Response to life insurers' interest rate risk under the ultra-low interest rate
- Case study of Japan, Taiwan, Germany and Korea -

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I. Introduction

The global low interest rate that advanced in the 2010s restricts the management of financial institutions. Among others, the impact of low interest rates is significant for life insurance companies that provide long-term insurance products. Depending on the taking of interest rate risk, the soundness of management may be seriously affected. In the past, the collapse of management has been one after another due to the decline in the interest rate level.

In this paper, I summarize the interest rate risks often dealt with life insurance companies and their countermeasures. And I investigate the correspondence situation of insurance companies in major life insurance markets considered to have a high interest rate risk from published materials and consider differences in management behavior from the viewpoint of external observers[1].

[1] I also refer to the interview contents carried out to the CRO etc. of the major insurance companies in the four countries. For your reference, I have experience of analyzing and evaluating the insurance company's business condition from the outside as a credit analyst of a rating agency and a regulator of FSA Japan in charge of insurance company for about 20 years, in addition to current insurance company consulting work.

II. Life Insurance Company and Interest Rate Risk

1. Characteristics of Traditional Life Insurance Products Viewed from the Interest Rate

Interest rate risk as referred to in this paper is the risk of impairing the corporate value of insurance companies by fluctuating interest rate levels.

Insurance is a mechanism that insurance companies receive money (insurance premiums) from subscribers against promises to pay money (insurance payment) when insurance accident occurs at some future time. In other words, the insurance company provides a cash flow of insurance payments in the future.

In the case of life insurance, it is quite ahead of the insurance company to actually offer cash flow after selling the product. In addition, the cash flow to be offered in the future is determined at the time of sale in traditional life insurance. For this reason, insurance companies will be affected by fluctuations in financial markets unless they purchase the future cash flow, which is the raw material for providing confirmed future cash flows, from the financial market in advance. Moreover, the future cash flow is discounted by the interest rate, the longer the period until providing the cash flow, the greater the influence of interest rate fluctuations[2].

This is because the insurance accounting adopted by many countries at present, including Japan, has not been able to accurately indicate the effect of fluctuations in interest rates on insurance companies. In current accounting, insurance companies generally evaluate financial assets in a market-consistent manner,

[2] This is the same as the idea of calculating bond prices.

while insurance liabilities are generally evaluated at acquisition cost. As a result, the impact of fluctuations in interest rates is reflected exclusively on assets, and increases in interest rates have a negative impact on life insurance management on accounting. However, as insurance liabilities, which are definite future cash flows, are naturally affected by interest rate fluctuations, whether or not the corporate value will be damaged depends on the positions of assets and liabilities. If there are companies that are not providing sufficient raw materials (assets) for long-term insurance liabilities, while they provide the products with a very long time to provide cash flow such as whole life insurance, declining interest rates becomes a factor that worsens corporate value.

2. Life Insurance Market with High Interest Rate Risk

As described above, in insurance companies that have mainly provided traditional life insurance, they often tend to take large interest rate risk because they guarantees fixed interest rates over a long period of time. For the Commercial banks, they are usually short-term financing and long-term lending, rising interest rates are their risk factors. In contrast to this, for the life insurance companies, they are long-term financing and long-term investing in general, lower interest rates reduce their corporate value.

By the way, the life insurance market has strong locality, and market characteristics are quite different depending on the country and region. It seems to be affected by the social security and financial system, the business environment of the insurance company including various regulations, the public consciousness and customs on security, etc. are influenced. In addition, life insurance are not global products unlike securities or real estate. For example, people living in Japan can only purchase insurance products from the insurance companies licensed by the Japanese government. For this reason, even with the same “life insurance”, some countries currently dominate the traditional products that insurance companies are likely to be affected by interest rate fluctuations, that is, the future cash flow confirmed at the time of purchase, other countries are less likely to be affected by interest rate fluctuations, because of wide spread variable type products, where policyholders take risks of financial market fluctuations.

The latter is typical in UK. UK life insurance market is predominantly single payment saving and retirement products, and there are many variable type products and actual dividend products with no minimum guarantee. Insurance company's interest rate risk is generally small. EU insurance regulator EIOPA evaluated UK life insurance industry as a small mismatch between asset and liability through their stress test in 2016.

In the United States which is the world's largest market, there are the products with high interest rate risk, such fixed annuity, traditional whole life, variable annuity with minimum guarantee, etc. However, US life insurance companies provide various products. About 80% of their general account assets account for fixed income assets, due to the existence of developed bond markets. It is popular the ALM based on the principle of reducing interest rate risk by duration matching.

