[Article]

An Analysis of EVA to ROE in the Japanese Insurance Industry

Yasuhiro Iwase*

Abstract

Non-Life insurance business, which is part of financial industry, is now required to improve shareholders' value in the midst of deregulation. However, it won't be the proper direction for the industry to put a focus only on the earning's ratio for invested capital.

In this report, analysis of EVA[1)] to ROE reveals that Japanese non-life insurance business is different from other industries due to its specific characteristics (related to products, business operation and market).

We analyzed Japanese non-life insurance business based on changes in EVA during a period from FY1996 to FY2004, and found that the limiting point of ROE would be 6.3%. The EVA was calculated by using "Goal by ROE (%)," of which the top management assures shareholders.

The top management must improve shareholders' value as one of their most important tasks. However, excessively high target may lead to insufficient basis of liability reserves, and therefore thorough consideration is necessary for the top management in setting such a high target to secure stable management.

Key words : EVA, ROE, Risk Capital

Table of Contents

Received 2008.4.15
Accepted 2008.6.5

* Associate Professor of Fukui Prefectural University, Research Institute for Regional Economics.
A member of The Japanese Society of Insurance Science, The Society for Risk Analysis Japan-Section, The Japan Society of Household Economics.

1 Introduction

EVA is the registered trade mark of Stern Stewart Co., Ltd. in U.S.A. It is calculated by subtracting the cost of creditors and the cost of shareholders' equity from the income for the current year. In other words, EVA is the value found by subtracting the cost of interest-bearing liabilities and the cost of shareholders' equity from net income after tax.

Non-Life insurance business, which is part of financial industry, is now required to improve

shareholders' value in the midst of deregulation. However, will it be the proper direction for the industry to put a focus only on the earning's ratio for invested capital?

In this report, we will discuss specific characteristics of the non-life insurance business through an analysis of EVA.

2 Methods of Analysis

2.1 Definition of EVA

EVA = NOPAT − (Cost of interest-bearing liabilities + Cost of shareholder's equity)

EVA = NOPAT − C × WACC

NOPAT: Net Operation Profit after Tax

C: Invested Capital

WACC: Weighted Average Cost of Capital

2.2 Restricted Condition

2.2.1 Risk Capital

There is a difference of liability reserves between the U.S.A. and Japan. In the U.S.A., it is general to consider that risk requires cost of capital, and if insurance portfolio changes, cost of capital moves in line with the risk. On the other hands, in Japan, it is general opinion that cost of capital to risk is adjusted by provisions and refunds of liability reserves.

And when a big sale of high-risk products (high premiums) paves the way for improvement of EVA, we cannot judge correctly about whether it is profitable or not.

2.2.2 Cost of shareholders' equity

In calculation of cost of shareholders' equity, we did not use CAPM (Capital Asset Pricing Model), because CAPM is just statistic calculated by stock quote of the past. In this report, we used the "Goal by ROE (%)" which the management has committed to the shareholders.

2.2.3 MVA (Market Value Added)

EVA is an indicator that attaches importance to the directional movement. In consequence, EVA is often calculated as a negative factor. On the other hands, MVA is an indicator used for long-time analysis. In short, EVA is an indicator that shareholders can figure out return over investment under time restriction, and MVA is an indicator that shareholders can figure out return over investment with no time restriction.

$$MVA = \Sigma \text{ present value of projected EVA}$$

2.3 Precondition

2.3.1 Net Operation Profit after Tax

(a) Net profit includes net premium income, investment income, and other profits, but not premiums of saving-type insurance.

(b) In recent days, there is a general tendency that financial commodity is rated at the current prices and therefore, when sales profit of securities is included in income, the profit-level will shake up and down. However, we cannot judge whether sales profit of securities can be continuously beneficial or not, because it depends on businesses of each company. In this report, we performed two types of calculation: one is for a case that sales profit of securities is included in income, another is a case that sales profit of securities is not included in income.

(c) Life insurance income is not included in net profit.

(d) Provisions and refunds for liability reserves and provisions and refunds outstanding claims are not included in net profit.

(e) Business expenses mean the total of underwriting expenses of saving-type insurance excluding maturity refunds, investment expenses, and other expenses.

(f) Other investment expenses except for interest paid are included in expenses. Interest paid is included in cost of interest-bearing liabilities for creditor.

(g) Corporate tax rate is 40%.

2.3.2 Cost of Interest-bearing Liabilities

We calculated the actual cost of liabilities.

(a) Investment income of savings premiums is the cost of interest-bearing liabilities for policyholders.

(b) 3% of reserves for retirement benefits are the cost of interest-bearing liabilities for employees.

(c) We did not calculate the difference in actuarial liability for retirement benefits.

(d) Corporate tax rate is 40%.

2.3.3 Cost of shareholders' equity

(a) In calculation of cost of shareholders' equity, we did not use CAPM (Capital Asset Pricing Model), because CAPM is just a statistic calculated by stock quote of the past. In this report, we used the "Goal by ROE (%)" which the management has committed to the shareholders.

