Measuring the Degree of Market Concentration in Thailand Insurance Industry

Sivalap Sukpaiboonwat¹, Chucheep Piputsitee¹ & Arunee Punyasavatsut¹

¹Faculty of Economics, Kasetsart University, Bangkok, Thailand

Correspondence: Sivalap Sukpaiboonwat, Faculty of Economics, Kasetsart University, Bangkok, Thailand.
E-mail: sivalap@gmail.com

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Abstract
This paper investigates market structure of life insurance and non-life insurance industry in Thailand. This paper uses the Concentration Ratio and the Herfindahl-Hirschman Index to measure the degree of market concentration. The paper also analyzes various data from all type of insurance premium, balance sheet and income statement to measure the concentration and competition trend.

An analysis of life insurance premium, group market is unconcentrated whereas ordinary and industry markets are concentrated. As for the life insurance balance sheet and income statement are concentrated market. An analysis of non-life insurance premium, fire, marine and transportation and automobile markets are unconcentrated. As for the non-life insurance balance sheet and income statement are unconcentrated market. In terms of the same sub-categorized product, personal accident and health insurance have difference concentrate degree. Personal accident in life insurance is near monopoly and highly concentrated market while personal accident in non-life insurance is loose oligopoly and moderate concentrated market. Health insurance in life and non-life insurance are tight oligopoly and concentrated market.

The results conclude that the life insurance industry is more concentrated than the non-life insurance industry. In both segments of the insurance market, as well as in the overall insurance sector, there is a downward trend in market concentration, which indicates the success of the competition promoting process which allows a greater and better choice for customers.

Keywords: insurance industry, market structure, concentration measurement

1. Introduction
The insurance industry serves individuals and businesses with security products such as life insurance, health insurance, automobile and other liability coverage of non-life insurance. Moreover, insurance industry plays a major role in financial intermediation, thus enhancing a nation’s financial and economic development.

Life insurance brings confidence and security for all income groups of society who may be affected by life’s uncertainties. At the same time, health insurance has become increasingly important due to the rapidly growing elderly population and the advanced medical technology that enables people to have a longer life span. Developed countries such as the US, Europe, Japan and South Korea as well as developing countries such as Thailand are stepping into the aging society because the elderly population are growing at a faster rate than the child-bearing population. It is estimated that the elderly population in Thailand will increase to 8.0 million (11.9% of total population) in 2010, to 17.7 million (25.1% of total population) in 2030 (Office of the National Economic and Social Development Board, 2010). Thus, governments in most countries are making effort in encouraging the population to seek ways to increasing their savings through government bonds, real estate schemes and retirement plans and to boost confidence and security in the form of life and health insurance. With a reliable saving plan, our stable income can be fortified through a life insurance system that provides protection and secures our savings. If the individual learns to take advantage of a savings plan, the saving plan will help increase the country’s savings and further lead to the nation’s economic development and expansion.

Likewise, non-life insurance is beneficial to business and investment sectors of society who are inevitably faced with daily risks from unforeseen circumstances or natural disasters such as floods, hurricanes, tsunamis, fire, explosions, accidents arising from travel and carelessness. All these risks and financial damage can be alleviated.
by reliable non-life insurance system.

As alluded to above, there were empirical studies that reveal the insurance industry in the term of insurance market structure. Jedlicka & Jumah (2006) analyze the Austrian insurance industry using insurance premium. The study finds a positive relationship between market share and profitability. The higher market concentration leads to higher market power and higher returns. Dumm & Macpherson (2006) examine insurance premium in Florida. The study finds that Florida insurance industry is highly concentrated that two companies have 50 percent of premiums and six companies have 99 percent of premiums in 2004. Glambotskaya (2009) studies the structure of the Belarusian insurance market by insurance premiums. The study finds that Belarusian insurance business concentration is very high. Herfindal-Hirshman index for the insurance sector in 2007, calculated on the written premiums, was 3540. The biggest share of the insurance market belongs to the state-owned insurers. Austin & Hungerford (2009) study the market structure of the health insurance industry in United State. The study finds that health insurance markets are highly concentrated. The concentrated markets lead to high premium and limit access to health insurance. All of the studies show insurance market having a high market share and high market power.

Past studies concentrated only on insurance premium. No study investigates in the part of balance sheet and income statement, in spite of the fact that these data are keys to the financial position. Thus, this paper use balance sheet and income statement to measure market structure. This study will determine all type of premium both of life and non-life insurance and learn more about balance sheet which include assets, liabilities and shareholder’s equity and income statement which include revenue, expenditures and net profit for the most comprehensive and complete insurance market study. It is helpful to have an understanding of the current structure of the insurance industry and consider their future paths. This study is organized as follows: section 2 measures the degree of concentration in Thailand insurance industry; section 3 shows the results of market concentration in Thailand insurance industry; then section 4 presents conclusions of the study.

### 2. Method

A market is any arrangement in which buyers and sellers exchange goods or services at agreed-upon price and quantity. Market structure is implying the number and relative size of the producers in an industry. An industry’s market structure is a reflection the similarity of products produced within the industry and the relative ease for new producers to enter the market. Market structure also determines the producers’ competitive environment. Economists commonly categorize market structures into four basic types: perfect competition, monopoly, monopolistic competition, and oligopoly (Johnson & Stone, 1998).