On the other hand, in the life insurance market in Japan, Taiwan, Germany and Korea, insurance companies provide long term traditional products, with future cash flows are confirmed at the time of buying, or with minimum guarantees such as interest rates. Moreover, life insurance companies based in these four countries are not always able to cover the future cash flow of liabilities with assets, so they take large interest rate risk which may affect their corporate value. For example, the report "Low Interest Rates are Credit Negative for Insurers Globally, but Risks Vary by Country" issued by the rating agency Moody's in March 2015 shows about the impact of low interest rates. Moody’s evaluate Germany and Taiwan as "Very High Risk to Profitability" and Japan and Korea as "High Risk to Profitability" based on the insurance guaranteed liability, level of the guaranteed interest rate, the duration gap of assets and liabilities, and so on.

Life premium volume in USD in 2016

Rank	Country	Premium volume (in millions of USD)	World share (in %)
1	United States	558,847	21.35
2	Japan	354,053	13.53
3	China	262,616	10.03
4	UK	199,369	7.62
5	France	152,817	5.84
6	Italy	122,438	4.68
7	South Korea	104,169	3.98
8	Germany	94,661	3.62
9	Taiwan	84,493	3.23
10	India	61,817	2.36

Source：Swiss Re Institute sigma No 3/2017

Therefore, in this paper, I research the life insurance companies how to respond for ultra-low interest rate environment and consider the reason of their differences in management behavior from the published materials based in the four countries, large market scale and large interest rate risk.

3. What does it mean the Risk Taking of Interest Rate under the Ultra-low Interest Rate Environment?

Before entering the case study, I would like to summarize the meaning of insurers' behavior "keeping their large interest rate risk and waiting for the interest rate recovers", under the ultra-low interest rate environment nobody experienced in the past, such as those seen in the four countries mentioned above.

Their corporate value should have decreased except for other factors because of declining interest rate compared to before. In other words, the risk taking by the management team is backfired, and the net asset value based on economic value has decreased.[3] Although the asset value of the insurance company increases as the interest rate falls, the insurance liability value rises further.

Under such circumstances, the behavior "keeping their large interest rate risk and waiting for the interest rate recovers", that is, to allow ALM mismatch for a while, it is the meaning insurance companies are continuing risk taking to expect increasing interest rate in spite of declining net assets.

Of course, even under low interest rates, you can not deny such

[3] Net asset value based on economic value is used herein refers to the difference between assets and liabilities that are evaluated in a market consistent manner. It is closer to the corporate value of insurance companies than to net asset value on accounting.

risk taking if you have sufficient net assets to support risk taking. However, more convincing explanation will be necessary for external stakeholders the reason of business judgments by companies because we have continued to decline in interest rate and insurance company has continued to fail risk taking as before.

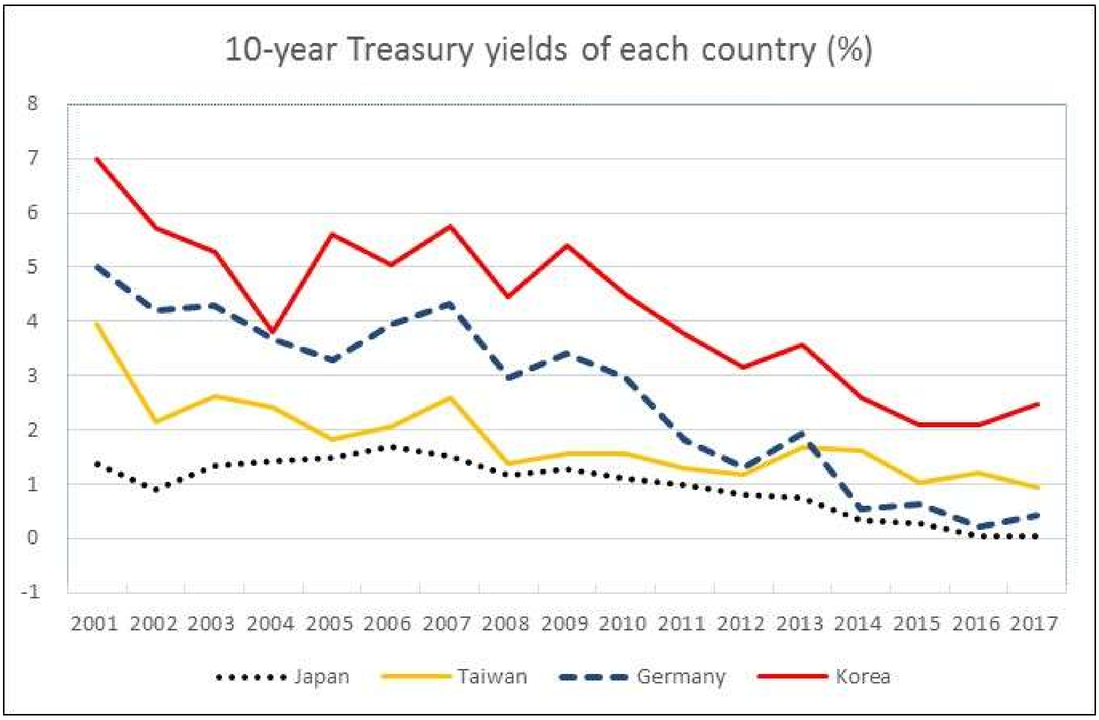
To insurance company's response to interest rate risk, reduction of insurance liabilities by some method such as reinsurance, increasing capital (solvency margin) to enhance risk tolerance, as well as matching of insurance liabilities to future cash flows due to purchase of super long-term bonds, etc. Furthermore, as indirect countermeasures, it will be possible to improve the profitability of insurance underwriting and asset management, review the product strategy for reducing the burden of insurers' interest rate risk. Entering new business, which becomes a risk hedge of the insurance liability, is also their option. However, these indirect countermeasures require long time unless large-scale acquisitions, and so on.