Cost of shareholders' equity = shareholders' equity × Goal by ROE (%)

2.4 Calculation of EVA

2.4.1 Net Operation Profit after Tax

【Income】

1 net premiums income

2 other underwriting income

3 interests & dividends income

4 interest on money trust

5 sales profit of securities

6 profit on redemption of securities

7 other investment income

8 other ordinary profits

All Income A 1 - 8

【Expenses】

9 net claims paid

10 claims expenses

11 commissions

12 policyholder dividends

13 other underwriting expenses

14 investment expenses

15 sales and general administration expenses

16 provisions for bad debts reserves

17 bad debts loss

18 depreciation of deferred assets

19 provisions for investment loss reserves

20 other ordinary expenses

All Expenses B 9 - 20

Net Operation Profit before Tax $C = A - B$

Net Operation Profit after Tax $D = C \times (1 - 40\%)$: Tax 40%

2.4.2 All Costs of Invested Capital

【Cost of Interest-bearing Liabilities】

21 Interest paid

22 Cost (Transfer) of investment income on saving premiums

23 Cost of reserves for retirement benefits

All Costs of Interest-bearing liabilities before tax 21 - 23

All Costs of Interest-bearing liabilities after tax　F = E × (1 − 40%): Tax 40%

【Cost of Shareholders' Equity】 G = Shareholders' equity × The goal by ROE (%)

All Costs of invested capital = F + G

2.4.3 EVA

EVA = Net Operation Profit after Tax – (Cost of Interest-bearing Liabilities + Cost of Shareholders' Equity)

= D − (F + G)

= Net Operation Profit after Tax − All Costs of Invested Capital

= D − H

3 Analysis based on EVA

3.1 Change of EVA with a Parameter of ROE

The figures below show changes of EVA with ROE in the Japanese non-life insurance business from FY1996 to FY2004 (FY2004: 10 domestic companies only).

Figure 1 indicates a case which sales profit of securities is included in income. When ROE is 2%, EVA is higher than zero. However, when ROE is over 13%, EVA decreases to lower than zero. (When the average of EVA is ±0, ROE is 6.3%)

Figure 2 indicates a case that sales profit of securities is not included in income. In this case, EVA is nearly zero. (When the average of EVA is ±0; ROE is 1.2%)

3.2 EVA of Each Company

The figures below show EVA of each company (10 domestic companies) from FY1998 to FY2004. (Figure 3: ROE is 3%, Figure 4: ROE is 4%, and Figure 5: ROE is 5%)

When ROE is 3%, companies whose EVA is higher than zero account for 25%. When ROE is 4%, companies whose EVA is lower than zero account for 32%. When ROE is over 5%, companies whose EVA is lower than zero reach nearly 40%.

Figure 1: Relation of EVA to ROE (Sales profit securities is included in income)

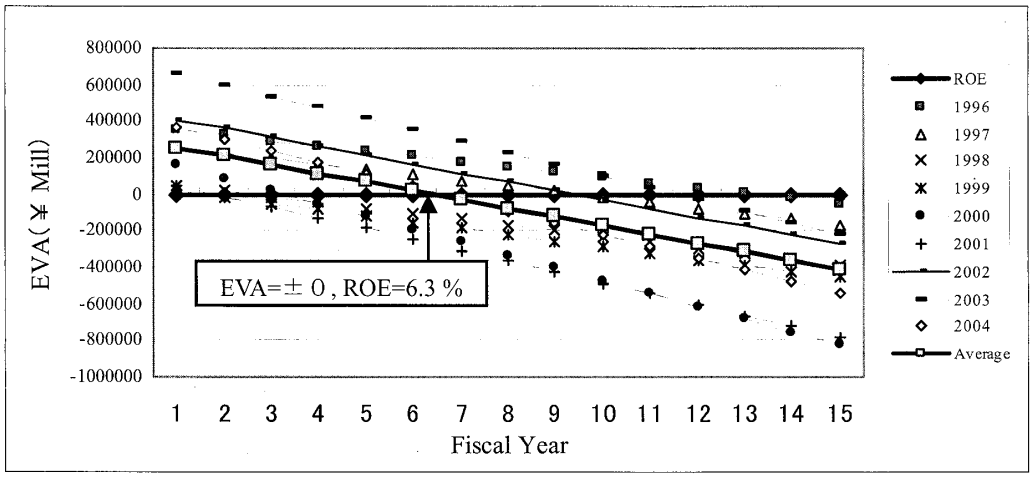
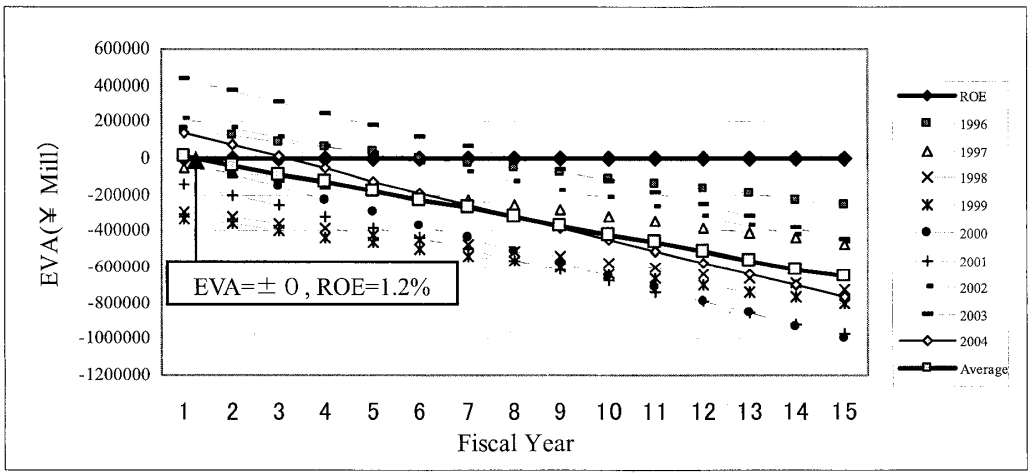


Figure 2: Relation of EVA to ROE (Sales profit securities is not included in income)



Source: Figures 1 & 2 are prepared by the author based on *each company's P/L & B/S from FY1996 to FY2004* and *The Statistics of Japanese Non-Life Insurance Business in FY1997 – 2005 (Annual Special Issue).*

Figure 3: EVA of each company (ROE 3%)