The imperfect market such as monopolistic competition, oligopoly, and monopoly, which there are few sellers and differentiated products, results in some market power. On the opposite, perfect competition, a market structure characterized by a large number of small sellers supplying a homogeneous product incurs no market power. To consider size of firm and significant percentage of the market supply, there are two elements of market structure. They are concentration ratios and Herfindahl-Hirschman index.

The concentration ratio is the percentage of market share owned by the largest n firms in an industry. The largest firm concentration ratio is CR1. The most common concentration ratio is the four-firm concentration ratio (CR4).

Let \( S_i \) denotes the output of each firms in an industry, \( i = 1, 2, 3 \ldots n \), and \( S_T \) denotes the total output of all firms in the industry. Let firm i’s share of the total market output is \( W_i = \frac{S_i}{S_T} \). Then the CR4 is the fraction of total industry output produced by the four largest firms in the industry.

\[
CR_4 = \frac{S_1 + S_2 + S_3 + S_4}{S_T}, \quad CR_4 = \sum_{i=1}^{4} W_i
\]

Another measurement is Herfindahl-Hirschman index (HHI). The HHI is the sum of the squared market shares of firms in the industry, multiplied by 10 000 to eliminate the decimals. Then the Herfindahl-Hirschman index is

\[
HHI = 10,000 \left[ \left( \frac{S_1}{S_T} \right)^2 + \left( \frac{S_2}{S_T} \right)^2 + \ldots + \left( \frac{S_n}{S_T} \right)^2 \right], \quad HHI = 10,000 \sum_{i=1}^{n} W_i^2
\]

The HHI measures the size of firms in relation to the industry, but also as an indication of the amount of competition. If HHI decrease it is interpreted as a loss of market power and at the same time an increase in competition.
Table 1. Classifying industries with the CR1, CR4, and HHI

| CR4   | HHI        | Interpretation of Market Structure                                      |
|-------|------------|------------------------------------------------------------------------|
| CR4 = 0 | HHI = 0    | Perfect Competition                                                     |
| 0 < CR4 < 40 | HHI < 1000 | Effective Competition or Monopolistic Competition, Unconcentrated       |
| 40 ≤ CR4 < 60 | 1000 ≤ HHI < 1800 | Loose Oligopoly or Monopolistic Competition, Moderately concentrated |
| 60 ≤ CR4 < 90 | 1800 ≤ HHI < 2500 | Tight Oligopoly, Concentrated                                           |
| 90 ≤ CR4 | 2500 ≤ HHI < 9999 | Effective Monopoly (near monopoly), Highly concentrated                |
| CR1 = 100 | HHI = 10 000 | Monopoly                                                               |

Source: Lipczynski et al. (2005, p. 215)

Table 2. Comparison of market structures

| Type of Market Structure | Power to set supply and price | Number of sellers | Level of product differentiation | Number of barriers to entry |
|-------------------------|-------------------------------|------------------|---------------------------------|----------------------------|
| Monopoly                | High                          | One              | Unique                          | Many                       |
| Oligopoly               | Some                          | Few              | Either differentiated or homogeneous | Many                       |
| Monopolistic Competition| Very little                  | Many             | Differentiated                  | Few                       |
| Perfect Competition     | None                          | Very many        | Homogeneous                     | None                      |

Source: Johnson and Stone (1998, p. 64)

3. Results

The prevailing method of analyzing market structure is the measurement of concentration. This section focuses on life and non-life insurance industry in terms of the CR1 ratio, CR4 ratio and Herfindahl-Hirschman index.

3.1 Life Insurance Industry

This part presents market concentration on life insurance premium, life insurance balance sheet and life insurance income statement.

3.1.1 Market Concentration on Life Insurance Premium

Table 3. Market concentration on life insurance premium

| Year | 1997 | 1998 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|-----------------------|
| 1. Total Premium                           |      |      |      |      |                       |
| CR1  | 46.83| 47.50| 30.93| 28.79| (6.91)                |
| CR4  | 85.33| 85.48| 62.24| 62.08| (0.26)                |
| HHI  | 2900 | 2941 | 1470 | 1402 | (9.51)                |
| 2. Ordinary premium                        |      |      |      |      |                       |
| CR1  | 54.3 | 55.13| 33.54| 30.29| (9.68)                |
| CR4  | 90.13| 90.56| 67.11| 65.45| (4.63)                |
| HHI  | 3597 | 3664 | 1682 | 1522 | (9.51)                |
## Year 1997 1998 2010 2011 % increase (decrease)

### 3. Industry Premium

| CR<sub>1</sub> | 65.08 high market share | 66.61 high market share | 79.27 high market share | 78.04 high market share | (1.55) |
| CR<sub>4</sub> | 98.63 near monopoly | 98.57 near monopoly | 99.73 near monopoly | 99.75 near monopoly | 0.02 |
| HHI | 5046 highly concentrated | 5196 highly concentrated | 6516 highly concentrated | 6348 highly concentrated | (2.58) |

### 4. Group Premium

| CR<sub>1</sub> | 33.83 moderate market share | 34.45 moderate market share | 15.27 low market share | 17.76 low market share | 16.31 |
| CR<sub>4</sub> | 70.14 tight oligopoly | 69.49 tight oligopoly | 49.76 loose oligopoly | 52.17 loose oligopoly | 4.83 |
| HHI | 1738 moderate concentrated | 1754 moderate concentrated | 903 unconcentrated | 958 unconcentrated | 6.09 |