III. Correspondence of Life Insurance Companies at Ultra-low Interest Rate Environment

1. Case Study of Major Life Insurers in Published Materials

I will show the correspondence situation of insurers based in Japan, Taiwan, Germany and Korea, which are considered to have a large market size and generally high interest rate risk. I observe mainly mid 2010s when the interest rate declined.

Actually I would like to confirm the trends of the whole industry in each country, but because the published management information is very limited. So, I focus on the major listing insurance companies based in each country as the next best measure. I confirm the management behavior under low interest rates through their information for analysts and investors (IR materials) in English on the website.



2. Japan

It is the second largest market in the world next to the United States, and it is a market mainly traditional life insurance and individual annuity. Variable type products are not so large in recent years. Though Japanese major life insurers provide mainly protection products within 15 years since 1990s, there are lots of liabilities which are whole life insurance and long-term annuity products acquired until the mid-1990s, when the guaranteed interest rate was high. In around 2000, mid-sized life insurers collapsed one after another due to the declining interest rate and falling asset prices, and some of the major life insurers also suffered from a solvency problem.

In Japan, low interest rates have already been in effect since the late 1990s, but the interest rate level further declined after the Bank of Japan began massive quantitative and qualitative monetary easing from April 2013, and introduced a negative interest rate policy from January 2016. JGB 10 years yield has been almost 0% since 2016 and, 30 year yield has been below 1% at the present.[4]

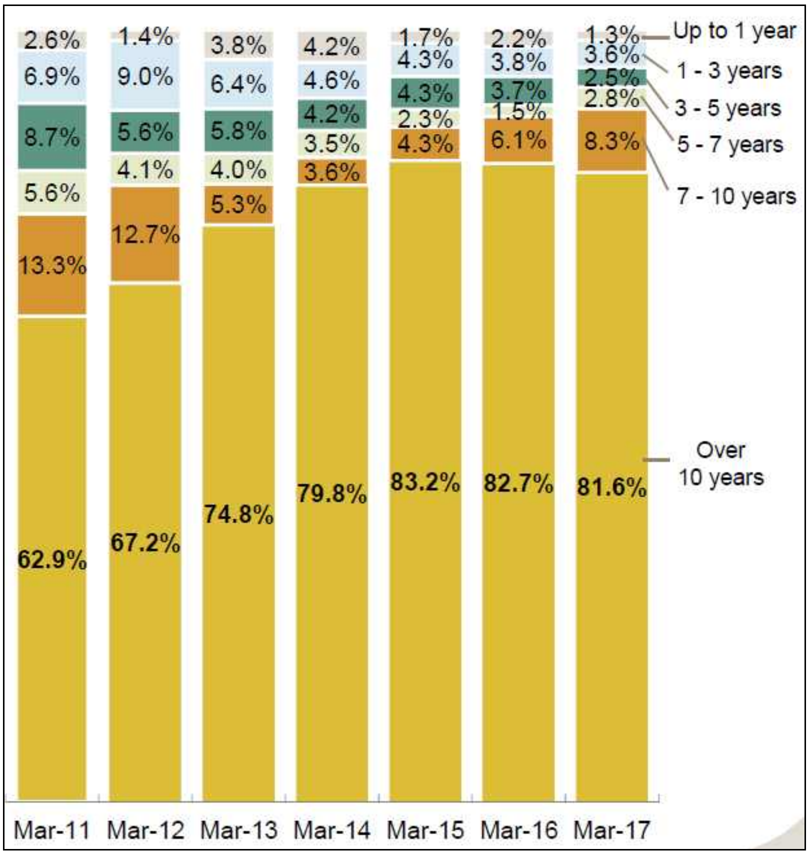
Among the major 5 life insurance companies, Dai-ichi Life, demutualized in 2010, and Japan Post Insurance, privatized in 2007, are listed. Other major life insurers (Nippon Life, Sumitomo Life, Meiji Yasuda Life) are mutual companies. Therefore, I have researched the correspondence situation of major life insurance companies using mainly on IR materials of the two listed companies after 2013, BOJ started massive monetary easing and declined interest rate further.