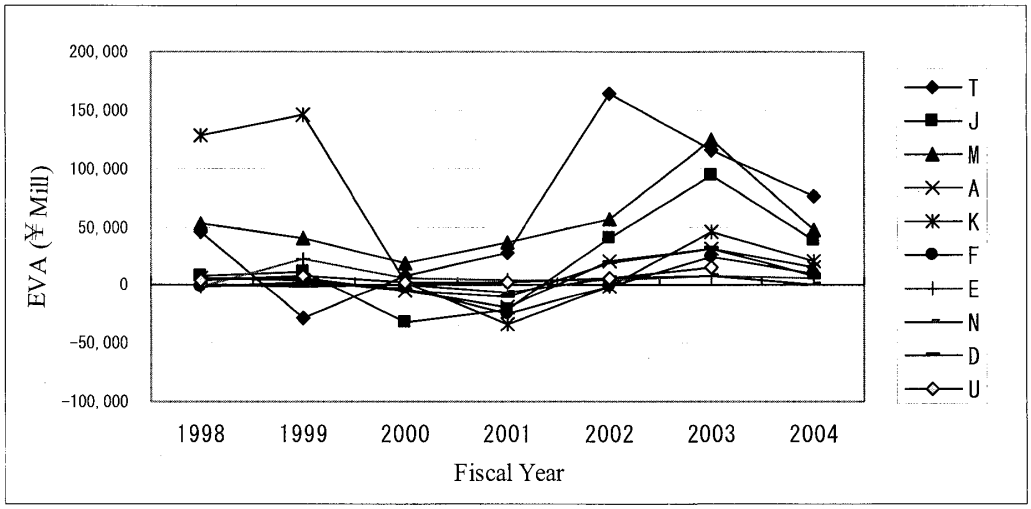


Figure 4: EVA of each company (ROE 4%)

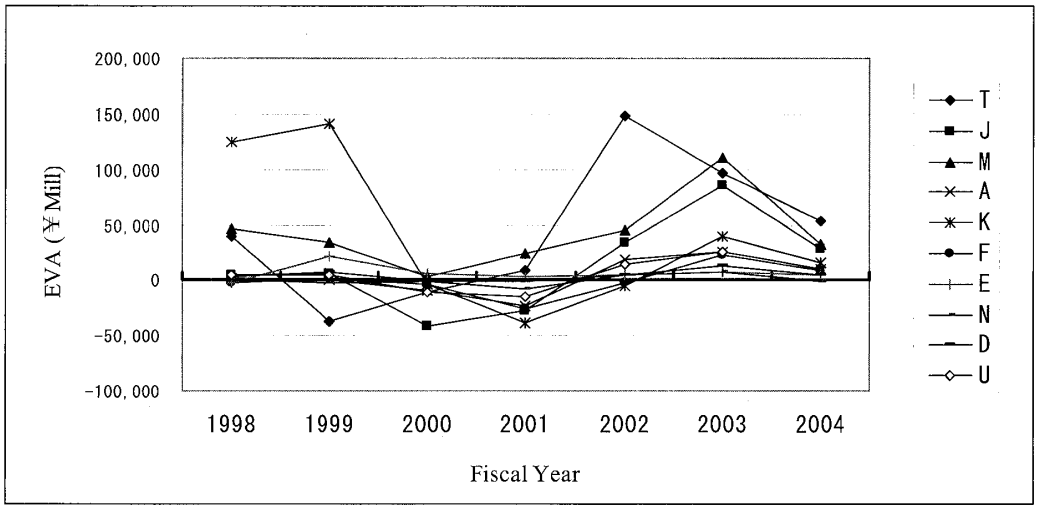
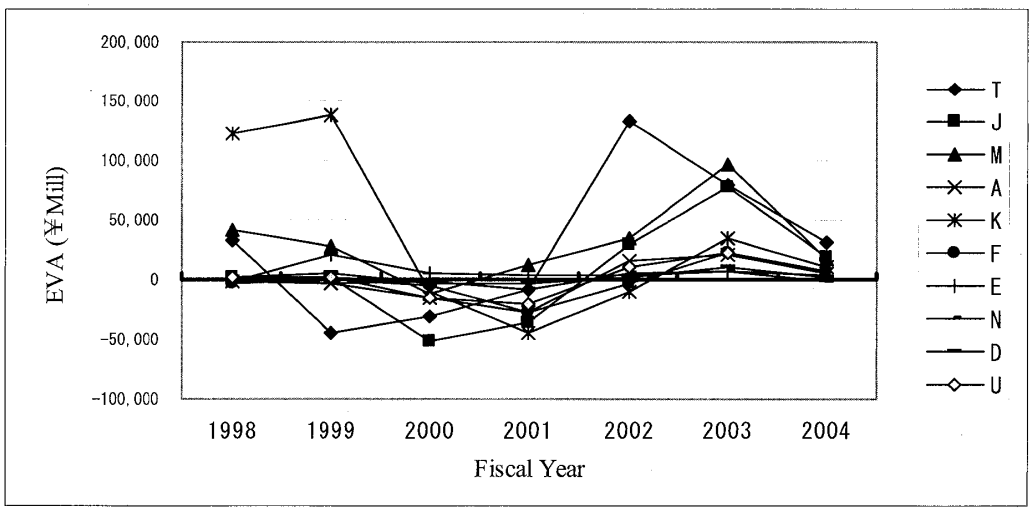


Figure 5: EVA of each company (ROE 5%)