### 5. Personal Accident Premium

| CR<sub>1</sub> | 74.55 high market share | 74.45 high market share | 74.45 high market share | 74.45 high market share | (0.14) |
| CR<sub>4</sub> | n. a. | n. a. | 90.13 Near monopoly | 91.76 Near monopoly | 1.80 |
| HHI | 5664 highly concentrated | 5662 highly concentrated | 958 unconcentrated | 958 unconcentrated | (0.04) |

### 6. Health Insurance Premium

| CR<sub>1</sub> | 52.65 high market share | 52.52 high market share | 49.34 moderate market share | 48.23 moderate market share | (2.25) |
| CR<sub>4</sub> | 92.18 Near monopoly | 91.70 Near monopoly | 83.79 Tight oligopoly | 83.13 Tight oligopoly | (0.79) |
| HHI | 3583 Highly concentrated | 3507 Highly concentrated | 2906 Highly concentrated | 2804 Highly concentrated | (3.51) |

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 3 and Figure 1, the life insurance industry in term of total premium indicates tight oligopoly and concentrated market with decreasing trend. The CR₄ and HHI of total premium are 62.08% and 1402, respectively, in 2011. Life insurance industry in Thailand has four sub-categorized products, including ordinary, industry, group, personal accident and health insurance product. The highest competition is group product and highest concentration is industry product. The CR₄ of group premium is 17.76 % and the CR₄ of industry premium is 78.04% in 2011. The HHI of group premium is 958 and the HHI of industry premium is 6348 in 2011.

3.1.2 Market Concentration on Life Insurance Balance Sheet

Table 4. Market concentration on life insurance balance sheet

| Year  | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|-------|------|------|------|------|------------------------|
| 1. Investment Assets | | | | | |
| CR₁ | 48.20 | moderate market share | 47.18 | moderate market share | 42.09 | moderate market share | 39.80 | moderate market share | 39.80 | moderate market share | (5.43) |
| CR₄ | 80.16 | tight oligopoly | 78.34 | tight oligopoly | 71.00 | tight oligopoly | 68.79 | tight oligopoly | 68.79 | tight oligopoly | (3.12) |
| HHI | 2771 | highly concentrated | 2668 | highly concentrated | 2195 | concentrated | 2023 | concentrated | 2023 | concentrated | (7.83) |
| 2. Building & Operating Assets | | | | | | |
| CR₁ | 31.12 | moderate market share | 31.02 | moderate market share | 33.39 | moderate market share | 29.98 | low market share | 29.98 | low market share | (10.20) |
| CR₄ | 85.86 | tight oligopoly | 82.28 | tight oligopoly | 84.82 | tight oligopoly | 85.74 | tight oligopoly | 85.74 | tight oligopoly | 1.08 |
| HHI | 2233 | concentrated | 2087 | concentrated | 2219 | concentrated | 2278 | concentrated | 2278 | concentrated | 2.65 |
| 3. Others Assets | | | | | | |
| CR₁ | 34.34 | moderate market share | 33.45 | moderate market share | 23.20 | low market share | 25.54 | low market share | 25.54 | low market share | 10.08 |
| Year | 2006       | 2007       | 2010       | 2011       | % increase (decrease) |
|------|------------|------------|------------|------------|-----------------------|
| CR4  | 66.97      | 65.33      | 60.48      | 60.92      | tight oligopoly       |
|      | tight oligopoly | tight oligopoly | tight oligopoly | tight oligopoly | 0.72                  |
| HHI  | 1690       | 1626       | 1207       | 1294       | moderate concentrated |
|      | moderate concentrated | moderate concentrated | moderate concentrated | moderate concentrated | 7.22                  |

4. Total Asset

| CR1  | 47.10      | 46.13      | 40.96      | 38.82      | moderate market share |
|      | moderate market share | moderate market share | moderate market share | moderate market share | (5.22)                  |
| CR4  | 79.50      | 77.73      | 70.39      | 68.41      | tight oligopoly       |
|      | tight oligopoly | tight oligopoly | tight oligopoly | tight oligopoly | (2.81)                  |
| HHI  | 2677       | 2580       | 2115       | 1962       | concentrated          |
|      | highly concentrated | highly concentrated | concentrated | concentrated | (7.25)                  |

5. Policy Liabilities

| CR1  | 42.70      | 41.42      | 37.93      | 34.57      | moderate market share |
|      | moderate market share | moderate market share | moderate market share | moderate market share | (8.86)                  |
| CR4  | 78.86      | 76.75      | 69.10      | 66.15      | tight oligopoly       |
|      | tight oligopoly | tight oligopoly | tight oligopoly | tight oligopoly | (4.27)                  |
| HHI  | 2380       | 2265       | 1929       | 1718       | concentrated          |
|      | concentrated | concentrated | concentrated | concentrated | (10.91)                 |

6. Other Liabilities

| CR1  | 58.90      | 59.17      | 45.88      | 40.03      | high market share   |
|      | high market share | high market share | moderate market share | moderate market share | (12.76)               |
| CR4  | 82.69      | 79.99      | 66.89      | 64.23      | tight oligopoly     |
|      | tight oligopoly | tight oligopoly | tight oligopoly | tight oligopoly | (3.98)                 |
| HHI  | 3706       | 3707       | 2370       | 1953       | concentrated         |
|      | highly concentrated | highly concentrated | concentrated | concentrated | (17.59)                |