Japanese life insurers have suffered from so-called negative spread problem arising from mismatches of assets and liabilities since late 1990s. In recent years, many companies have introduced risk management framework based on economic value. So they became to consider the impact of large interest rate risk. They changed their asset allocation to yen-based fixed income assets and continued to prolong their assets under the low interest rate environment. Until around 2013, Dai-ichi Life and other major life insurers purchased over 10 years super long-term bonds for

[4] The Bank of Japan set the short-term interest rate at minus 0.1% and also set the operation target for long-term interest rate, the 10-year government bond yield to "about 0% ".

reducing their interest rate risk. However, since the start of large-scale easing, the trend toward asset prolongation has gradually stopped, and after the introduction of negative interest rate policy, no company prolonged their assets. In the IR document of November 2016, Dai-ichi Life said, "While purchasing a large amount of super long-term government bonds in a situation where interest rates are being policy-driven, even if it could be a short-term risk reduction, it will not lead to sustainable value creation." However, it is not a move to actively take interest rate risk expecting of interest rate rising. There are still maintaining their duration gap at a certain level by using derivatives.

Maturity Profile of Domestic Bonds



Sourse：Dai-ichi Life Holdings, May 25, 2017

We can observe they increase foreign securities in their assets and diversify investment objectives, which are considered to be an effort to strengthen profitability rather than responding to interest rate risk. They have increased to invest foreign securities, mainly foreign corporate bonds since early 2010s, and continued even after BOJ large-scale easing. Foreign investments are accounted for over 20% recently.[5] About 70% of foreign exchange risks are hedged, so it is consider they focus on risk taking to overseas interest rates. As diversification of investment objects, for example, Dai-ichi Life has expanded investment target countries and currencies of foreign bonds and has implemented infrastructure and real estate investment. Japan Post has worked on alternative investments such as hedge funds and real estate.

After the BOJ's massive easing, major life insurers have boosted solvency margin. Until then, there were moves to increase policy reserve additionally, and since 2015 they have increased by issuance hybrid securities, including Dai-ichi Life. It is considered to be their conscious of net assets based on economic value, because it seems to keep enough regulatory capital.

On the product strategy, they shift to protection products more and more, especially after the introduction of negative interest rate policy. It can be seen that each company keeps down sales of yen-denominated single payment products by lowering guarantee interest rate extremely. It is considered they emphasize new business value rather than premium income. For example, Dai-ichi Life reinforces protection products by adjusting the evaluation

[5] For reference, insurance products denominated in foreign currencies are not so popular in Japan.

standards of sales staff, and releases new protection products whose premiums are determined according to health conditions. Japan Post, which has provided saving type products traditionally, focus on providing medical rider, and launch whole life with low surrender value and the product for longevity risk.

In Japan, FSA Japan is still considering to introduce solvency margin ratio based on economic value and not announce the timing of introduction yet. International accounting standard, IFRS is not mandatory but voluntary applied. Meanwhile, many Japanese insurance companies already use economic value base (or strong affinity) indicators such as EEV and ESR for their business and risk management, and listed companies disclose them voluntary. [6]

3. Taiwan

In Taiwan, life insurance has spread rapidly since the 1990s, and the scale of the market per population and GDP is the world's leading level.