3.3 Relation of EVA with Various Indexes

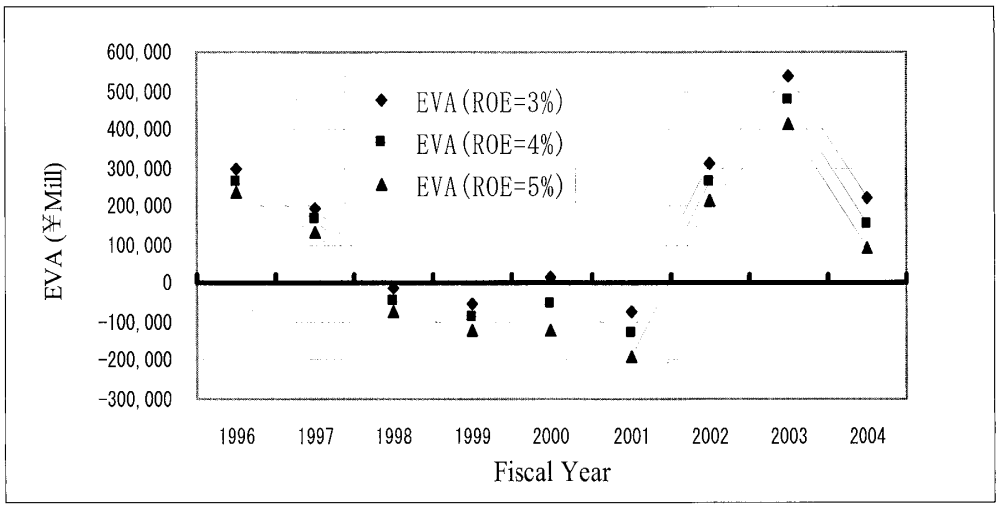
3.3.1 Shareholders' Equity and Liability Reserves

Figure 6 indicates changes of EVA (when ROE is 3%, 4%, and 5%) in the Japanese non-life insurance business from FY1996 to FY2004. (FY2004: 10 domestic companies only)

Figure 7 to Figure 14 indicate changes of EVA with various indexes: Shareholders' Equity, Liability Reserves, Net Premiums Income, Net Premiums Paid, Investment income of Savings Premiums to Customers, Total Company's Expenses, Employee Numbers, and Personal Expenses.

Refer to the attached Pearson's correlation coefficient. The closer the coefficient to ±1, the stronger the correlation relation will be either for plus or minus.

Figure 6: Change of EVA



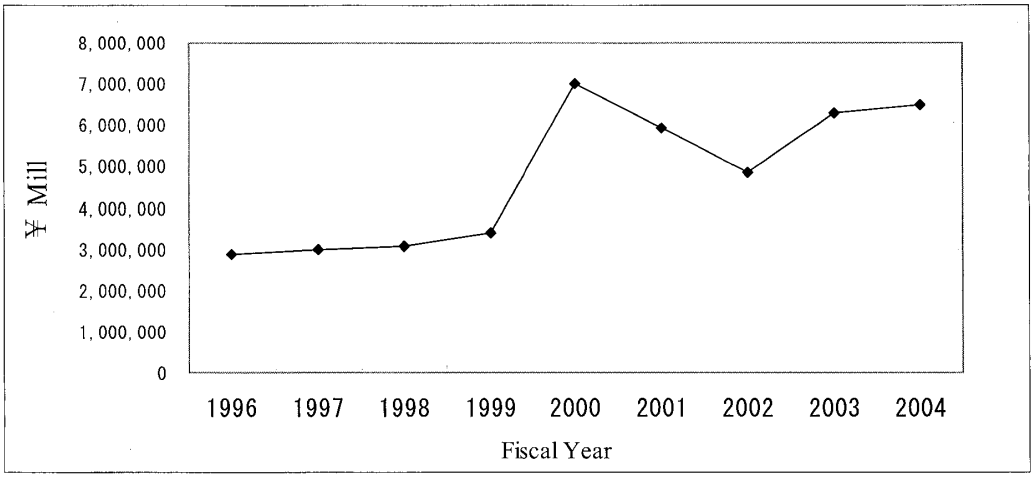
Since FY2002, EVA has drastically increased. (EVA has declined in FY 2004. A wave of heavy typhoons contributed to an increase of the Catastrophe Reserve, which resulted in the reduction of the Net Profit. It is transient case.)

In FY2002, almost all companies reduced shareholder's equity by payback to improve ROE. As a result, such reduction of shareholders' equity contributed to improvement of EVA.

In FY2003, many companies liquidated loss, which was a cause for the impairment of their assets. As a result, reduction of investment expenses contributed to improvement of EVA.

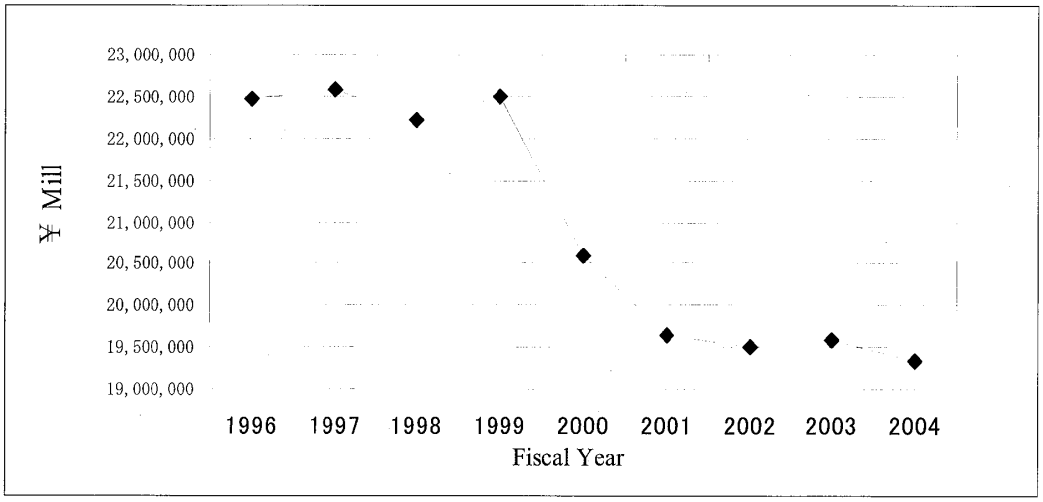
On the other hand, liability reserves have slowly decreased year after year. Liability reserves reduced by keen competition can be a trigger to decrease the stability of insurance business, for example, diversification of products and considerable expanse of coverage.