7. Capital Funds

| CR1  | 68.69      | 68.20      | 57.25      | 53.03      | high market share   |
|      | high market share | high market share | high market share | high market share | (22.79)               |
| CR4  | 87.12      | 88.49      | 81.28      | 79.22      | tight oligopoly     |
|      | tight oligopoly | tight oligopoly | tight oligopoly | tight oligopoly | (9.07)                 |
| HHI  | 4868       | 4817       | 3524       | 3109       | highly concentrated |
|      | highly concentrated | highly concentrated | highly concentrated | highly concentrated | (36.13)                |

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 4 and Figure 2, the life insurance balance sheet is tight oligopoly and concentrated. The CR₄ and HHI of investment asset are 68.79% and 2023, respectively, in 2011. The CR₄ and HHI of total asset are 68.41% and 1962, respectively, in 2011. The CR₄ and HHI of policy liabilities are 66.15% and 1718, respectively, in 2011. The CR₄ and HHI of capital funds are 79.22% and 3109, respectively, in 2011.

3.1.3 Market Concentration on Life Insurance Income Statement

| Year | 2006   | 2007   | 2010   | 2011   | % increase (decrease) |
|------|--------|--------|--------|--------|-----------------------|
| 1. Net Written Premiums |        |        |        |        |                       |
| CR1  | 41.87  | moderate market share | 38.74  | moderate market share | 30.95  | moderate market share | 28.82  | low market share | (6.87) |
| CR4  | 72.70  | tight oligopoly        | 70.45  | tight oligopoly       | 62.48  | tight oligopoly       | 62.21  | tight oligopoly | (0.44) |
| HHI  | 2211   | concentrated          | 1992   | concentrated        | 1476   | moderate concentrated | 1407   | moderate concentrated | (4.72) |
| 2. Net Investment Income & Other Income |        |        |        |        |                       |
| CR1  | 52.26  | high market share     | 49.36  | moderate market share | 43.82  | moderate market share | 39.70  | moderate market share | (9.42) |
| Year | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|----------------------|
| CR4  | 81.75 tight oligopoly | 80.06 tight oligopoly | 72.36 tight oligopoly | 69.18 tight oligopoly | (4.40) |
| HHI  | 3103 highly concentrated | 2849 highly concentrated | 2338 concentrated | 2036 concentrated | (12.91) |

3. Total Income

| CR1  | 43.60 moderate market share | 40.46 moderate market share | 32.93 moderate market share | 30.52 moderate market share | (7.31) |
| CR4  | 73.73 tight oligopoly | 71.66 tight oligopoly | 63.79 tight oligopoly | 63.27 tight oligopoly | (0.80) |
| HHI  | 2340 concentrated | 2111 concentrated | 1580 moderate concentrated | 1483 moderate concentrated | (6.18) |

4. Life Policy Reserve

| CR1  | 33.96 moderate market share | 32.98 moderate market share | 24.47 low market share | 20.39 low market share | (16.67) |
| CR4  | 68.70 tight oligopoly | 66.86 tight oligopoly | 60.05 tight oligopoly | 62.67 tight oligopoly | 4.36 |
| HHI  | 1755 moderate concentrated | 1649 moderate concentrated | 1237 moderate concentrated | 1208 moderate concentrated | (2.40) |

5. Benefit Payments During the Year

| CR1  | 48.87 moderate market share | 43.77 moderate market share | 39.76 moderate market share | 38.00 moderate market share | (4.43) |
| CR4  | 80.55 tight oligopoly | 79.07 tight oligopoly | 72.88 tight oligopoly | 71.75 tight oligopoly | (1.55) |
| HHI  | 2911 highly concentrated | 2527 highly concentrated | 2137 concentrated | 2015 concentrated | (5.72) |

6. Dividends

| CR1  | 64.90 high market share | 55.47 high market share | 33.40 moderate market share | 31.66 moderate market share | (5.20) |
| CR4  | 96.75 near monopoly | 95.43 near monopoly | 93.81 near monopoly | 97.43 near monopoly | 3.87 |
| HHI  | 4717 highly concentrated | 3807 highly concentrated | 2381 concentrated | 2492 concentrated | 4.66 |

7. Salary and Brokers

| CR1  | 44.88 moderate market share | 45.51 moderate market share | 24.16 low market share | 37.02 moderate market share | 53.21 |
| CR4  | 72.79 tight oligopoly | 71.45 tight oligopoly | 60.71 tight oligopoly | 69.56 tight oligopoly | 14.58 |
| HHI  | 2413 concentrated | 2425 concentrated | 1230 moderate concentrated | 1855 concentrated | 50.78 |

8. Total Expense

| CR1  | 40.61 moderate market share | 37.88 moderate market share | 31.53 moderate market share | 29.52 low market share | (6.38) |
| CR4  | 71.82 tight oligopoly | 69.23 tight oligopoly | 62.21 tight oligopoly | 61.84 tight oligopoly | (0.599) |
| HHI  | 2120 concentrated | 1931 concentrated | 1494 moderate concentrated | 1421 moderate concentrated | (4.89) |

9. Profit from Operation

| CR1  | 68.57 high market share | 62.76 high market share | 44.93 moderate market share | 38.98 moderate market share | (13.25) |
| CR4  | 87.15 tight oligopoly | 86.26 tight oligopoly | 75.51 tight oligopoly | 74.43 tight oligopoly | (1.43) |
| HHI  | 4864 highly concentrated | 4196 highly concentrated | 2487 concentrated | 2099 concentrated | (15.58) |

Source: Calculated by author, using data from Office of Insurance Commission
Figure 3. Market concentration on life insurance income statement

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 5 and Figure 3, the life insurance income statement is tight oligopoly and concentrated. The CR4 and HHI of net written premium are 62.21% and 1407, respectively, in 2011. The CR4 and HHI of life policy reserve are 62.67% and 1208, respectively, in 2011. The CR4 and HHI of profit from operation are 74.43% and 2099, respectively, in 2011.