As insurance liabilities, there are lots of traditional long term life insurance such as endowment and whole life insurance with high guarantee rate acquired in the past. Before the financial crisis since 2008, sales of variable products increased, but the assets of these special account products occupy only about 7% of the total assets. Although the sales of the products denominated in foreign currencies have increased in recent years, it seems that the proportion of insurance liabilities accounts for a limited yet.

[6] EV (Embedded value) is one of the indicators showing the corporate value of life insurance companies, and EEV (European Embedded Value) is one of the measurement methods of EV. ESR (Economic solvency ratio) is the soundness indicator and it is calculated based on economic value.

In response to the financial crisis, the central bank lowered the policy rate, which was in the mid-3% in 2008 to the lower-1%, and Taiwan has the lowest interest rate country in East Asia next to Japan. 10 year government bond yield has declined at a level below 2% since 2008, and declined at around 1% at the time of the economic downturn from 2015 and it reaches the present.

Due to the severe business environment and other reasons, foreign life insurers have withdrawn and all major life insurance companies are domestic now. In recent years, the bankruptcies of life insurers have occurred. According to the Taiwan Insurance Guarantee Fund (TIGF), low interest rate environments affected their bankruptcies with their mismatch between assets and liabilities.

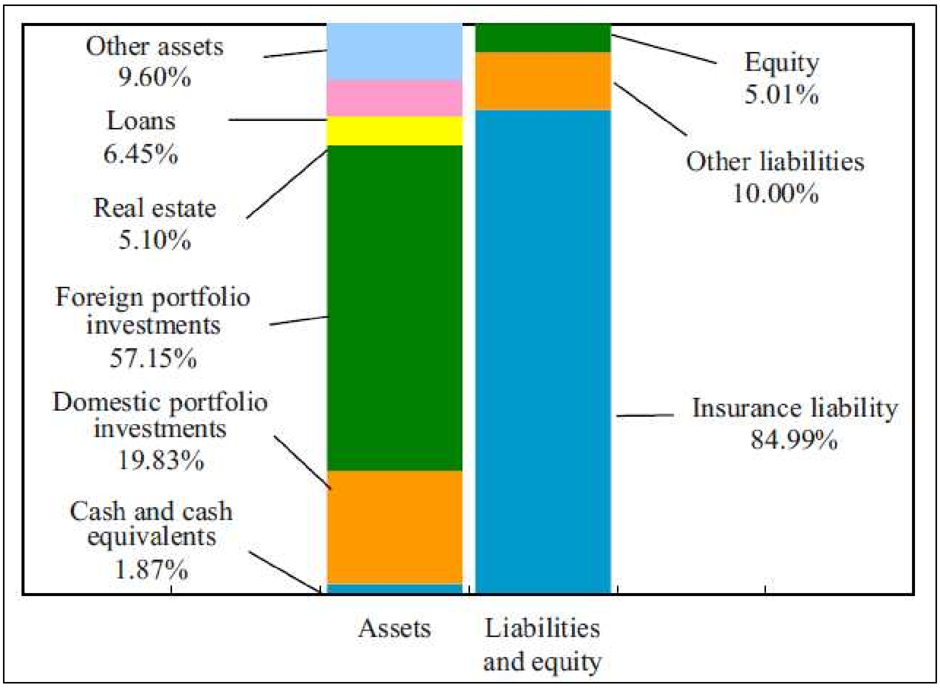
In Taiwan, Cathay Life, Fubon Life and Nanshan Life are the top three companies. The holding companies of Cathay Life and Fubon Life disclose their management information for analysts and investors. In the following, I have researched the state of correspondence to the ultra-low interest rate environment based on their IR materials and the reports of Moody's and Central Bank.

First, there is a large mismatch between assets and liabilities because the domestic bond market is immature. Moody's estimated that there was a duration gap of 5 to 8 years as of March 2015. However, looking at the asset allocation of each company, the duration gap may not make much sense. As of the end of 2017, the proportion of domestic bonds and mortgage loans, considered to be the assets corresponding to the future cash flows of insurance liabilities, was only 13.6% in Cathay Life and 15.9% in Fubon Life. It is clear the unbalance between assets and liabilities.

Compared with the asset composition at the end of 2008 and the end of 2017, we can see the increasing of foreign securities. In Cathay Life, the composition ratio increased from 34.9% to 62.0%, and in Fubon Life, it rose from 28.3% to 62.7%. Although both companies are likely to hedge more than 70% of the exchange rate risk, such a concentration on foreign securities (mostly in bonds) is not found in the other three countries. For reference, you can see the same trend in the whole industry, increasing from 26% at the end of 2008 to 57% at the end of 2016. Furthermore major life insurers In Taiwan have large exposure in real estate. Cathay Life in particular, the composition ratio of real estate is also about 9%.