Figure 7: Shareholder's Equity



Fiscal Year	1996～2004	2000～2004
Pearson's correlation coefficient	−0.02	−0.30

Figure 8: Liability Reserves

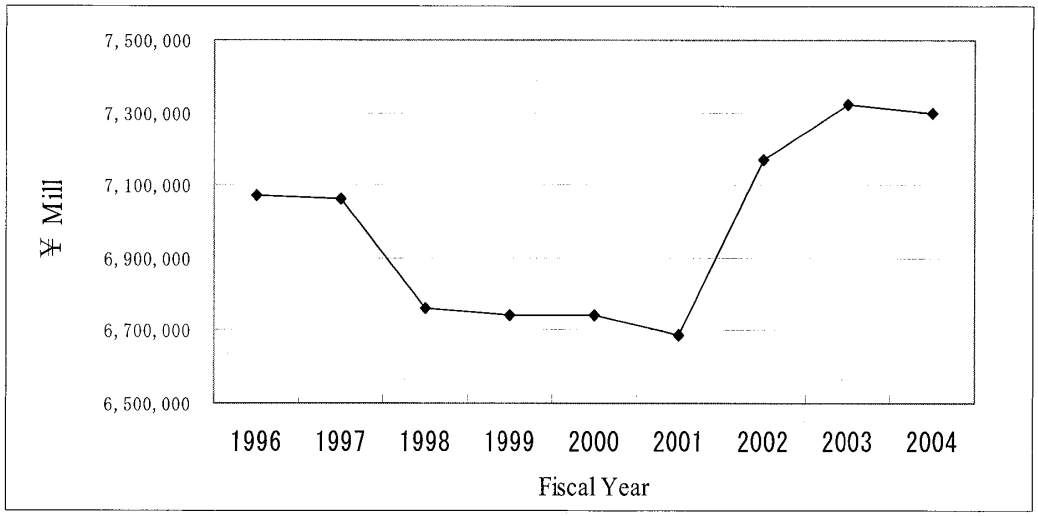


Fiscal Year	1996～2004	2000～2004
Pearson's correlation coefficient	−0.18	−0.50

3.3.2 Net Premiums Income, Net Premiums Paid

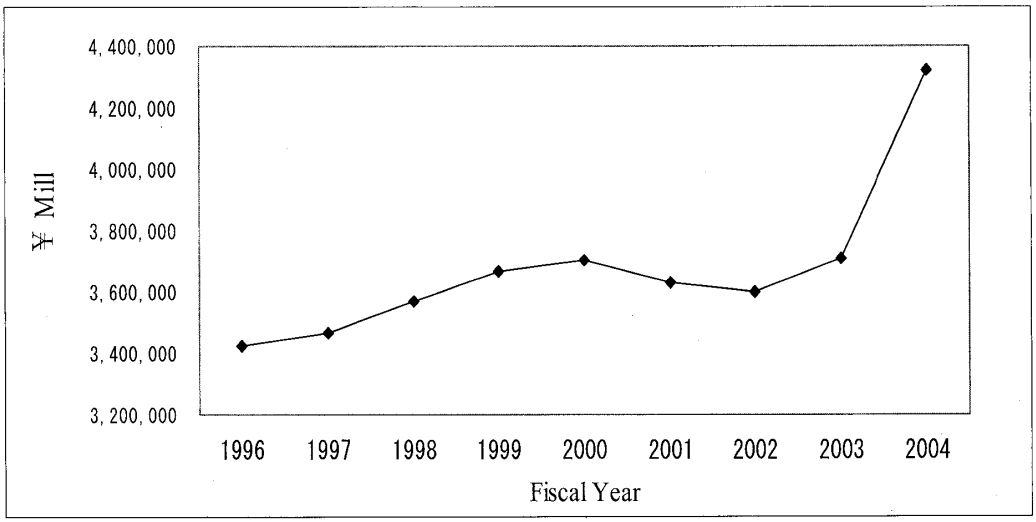
Net premiums income has a correlation with improvement of EVA, and Net Premiums Paid has a correlation with reduction of EVA.