3.2 Non-Life Insurance Industry

This part presents market concentration on non-life insurance premium, non-life insurance balance sheet and non-life insurance income statement.

3.2.1 Market Concentrations on Non-Life Insurance Premium

Table 6. Market concentration on non-life insurance premium

| Table 6. Market concentration on non-life insurance premium |
|-------------------------------------------------------------|
| **Year** | **1997** | **1998** | **2010** | **2011** | **% increase (decrease)** |
|-----------|----------|----------|----------|----------|---------------------------|
| **1. Total Premium** | | | | | |
| CR1 | 13.13 low market share | 12.27 low market share | 16.15 low market share | 15.51 low market share | (3.94) |
| CR4 | 34.08 monopolistic | 31.50 monopolistic | 36.71 monopolistic | 37.03 monopolistic | 0.88 |
| HHI | 467 unconcentrated | 419 unconcentrated | 533 unconcentrated | 531 unconcentrated | (0.38) |
| **2. Fire Premium** | | | | | |
| CR1 | 12.18 low market share | 12.09 low market share | 16.15 low market share | 12.74 low market share | (21.13) |
| CR4 | 32.15 monopolistic | 32.18 monopolistic | 36.71 monopolistic | 42.56 loose oligopoly | 15.94 |
| HHI | 435 unconcentrated | 429 unconcentrated | 533 unconcentrated | 640 unconcentrated | 20.08 |
| **3. Marine and Transportation Premium** | | | | | |
| CR1 | 11.42 low market share | 10.93 low market share | 14.57 low market share | 12.93 low market share | (11.28) |
| CR4 | 33.63 monopolistic | 33.90 monopolistic | 42.18 loose oligopoly | 39.81 monopolistic | (5.61) |
| HHI | 475 unconcentrated | 471 unconcentrated | 648 unconcentrated | 585 unconcentrated | (9.72) |
| **4. Automobile Premium** | | | | | |
| CR1 | 20.35 low market share | 20.13 low market share | 24.92 low market share | 23.98 low market share | (3.78) |
| CR4 | 50.02 loose oligopoly | 43.58 loose oligopoly | 42.61 loose oligopoly | 41.74 loose oligopoly | (2.03) |
| HHI | 821 unconcentrated | 734 unconcentrated | 858 unconcentrated | 828 unconcentrated | (3.50) |
| **5. Personal Accident Premium** | | | | | |
| CR1 | 45.71 moderate market share | 19.58 low market share | 26.32 low market share | 34.43 |
| CR4 | n.a. | 62.68 tight oligopoly | 50.76 loose oligopoly | 53.09 loose oligopoly | 4.60 |
| HHI | 2244 concentrated | 944 unconcentrated | 1109 moderate concentrated | 17.48 |
| **6. Health Premium** | | | | | |
| CR1 | 47.12 moderate market share | 31.30 moderate market share | 30.72 moderate market share | (1.87) |
| CR4 | n.a. | 77.18 tight oligopoly | 60.54 tight oligopoly | 61.23 tight oligopoly | 1.14 |
| HHI | 2640 highly concentrated | 1396 moderate concentrated | 1369 moderate concentrated | (1.93) |

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 6 and Figure 4, the non-life insurance industry in term of total premium indicates monopolistic competition and unconcentrated market. The CR₄ and HHI of total premium are 37.03% and 531, respectively, in 2011. Non-life insurance industry in Thailand has four sub-categorized products, including fire, marine and transportation, automobile, personal accident and health in miscellaneous insurance product. The highest concentration is health product. The CR₄ and HHI of health premium is 61.23% and 1369, respectively, in 2011. However, the HHI trend of the health market concentration slows down.
### 3.2.2 Market Concentrations on Non-Life Insurance Balance Sheet