<u>Asset / liability Structure of Life Insurance Companies</u>

(the end of 2016)



Sourse：Central Bank of the Republic of China (Taiwan), Financial Stability Report May 2017

Both companies are inclined to invest in foreign bonds that can be expected to get higher yields than domestic bonds, and they also show the average guarantee rate of insurance liabilities and the investment yield after currency hedging in their IR documents. It is thought that the management priority is given to securing liability costs rather than a reduction of interest rate risk, and they take investment risks aggressively to realize that. In addition, Financial Supervisory Committee, a regulatory authority in Taiwan, gradually relaxed the regulation of overseas investment and pushed the boosting of foreign investment in the result.

On the other hand, it is found to provide products with reduced interest rate risk for insurance companies in terms of product strategy. They urge to transfer from traditional type to variable type and strengthen sales of protection products and foreign currency-denominated products. Cathay Life and Fubon Life have shifted to provide products with high new business value, not insurance premium income.

Cathay Life and Fubon Life are the members of the financial holding company group. They are operating life insurance, non-life insurance, banking and securities businesses. They are also expanding overseas mainly in Asia. There is also a movement to increase solvency margin by external funding.

Taiwan solvency ratio, RBC for insurance companies reflect mismatches between assets and liabilities as interest rate risk to some extent, but it is not a regulation based on economic value. On the other hand, Taiwan is an enforceable country of IFRS, which is considered to have a major impact on the assessment of insurance liabilities.

4. Germany

Although main products are shifting from endowment insurance to individual annuities, it occupies the main power for traditional long-term savings products. Variable type (unit link) products are about 15% of the premium income. Such market characteristics are reflected directly in insurance liabilities, and insurance companies are likely to have interest rate risks.[7]

As the monetary easing policy by the European Central Bank (ECB) continued, long-term interest rates in Germany remained at low levels. In addition, as the ECB lowered the policy rate to minus in 2014 and the quantitative easing expanded, 10-year government bond yield has fallen under 1%, 30-year government bond yield under 2% since August 2014.

I have reviewed the correspondence situation with the low interest rates environment since 2014, researching on major insurance companies such as Germany's largest insurance group Allianz, and ERGO, the member company of Munich Re, the world's largest reinsurance group. Apart from Japan and Taiwan, there are about 90 life insurance companies in Germany and there are differences in the response situation to interest rate risk between major companies and others. I first show the analysis results of whole German life insurance industry through the Moody's and regulators report, and then show major companies' trends.

In the report of 2015, Moody's indicated the German life insurers' duration gap between assets and liabilities are over 10

[7] For reference, life insurance companies in Germany are unable to provide medical insurance, and independent medical insurance companies are responsible.

years because most of their insurance liabilities are long-term with guarantee rate. Large mismatches of assets and liabilities are also disclosed in the stress test conducted by EIOPA, the insurance supervisory authority of the EU. According to the report of 2016, the duration of German insurance liability was 21.40, in response to the duration of 9.61 for fixed income assets at the beginning of 2016. EIOPA also provided cash flow analysis of assets and liabilities and it show that the large cash out flow over 20 years.[8][9]

The EU introduced Solvency II as a new soundness regulation including the utilization of economic value-based soundness indicators in 2016. According to German insurance supervisory authority BaFin, at the beginning of 2016, all life insurance companies had achieved the SCR ratio required under Solvency II, but 16 out of 84 applied transitional measures and they could not achieve unless them. And at the end of March 2016 when the interest rate declined, the application of transitional measures spread to 26 companies.[10]

Interestingly, IMF disclosed the impact of the stress scenario such as interest rate declining on the SCR ratio is larger for medium-sized companies rather than for large and small companies according to the report of the Financial Sector Assessment Program (FSAP) released in 2016.

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[8] 20 life insurance companies in Germany took part in the test, account for 75% of the market share. EIOPA does not indicate the situation of mismatch because the calculation method of duration is not the same for assets and liabilities.

[9] They indicate that liability cash flow over 20 years are not sufficiently covered by asset cash flow and easily affected by interest rate fluctuations.

[10] SCR ratio is the soundness indicator contrasting risk amount and own funds. Starting of Solvency II, transitional measures have been set up to 16 years.