Figure 9: Net Premiums Income



Fiscal Year	1996～2004	2000～2004
Pearson's correlation coefficient	0.91	0.90

Figure 10: Net Premiums Paid

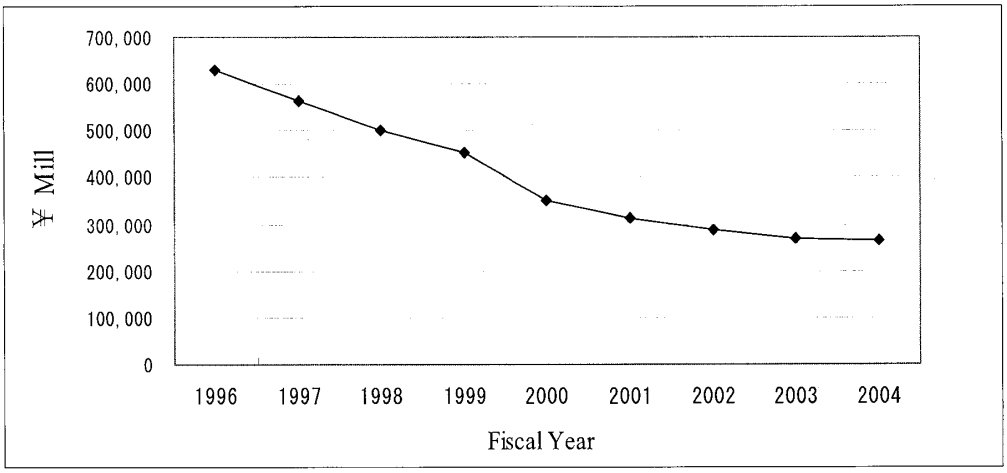


Fiscal Year	1996～2004	2000～2004
Pearson's correlation coefficient	−0.02	−0.67

3.3.3 Investment Income of Savings Premiums to Customers

Passive sales of savings-type insurance brought about reduction of ¥3,636 billion in the past 9 years. Therefore, cost reduction of interest-bearing liabilities contributed to improvement of EVA.

Figure 11: Investment income of Saving Premiums to Customers



Fiscal Year	1996～2004	2000～2004
Pearson's correlation coefficient	−0.04	−0.77

3.3.4 Total Company's Expenses, Number of Employees, and Personnel Expenses

Figure 12 indicates changes of EVA with Total Company's Expenses in the past 9 years. Reduction of ¥3,100 billion in Total Company's Expenses contributed to improvement of EVA.

Figure 13 to Figure 14 show changes of EVA with Number of Employees, and Personal Expenses from FY1996 to FY2004.

Decrease of 23,607 in the Number of Employees and Reduction of ¥2,035 billion in Personnel Expenses and contributed to improvement of EVA.

Figure 12: Total Company's Expenses

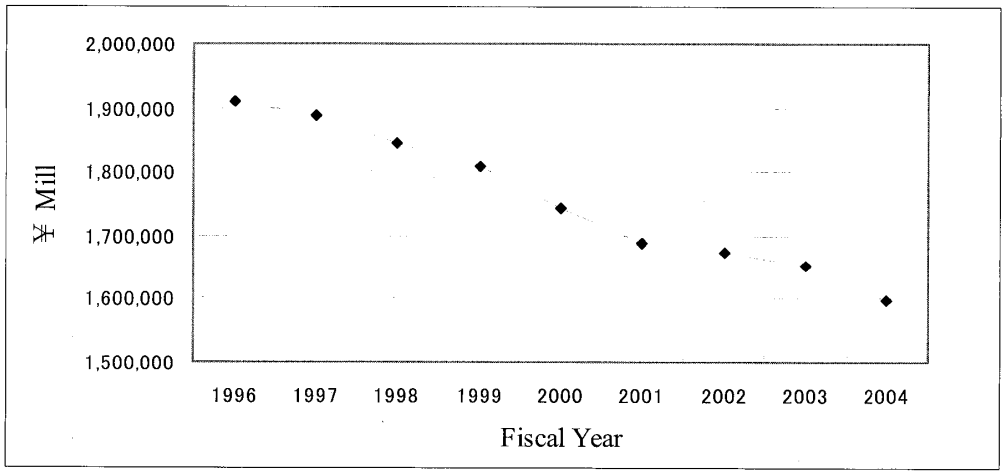


Figure 13: Number of Employees

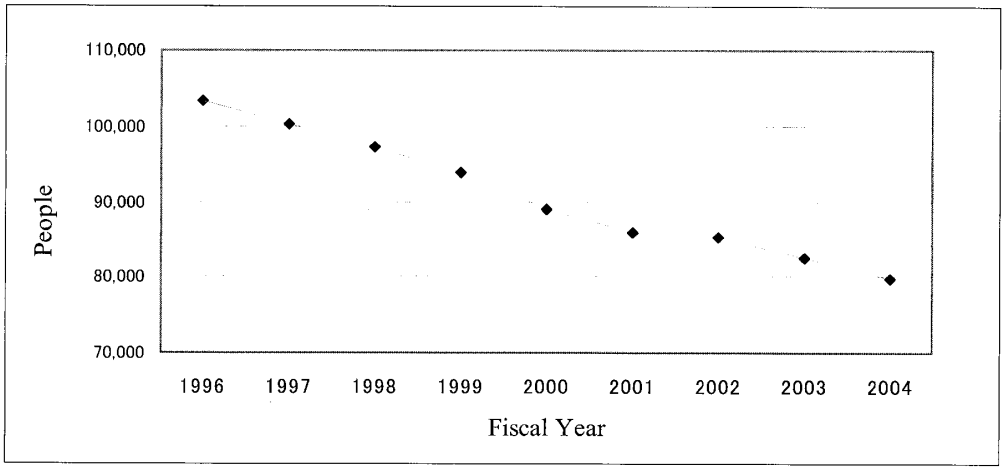
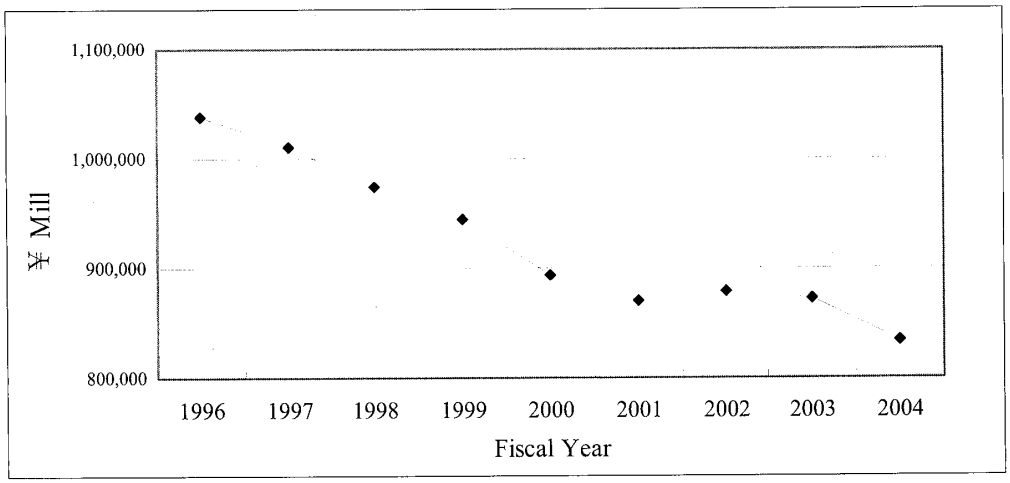