Table 7. Market concentration on non-life insurance balance sheet

| Year | 2006    | 2007    | 2010    | 2011    | % increase (decrease) |
|------|---------|---------|---------|---------|-----------------------|
| **1. Investment Assets** |         |         |         |         |                       |
| CR1  | 16.74   | low market share | 16.47   | low market share | 14.89     | low market share | 16.03     | low market share | 7.64 |
| CR4  | 42.21   | loose oligopoly | 41.71   | loose oligopoly | 43.08     | loose oligopoly | 44.53     | loose oligopoly | 3.37 |
| HHI  | 631     | unconcentrated | 625     | unconcentrated | 641       | unconcentrated | 697       | unconcentrated | 8.63 |
| **2. Building & Operating Assets** |         |         |         |         |                       |
| CR1  | 13.92   | low market share | 13.36   | low market share | 18.09     | low market share | 13.47     | low market share | (25.53) |
| CR4  | 40.34   | loose oligopoly | 39.00   | monopolistic   | 44.20     | loose oligopoly | 38.17     | monopolistic   | (13.66) |
| HHI  | 614     | unconcentrated | 591     | unconcentrated | 721       | unconcentrated | 614       | unconcentrated | (14.87) |
| **3. Others Assets** |         |         |         |         |                       |
| CR1  | 10.96   | low market share | 11.20   | low market share | 17.67     | low market share | 24.48     | low market share | 38.53 |
| CR4  | 35.63   | monopolistic   | 31.62   | monopolistic   | 46.92     | loose oligopoly | 53.38     | loose oligopoly | 13.78 |
| HHI  | 460     | unconcentrated | 406     | unconcentrated | 768       | unconcentrated | 991       | unconcentrated | 29.12 |
| **4. Total Asset** |         |         |         |         |                       |
| CR1  | 15.23   | low market share | 14.65   | low market share | 15.54     | low market share | 19.56     | low market share | 25.87 |
| CR4  | 38.60   | monopolistic   | 37.70   | monopolistic   | 43.12     | loose oligopoly | 43.85     | loose oligopoly | 1.69 |
| HHI  | 545     | unconcentrated | 533     | unconcentrated | 638       | unconcentrated | 729       | unconcentrated | 14.16 |
| **5. Policy Liabilities** |         |         |         |         |                       |
| CR1  | 19.69   | low market share | 20.15   | low market share | 19.36     | low market share | 22.39     | low market share | 15.67 |
| CR4  | 39.94   | monopolistic   | 39.55   | monopolistic   | 42.10     | loose oligopoly | 50.30     | loose oligopoly | 19.46 |
| HHI  | 649     | unconcentrated | 649     | unconcentrated | 683       | unconcentrated | 880       | unconcentrated | 28.84 |
| **6. Other Liabilities** |         |         |         |         |                       |
| CR1  | 16.75   | low market share | 16.23   | low market share | 33.66     | moderate market share | 23.80 | low market share | (29.30) |
| CR4  | 36.97   | monopolistic   | 35.21   | monopolistic   | 52.45     | loose oligopoly | 41.83     | loose oligopoly | (20.25) |
| HHI  | 542     | unconcentrated | 519     | unconcentrated | 1,357     | moderate concentrated | 797   | unconcentrated | (41.29) |
| **7. Capital Funds** |         |         |         |         |                       |
| CR1  | 26.14   | low market share | 26.07   | low market share | 24.41     | low market share | 23.44     | low market share | (10.31) |
| CR4  | 48.37   | loose oligopoly | 49.15   | loose oligopoly | 47.43     | loose oligopoly | 54.14     | loose oligopoly | 11.92 |
| HHI  | 967     | unconcentrated | 971     | unconcentrated | 892       | unconcentrated | 1060      | moderate concentrated | 9.59 |

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 7 and Figure 5, the non-life insurance balance sheet is loose oligopoly and unconcentrated with increasing trend. The CR₄ and HHI of investment asset are 44.53% and 697, respectively, in 2011. The CR₄ and HHI of total asset are 43.85% and 729, respectively, in 2011. The CR₄ and HHI of policy liabilities are 50.30% and 880, respectively, in 2011. The CR₄ and HHI of capital funds are 23.44% and 1060, respectively, in 2011.
3.2.3 Market Concentrations on Non-Life Insurance Income Statement

Table 8. Market concentration on non-life insurance income statement

| Year | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|-----------------------|
| **1. Earn Premiums** | | | | | |
| CR1 18.9/8 | low market share | 20.01 | low market share | 20.4/8 | low market share | 20.7/0 | low market share | 1.08 |
| CR4 35.5/6 | monopolistic | 36.58 | monopolistic | 38.0/9 | monopolistic | 38.2/3 | monopolistic | 0.38 |
| HHI 575 | unconcentrated | 615 | unconcentrated | 655 | unconcentrated | 672 | unconcentrated | 2.64 |
| **2. Net Investment and other income** | | | | | | |
| CR1 13.2/2 | low market share | 12.49 | low market share | 18.7/8 | low market share | 15.7/4 | low market share | (16.20) |
| CR4 36.0/3 | monopolistic | 34.59 | monopolistic | 49.7/1 | loose oligopoly | 44.2/0 | loose oligopoly | (11.08) |
| HHI 517 | unconcentrated | 486 | unconcentrated | 793 | unconcentrated | 674 | unconcentrated | (15.03) |
| **3. Total Income** | | | | | | |
| CR1 18.4/6 | low market share | 19.35 | low market share | 19.8/6 | low market share | 19.9/0 | low market share | 0.17 |
| CR4 35.2/2 | monopolistic | 36.03 | monopolistic | 37.5/1 | monopolistic | 37.6/6 | monopolistic | 0.39 |
| HHI 558 | unconcentrated | 593 | unconcentrated | 635 | unconcentrated | 647 | unconcentrated | 1.84 |
| **4. Losses Incurred after Deduction** | | | | | | |
| CR1 21.6/5 | low market share | 22.26 | low market share | 21.3/6 | low market share | 64.1/4 | high market share | 200.36 |
| CR4 39.6/7 | monopolistic | 40.70 | loose oligopoly | 39.0/9 | monopolistic | 76.2/3 | tight oligopoly | 95.03 |
| HHI 687 | unconcentrated | 718 | unconcentrated | 695 | unconcentrated | 4193 | highly concentrated | 503.76 |
| **5. Commission and Brokerages** | | | | | | |
| CR1 26.1/4 | low market share | 25.69 | low market share | 29.0/3 | low market share | 27.0/2 | low market share | (6.93) |
| CR4 46.2/1 | loose oligopoly | 46.52 | loose oligopoly | 50.7/6 | loose oligopoly | 48.5/8 | loose oligopoly | (4.29) |
| HHI 934 | unconcentrated | 918 | unconcentrated | 1127 | moderate concentrated | 1016 | moderate concentrated | (9.81) |
| **6. Underwriting Expenses** | | | | | | |
| CR1 14.2/8 | low market share | 15.6/3 | low market share | 19.41 | low market share | 18.3/6 | low market share | (5.40) |
| CR4 50.9/6 | loose oligopoly | 50.6/1 | loose oligopoly | 53.66 | loose oligopoly | 40.4/3 | loose oligopoly | (24.65) |
| HHI 788 | unconcentrated | 801 | unconcentrated | 946 | unconcentrated | 695 | unconcentrated | (26.56) |
7. Operating Expenses

