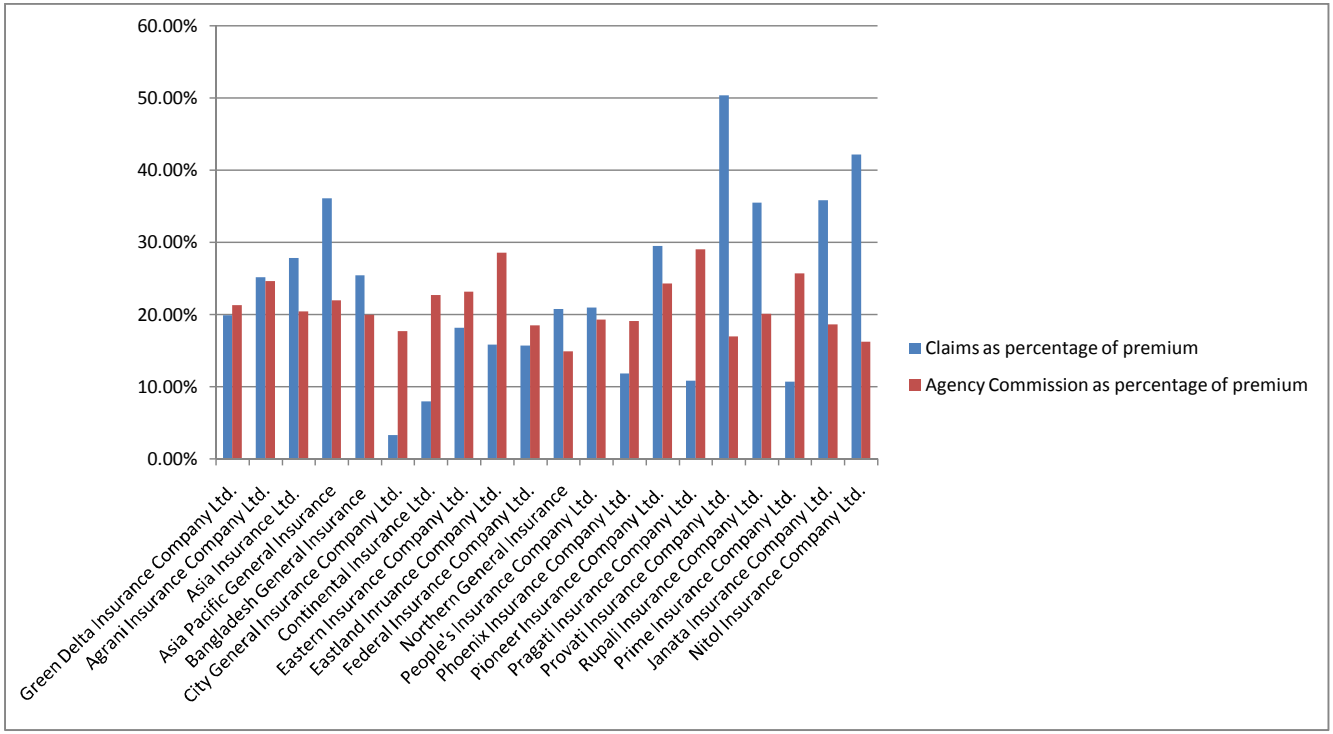

Figure 2: Total claim and agent commission as percentage of net premium

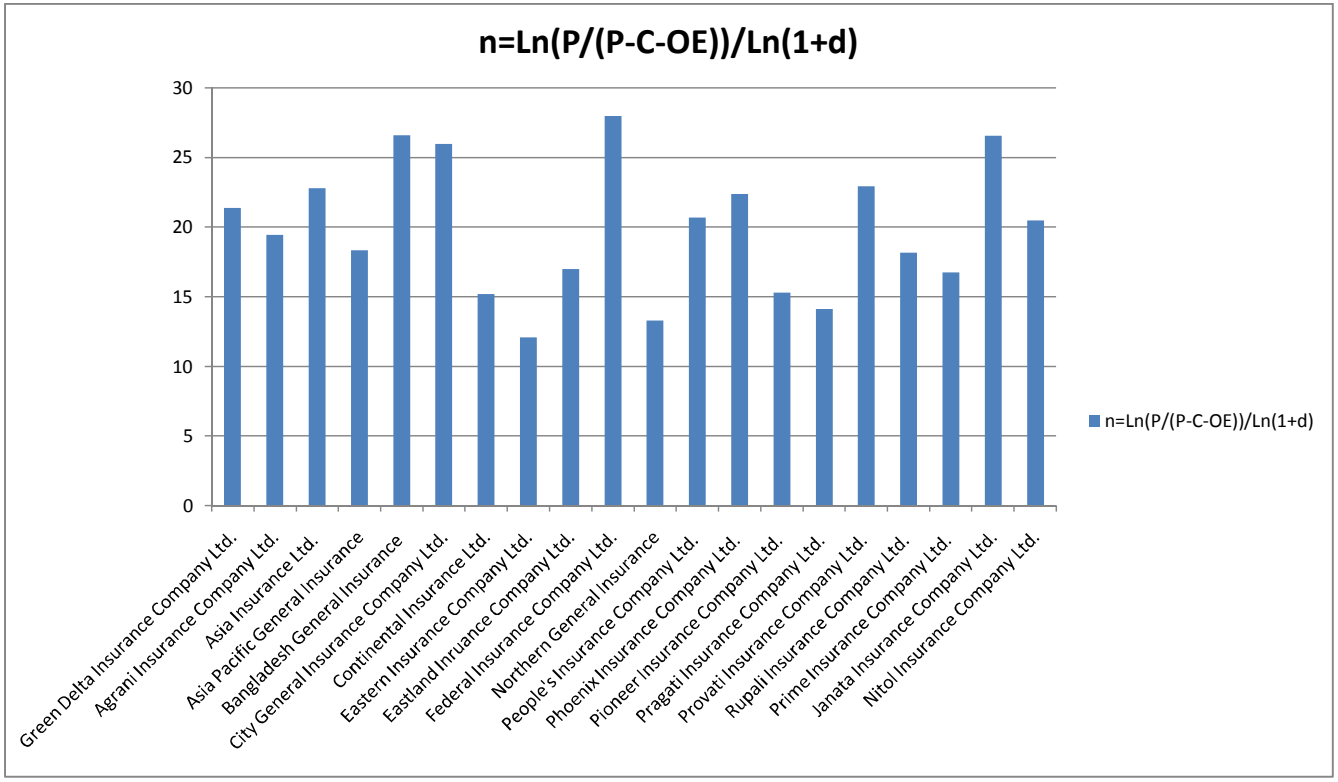

Figure 3: Number of years (n) required to attain a perpetual zero premium insurance scheme