Figure 14: Personal Expenses



Source: Figures 3 - 14 are prepared by the author based on *Each company's P/L & B/S in FY1996 – 2004,* and *The Statistics of Japanese Non-Life Insurance Business in FY1997 – 2005 (Annual Special Issue).*

4 Consideration

4.1 Analysis and Problem

(1) Limit of ROE

We analyzed Japanese non-life insurance business based on changes in EVA during a period from FY1996 to FY2004, and found that the limiting point of ROE would be 6.3%. The EVA was calculated by using "Goal by ROE (%)," of which the top management assures shareholders.

The top management must improve shareholders' value as one of their most important tasks. However, excessively high target may lead to insufficient basis of liability reserves, and therefore thorough consideration is necessary for the top management in setting such a high target to secure stable management.

(2) Savings-type Insurance

Investment income of savings-type insurance is an interest rate risk for policyholders. Therefore, EVA can be effectively improved by reducing interest-bearing liabilities.

(3) Sales Profit of Securities

Net profit level varies in accordance with sales profit of securities. However, in calculation of EVA, income including sales profit of securities reflects real business conditions better than that not including such profit.

(4) Total Company's Expenses

The sales and general administration expenses added to claims expenses may be the best index to examine the total company's expenses, for the following two reasons: Firstly, the more inter-company competition heats up, the more commissions become expensive.

As a result, such high commissions do not reflect each company's effort to reduce expenses. Secondly, enhancement of claims service leads to greater claims expenses.

(5) Personnel Downsizing

It is not prudent to further reduce personnel expenses and number of employees. This is because insurance business depends on close relationship with customers through face-to-face sales activities, not by mails or telephone calls.

(6) Reversion of Cash Flow

We consider that cash flow in the insurance business is different from that in other general businesses, because a different formula is used for calculation of accounting profit of insurance.

In general businesses, cost can be calculated prior to amount of sales.

However, in the insurance business, premiums (amount of sales) is calculated first, followed by calculation of the paid expenses (cost).

Formula of accounting profit in general business corporations accounting profit

= amount of sales - cost of primary materials - expenses - personnel expenses - allowance for depreciation - interest of cost - corporate tax

(7) Bank and Circulation Capitals

Bank and circulation capitals have penetrated the insurance market as new comers. Their purposes are to carry on profitable "fee business" with total financial services for customers. They put a focus on profitability in their businesses, and pay little attention to the original policy of underwriting. Their activities may damage the proper underwriting of risk, and therefore stable management of insurance may become impossible.

In addition, Bank and circulation capitals will enter the new market through over-the-counter sales or mail order system. They may perform dumping due to their weak sales potential. As a result, there is the possibility that they become dangerous outsiders who may bring about a price-slashing war.

4.2 Characteristics of Non-Life Insurance Business

As a result of the analysis, we can say that characteristics of non-life insurance business are different from those of general businesses. This chapter reports three characteristics (products, business operation and market) of the non-life insurance business.

4.2.1 Characteristics of Products

(1) Inversion of Product Cycle

As mentioned previously, the insurance business has an "Inversion of Product Cycle[2)]." In general businesses, cost of manufacture is recovered by sales. However, in the insurance business, cost of manufacture (claim paid) is determined when an accident occurs. In other words, premiums must be collected in advance for sound management of the insurance business.

Therefore, there are fears of dumping and default, such as uncollected premiums of monthly payment insurance and dumping of products at a lower price than production cost.

(2) Uncertain Product

Insurance products can be profitable for policyholders who received actual benefits (insurance money) when an accident occurred, and not profitable for other policyholders. In other words, policyholders do not understand incidence rates and the amount of damage as their own risk.

In short, we can say that insurance products are uncertain goods for policyholders who cannot ensure validity of price level (premiums level).

(3) Asymmetric Information

When premiums level is determined by the market mechanism, customers with high risks need insurance even if it is expensive. However, insurers do not hope to sell insurance to such customers due to their high risks. On the other hands, customers with low risks do not require insurances even if it is not expensive.

However, insurers intend to sell insurance to such customers because of their low risks. In fact, it can be said that there is asymmetric information between insurers and customers.

4.1.2 Characteristics of Business Operation

(1) Infinity of Supply

Generally, there is the market mechanism to determine the price based on the balance of supply and demand. In addition, production beyond a productive capacity leads to an increase of the cost. On the other hands, insurance products can be easily manufactured without problems of surplus stock or shortage of products.

The insurance business does not require manufacturing facilities and stock of products because of infinity of supply, although there are some exceptions of insurance products, which require reinsurance cover and/or particular underwriting in a tight market.

(2) Incentive Expanse in Quantity

As mentioned above, the insurance business easily encounters keen competition due to its greater

incentive expanse in quantity than that in other general businesses.

(3) Requirement of Large-scale Parent Population

In the insurance business, when the scale of parent population is large in accordance with the "law of average," the premiums (manufacturing cost) decrease because reliable data show that the margin of safety ratio is reduced.

We consider that the insurance business has two scale-related merits. Firstly, there is degradation of average cost due to expansion of production. Second one is the marginal cost reduced by expansion of production.