| Year | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|------------------------|
| CR1  | 13.2 | 13.5 | 13.8 | 14.5 | low market share 0%
| CR4  | 26.0 | 25.5 | 28.4 | 29.8 | monopolistic 5.00%
| HHI  | 367  | 370  | 404  | 429  | unconcentrated 6.26%

8. Total Expense

| Year | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|------------------------|
| CR1  | 19.9 | 20.3 | 20.6 | 52.8 | high market share 6%
| CR4  | 36.6 | 37.1 | 37.0 | 68.0 | monopolistic 155.96%
| HHI  | 606  | 623  | 645  | 2927 | highly concentrated 353.62%

9. Profit from Operation

| Year | 2006 | 2007 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|------------------------|
| CR1  | 12.9 | 11.2 | 16.5 | 22.9 | low market share 2%
| CR4  | 40.3 | 39.2 | 41.9 | 63.1 | tight oligopoly 50.58%
| HHI  | 618  | 613  | 678  | 1227 | moderate concentrated 80.96%

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 8 and Figure 6, the non-life insurance income statement in terms of earned premium is monopolistic competition and unconcentrated whereas profit from operation is tight oligopoly and concentrated with increasing trends. The CR₄ and HHI of earned premiums are 38.23% and 672, respectively, in 2011. The CR₄ and HHI of total asset are 68.41% and 1962, respectively, in 2011. The CR₄ and HHI of policy liabilities are 66.15% and 1718, respectively, in 2011. The CR₄ and HHI of profit from operation are 63.12% and 1227, respectively, in 2011.

3.3 Comparative on Personal Accident (PA) and Health between Life and Non-Life Insurance

This part presents market concentration on the same sub-categorized product in life and non-life industry as personal accident and health insurance.
Table 9. Comparative on PA and Health between life and non-life insurance

| Year | 2004 | 2005 | 2010 | 2011 | % increase (decrease) |
|------|------|------|------|------|-----------------------|
| **1. Personal Accident Premium** | | | | | |
| **1.1 Life Insurance** | | | | | |
| CR1 | 83.52 | high market share | 74.55 | high market share | high market share | (0.14) |
| CR4 | 92.96 | near monopoly | 90.13 | near monopoly | near monopoly | 1.80 |
| HHI | 7016 | highly concentrated | 5664 | highly concentrated | highly concentrated | (0.04) |
| **1.2 Non-Life Insurance** | | | | | |
| CR1 | 22.37 | low market share | 19.58 | low market share | low market share | 34.43 |
| CR4 | 48.42 | loose oligopoly | 50.76 | loose oligopoly | loose oligopoly | 4.60 |
| HHI | 878 | unconcentrated | 944 | unconcentrated | moderate concentrated | 17.48 |
| **2. Health Premium** | | | | | |
| **2.1 Life Insurance** | | | | | |
| CR1 | 55.79 | high market share | 49.34 | moderate market share | moderate market share | (2.24) |
| CR4 | 88.35 | tight oligopoly | 83.79 | tight oligopoly | tight oligopoly | (0.79) |
| HHI | 3543 | highly concentrated | 2906 | highly concentrated | highly concentrated | (3.51) |
| **2.2 Non-Life Insurance** | | | | | |
| CR1 | 51.52 | high market share | 31.30 | moderate market share | moderate market share | (1.87) |
| CR4 | 73.58 | tight oligopoly | 60.54 | tight oligopoly | tight oligopoly | 1.14 |
| HHI | 2941 | highly concentrated | 1396 | moderate concentrated | moderate concentrated | (1.93) |

Source: Calculated by author, using data from Office of Insurance Commission
As shown in Table 9 and Figure 7, the same sub-categorized product, PA and health, in life and non-life industry have difference concentrate degree. PA in life insurance is near monopoly and highly concentrated market while PA in non-life insurance is loose oligopoly and moderate concentrated market. The CR₄ and HHI of PA in life insurance are 91.76% and 5662, respectively, in 2011. The CR₄ and HHI of PA in non-life insurance are 53.09% and 1109, respectively, in 2011. Health in life and non-life insurance are the same, tight oligopoly that concentrate on large four firm. The CR₄ and HHI of health in life insurance are 83.13% and 2804, respectively, in 2011. The CR₄ and HHI of health in non-life insurance are 61.23% and 1369, respectively, in 2011. Health in life is more concentrated than health in non-life insurance. However, the trend of the health market concentration slows down that more competition in life and non-life insurance industry.