Under the low interest rate environment, BaFin introduced additional policy reserve (ZZR) in 2011. Insurance companies have to recalculate the policy reserve at the reference interest rate set by the authorities and compulsorily increase the shortfall. Of course, it is a soundness regulation, but it becomes a heavy burden for some insurance companies because the required ZZR has expanded year after year as the interest rate level declines.

On the other hand, it is found for Allianz's German life insurance business that the condition seems to be not so serious, as far as checking their IR materials. There is almost no duration gap between asset and liability as of 2014. Since 2003, Allianz executed "+ One Program" to prolong assets, liability cash flows up to around 30 years have been largely covered by asset cash flows.

<u>Cash Flow Matched for 30 years (Allianz Leben)</u>

Sourse：Allianz SA, “Allianz Capital Markets Day” (Nov 30, 2016)

Since the cover of over 30 years cash flow are limited, interest rate risk still remains, but it can be said that it is sufficiently managed. A similar approach is also seen in ERGO, which suppress interest rate risk by controlling duration gap.

Of course, they try to raise the yield on investment, such as credit and infrastructure investment, but there are no big change in the asset composition in recent years. Moody's also referred the good risk profile of major life insurers compared to the average company in Germany.

It is interesting on the product side. Allianz has developed saving products that lightening their capital burden rather than traditional ones, as well as unit linked, provided protection products such as term life, disability insurance, nursing-care, etc. based on the management policy of providing only hedgeable guarantees. As a result, the proportion of traditional products in the new sales has become considerably smaller. ERGO is more drastic. ERGO has stopped selling traditional life insurance products since 2016, and manage traditional policies separately. The company is promoting the life insurance business targeting unit-linked products, term life, disability insurance, etc.

Both Allianz and ERGO, although the importance of the German life insurance business is high but it is only a part of the whole group, there is also the option to control interest rate risk as a whole group. However, as long as we have confirmed IR materials etc., we are strongly aware of interest rate risk control as a life insurance business in Germany.

5. Korea

Life insurance market in South Korea is the second largest in East Asia after Japan and China. Until the 1990s life insurance has a strong character as "savings" and the main products were endowment insurance with interest rate guarantee. After the following “IMF shock” and deregulations, main products are shifting to a wide variety of products and variable products. Variable products are roughly 15% to 20% of the total on premium income basis.

However, from the viewpoint of the interest rate risk of the insurance company, the insurance liability of the guaranteed rate products sold in the past remained. According to the report of the Korea Central Bank, as of the end of June 2017, contracts with more than 20 years remaining accounted for 67% of insurance liabilities, contracts guaranteeing interest rates of 3% or more accounted for 63%. Especially in domestic mid and small companies, the proportion of traditional endowment tends to be high. And even for variable products, insurance companies provided with minimum guarantee interest rates of 3% or more mainly sold in the 2000s.

Moreover, as in Taiwan, because domestic bond markets are immature, it is difficult to cover the long-term insurance liability cash flow by asset and insurance companies tends to take large interest rate risk.[11]

Korean 10 year government bond yields is at the 2% level, which is higher than other three countries, However, Korean interest rate was mostly over 5% by around 2009. It is said to be quite a low

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[11] For reference, non-life insurance companies in Korea also provide long-term insurance as one of the main products, and it seems that they have large interest rate risks.

interest rate condition although it is returning at the current stage.

Korea is an enforceable country of IFRS and is preparing for application of IFRS 17 (Insurance Contract Accounting) in 2021. It will be expected to introduce under the low interest rate condition, and insurance companies have to evaluate insurance liabilities on economic value basis. In the result, the insurance liability will expand dramatically and fall into a capital shortage. For example, according to the estimate by the Korea Central Bank on the assumption of insurance liabilities as of the end of June 2017, the insurance liability will increase from 31 to 44 trillion won (5.7% to 8.2% of the insurance liability) for the whole life insurance industry.

Three major insurance companies (Samsung Life, Hanwha Life, Kyobo Life) is less than 50% share of market. Although their market share have declined due to the growth of bancasurance and joining the industry of agricultural cooperative etc., they keep the position as market leader. Therefore, I have reviewed two listed companies, Samsung Life and Hanwha Life from the IR materials.

In view of the interest rate sensitivity of embedded value (EV) announced by each company, the interest rate risks of both companies are not currently small, but in recent years, they efforts to change the structure of liabilities.[12] The most prominent aspect of Samsung Life's action is to increase the proportion of valuable products in insurance liabilities as response to interest rate risk.