(4) Public Confidence

In the insurance industry, a collapse of one company may bring about loss of public trust just like a collapse of banks.

4.2.3 Characteristics of Market

(1) Monopolistic Competitive Market

Many insurance products are sold through independent agencies who intend to sell products profitable for customers. In other words, inter-company competition can be already seen in sales activities of such agencies. In addition, there is severe competition among insurance companies regarding co-insurance for corporations.

On the other hands, there are many competitive goods of insurance companies, but such products are very similar, that is, there are many substitutive products. Therefore, it can be said that the insurance market is a monopolistic competition market that has both monopoly and competition.

(2) Nationwide and Homogeneous

Japan is a narrow country. Therefore, the Japanese insurance businesses have been performed nationwide and its market is homogeneous although there are some exceptions, such as Mutual Non Life Insurance for limited area and industries.

(3) Fewer Outsiders

In Japan, the number of insurance companies is very small, even after the number of foreign insurance companies is added. This is a distinctive characteristic of the insurance industry compared to not only banking and security industries but also other general businesses.

However, the insurers for special industries and customers, such as Japan Agricultural Cooperatives are regarded as an exception.

5 Conclusion

In this report, analysis of EVA to ROE reveals that Japanese non-life insurance business is different from other industries due to its specific characteristics (related to products, business operation and market).

The corporate value of insurance business should be evaluated from two standpoints, the corporate value creation by underwriting and that by investment.

We have realized that[3)];

(1)The corporate value creation by underwriting has a close correlation with underwriting income, but no such close correlation with increase ratio and loss ratio. In the comparison between the theoretical values and actual values of liability reserves, it was revealed that the decrease in the theoretical values was larger than that in the actual values.

(2)On the other hand, the corporate value creation by investment strategy has a negative correlation with the ratio of securities for assets. This shows that the return generated when an insurance business entity bears a high finance market risk will not confer benefits on stockholders regarding their value creation.

We analyzed Japanese non-life insurance business based on changes in EVA during a period from FY1996 to FY2004, and found that the limiting point of ROE would be 6.3%. The EVA was calculated by using "Goal by ROE (%)," of which the top management assures shareholders.

The top management must improve shareholders' value as one of their most important tasks. However, excessively high target may lead to insufficient basis of liability reserves, and therefore thorough consideration is necessary for the top management in setting such a high target to secure stable management.

End Notes

1. Economic Value Added: Registered Trade Mark of Stern Stewart Co., Ltd.
2. Mizushima [2006] p.18.
3. Iwase Y. [2007] "Insurance Business in Japan from Corporate Value Perspective", *Proceedings of The 10th International Conference of the Society for Global Business & Economic Development, Creativity & Innovation: Imperatives for Global Business and Development, Volume 3, MONTCLAIR STATE UNIVERSITY.*

References

[1] Deutsche Bank Group [2004] *Non-Life Insurance business : Earnings Report in Fiscal 2003.*

[2] Individual insurance companies [FY1996 to FY2004] *Earning statement and balance sheet.*

[3] Insurance Research Institute [FY1997 to FY2005] *The Statistics of Japanese Non-Life Insurance Business, Annual Special Issue.*

[4] Iwase Y. [2007] "A Study of Optimal Capital Structure in Japanese Non-Life Insurance Business"*Journal of Insurance Science, 596.*

[5] Iwase Y. [2007] "Insurance Business in Japan from Corporate Value Perspective", *Proceedings of The 10th International Conference of the Society for Global Business & Economic Development, Creativity & Innovation: Imperatives for Global Business and Development, Volume 3, MONTCLAIR STATE UNIVERSITY.*

[6] Iwase Y. [2007] "Structural Problem in Japanese Non-Life Insurance Business", *Fukui Regional Economies Volume.4, Fukui Prefectural University*

[7] Iwase Y. [2006] "Corporate Valuation based on EVA", *Journal of Insurance Science, 594.*

[8] Iwase Y. [2004] "An Analysis of Japanese Non-Life Insurance Business Based on EVA", *Journal of Insurance Science, 587.*

[9] Japan Institute of Life Insurance [1996] *Information & Good Selection, Research of Merchandise Information and consumer interest.*

[10] Japanese non-life insurance company's P/L & B/S [FY1996 to FY2004].

[11] Joel Wiley M.Stern and John S.Shiely. [2001] *The EVA Challenge: Implementing Value-Added Change in an Oraganization*, John Wiley & Sons, Inc.

[12] McKinsey & Company, Tim Koller, Marc Goedhart and David Wessels [2005] *Valuation : Measuring and Managing the Value of Companies, 4/Edition*, John Wiley & Sons, Inc.

[13] McKinsey & Company, Inc., Tom Copeland, Tim Koller, and Jack Murrin [2000] *VALUATION: MEASURING AND MANAGING THE VALUE OF COMPANIES,3/Edition*, John Wiley & Sons, Inc.

[14] Miyauchi A. [2004] "Characteristics of new BIS proposed regulation and its impact on financial System", *Japan Bank Working Paper Series,Economic Seminar, 598.*

[15] Mizushima K. [2006] *Modern Economical Insurance (Eighth Edition)*, Chikura publishing Company.

[16] Nikkei Research, *Definition & concept of EVA, Brand Information.*
Web site: http://www.nikkei-r.co.jp/brand/eva.pdf may 14, 2004.

[17] Swiss Re [2005] "Capital cost and creation of economic value in insurance companies, Theory and operational problems", *sigma ,Vol. 3.*

[18] Tanabe N. [July 10, 2001] "Estimation and Summary of EVA", *Security Analysts Association of Japan.*

[19] Tsumori S. [2001] *Value Based Management*, ChuoKeizai-Sha,Inc.