4. Conclusions

Using concentration ratio and Herfindahl-Hirschman index, it can be concluded the life insurance industry in Thailand is tight oligopoly and moderately concentrated. There are 24 life insurance companies in Thailand. The CR₄ and HHI of total premium are 62.08% and 1402, respectively, in 2011. Life insurance industry in Thailand has four sub-categorized products including ordinary, industry, group, personal accident and health insurance. The highest competition is group product and the highest concentration is industry product. An analysis of life insurance balance sheet and income statement shows similar results which are concentrated. However, all of concentration trends are slowing down, non-price competition is likely to increase. Customers always buy insurance from insurance company which has reputation and good after-sales service.

Using concentration ratio and Herfindahl-Hirschman index, it can be concluded the non-life insurance industry is monopolistic competition and unconcentrated. There are 65 non-life insurance companies in Thailand. The CR₄ and HHI of total premium are 37.03% and 531, respectively, in 2011. Non-life insurance industry in Thailand has four sub-categorized product under fire, marine and transportation, automobile, personal accident and health in miscellaneous insurance. The fire, marine and transportation, automobile and personal accident insurance markets are unconcentrated whereas health insurance market is moderate concentrated. An analysis of non-life insurance balance sheet and income statement show similar results which are unconcentrated market. However, all of trends are upward because some companies exit from the non-life insurance market. There are 74 companies, 73 companies, 73 companies, 71 companies, 69 companies and 68 companies in period from 2006 to 2011.

The same sub-categorized product in life and non-life industry, personal accident and health products have difference concentration degrees. Personal accident in life insurance is near monopoly while personal accident in non-life insurance is loose oligopoly. Health in life and non-life insurance have similar results, which are tight oligopoly. Consumers will purchase personal accident and health insurance from insurance company which has intensive hospital networks and good after-sales service to ensure getting the best treatment. Every company attempts to improve their service so all concentration trends slow down, leading to the reduction in market concentration in life and non-life insurance industry.

By concentration measurement, Concentration Ratio and the Herfindahl-Hirschman Index, this paper concludes that life insurance industry is more concentrated than non-life insurance industry. In both segments of the
insurance market, as well as in the overall insurance sector, there is a downward trend in market concentration, which indicates the success of the competition promoting process for benefiting consumers the most. However, alongside competition, it is necessary for government to conduct proper regulation in order to avoid adverse market situations.

References
Austin, D. A., & Hungerford, T. L. (2009). The Market Structure of the Health Insurance Industry. *Congressional Research Service Report*. The United States.

Bajtelsmit, V. L., & Bouzouita, R. (1998). Market Structure and Performance in Private Passenger Automobile Insurance. *The Journal of Risk and Insurance, 65*(3), 503-514. Colorado. The United States. http://dx.doi.org/10.2307/253662

Cummins, J. D. (2008). The Bermuda Insurance Market: An Economic Analysis. *The World's Risk Capital Report*. Bermuda.

Dumm, R. E., & MacPherson, D. A. (2006). A Preliminary Comparative Financial Analysis of Title Insurance Company. *Report of Office of Insurance Regulation*. Florida.

Ehrlich, I., & Becker, G. S. (1972). Market Insurance, Self-Insurance, and Self-Protection. *The Journal of Political Economy, 89*(4), 623-648. Chicago. The United States. http://dx.doi.org/10.1086/259916

Feen et al. (2006). Market Structure and the efficiency of European Insurance companies: Stochastic Frontier analysis. *KPMG Business Measurement Research*. The United of Kingdom.

Glambotskaya, A. (2009). The Belarusian Insurance Market Characteristics in the context of Economic liberalization: Analysis and Policy Recommendations. *Policy Paper, 1*, 1-12. Minsk, Belarus.

Greguric et al. (2011). Liberalization and Market Concentration in the Insurance Industry: Case of Croatia. *Journal of Economics and Business, 9*(2), 61-75. Croatia.

Ishii, H. (2009). *The Insurance Market in 2009: Changing Channels and Markets*. The Toa Reinsurance Company, Limited. Japan.

Jedlicka, L., & Jumah, A. (2006). The Austrian Insurance Industry: A structure, conduct and performance analysis. *Economic Series, 189*, 1-39. Vienna, Austrian.

Johnson, D. F., & Stone, G. (1998). *Introduction to Economics*. United States of America: Life Office Management Association, Inc. C.

Kozarevic, S., Regan, L., & Gibbons, R. J. (2008). *The European Union Integration Process and Insurance Market Development: The Case of the Former Yugoslav Countries*. International Insurance Foundation. The United States.

Lipczynski, J., Wilson, J., & Goddard, J. (2005). *Industrial Organization, Competition, Strategy, Policy*. Harlow: Prentice Hall.

Milo, M. S. (2003). *State of Competition in the insurance industry: Selected Asian Countries*. The Research Information Staff, Philippine Institute for Development Studies. Philippines.

Nissan, E., & Caveny, R. (2001). A Comparison of Large Firm Dominance in Property and Liability Insurance with Major Industries. *Journal of Insurance Issues, 24*(1 & 2), 58-73. Mississippi. The United States.

Office of Insurance Commission. (2012). *Statistic Report*. Retrieved from http://www.oic.or.th

Office of the National Economic and Social Development Board. (2010). *Statistic Report*. Retrieved from http://www.nesdb.go.th

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