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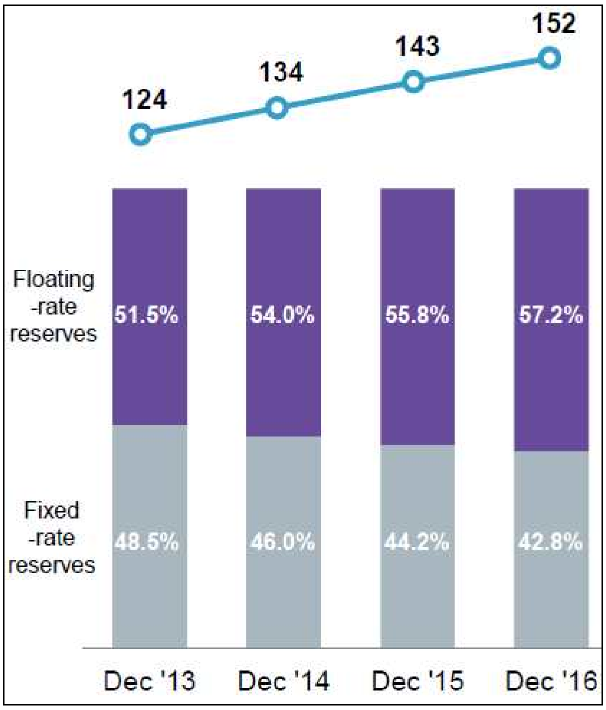
[12] The EVs disclosed by both companies and major life insurance companies in Taiwan are not EEV but reflected the asset composition of each companies. Companies usually publish the sensitivities of EV and EEV to interest rates, stock prices, mortality rates, etc.

It reached 59% at the end of 2017 from 41% at the end of 2010. Hanwha Life also raised the proportion of interest rate fluctuating type products, from 31% at the end of 2010 to 53% at the end of 2017. Hanwha has also worked on prolonging the asset which was as short as about 3 years. The duration gap which exceeded 4 years in 2009, have become 0.4 year in 2017.[13]

Reserve Composition (KRW trillion))



Sourse : Samsung Life, Mar 2017

However, it is considered the risks of minimum guarantee rate are not hedging enough, basically insurers are holding themselves. After the declining interest rate, they face the risk from the products selling in the past.

[13] Samsun Life does not disclose duration information in IR materials, but explains in the IR document of 2017 that "using long-term bonds and derivatives to prolong asset duration".

Looking at the IR documents on asset management, the focus of management is on how to secure the investment yield against the average guarantee rate of the insurance liability and soften the negative effect on accounting result, rather than the response to the future cash flow of the insurance liability. For example, both companies have increased the investment in foreign securities, especially in Hanwha Life, the proportion of foreign investment in investment assets has increased from 2.9% at the end of 2010 to 24.6% at the end of 2017 (Samsung Life is also increasing, but just 5.4% at the end of 2017).

On the product strategy, they try to increase the sales of profitable protection products in order to raise the value of new business in EV, as well as shifting to the floating type products as I mentioned. For example, Samsung Life announced not a "market share" but a “share of protection products”, not “new sales” but "value of new business" as important indicators under low growth and low interest rates environment among 2015 IR materials.

It is found the conversion from the keeping business scale to emphasizes increasing corporate value, as indicated by EV, through the cost reduction, keep the contract persistency rate.

IV. Comparison and Consideration of Correspondence Situation

1. Correspondence Situation on the Four Countries

Summarizing the interest rate risk correspondence of major life insurance companies based in the four countries mentioned so far is as follows.

Recognition of Interest Rate Risk and Asset Management Policy

<Japan>

- It is recognized for life insurers the importance of interest rate risk management because of the past experience, etc., but under the recent declining of interest rate, major insurers interrupt to reduce the interest rate risk.
- Major insurers increase their solvency margin by issuance of hybrid securities, etc.
- Insurers tend to expand investment risks for keeping their yield of assets.

<Taiwan>

- Insurers continue to take large interest rate risk and give priority to securing yield of assets.
- As a result, foreign securities occupy the majority of general account assets, in addition to interest rate risk.

<Germany>

- Major insurers are strongly aware of the importance of interest rate risk management and continuously reduce the risk. Even after the declining in recent years, their management attitudes have not changed. It seems to be different from the movement of the whole industry.

<Korea>

- There seems to be a focus on improving assets yield rather than interest rate risk control, as far as checking IR materials.
- Major insurers have been changing their insurance liabilities

for focusing on variable products.

<u>Products and Business Strategy</u>

<Japan>

- Some major insurers emphasize new business value rather than insurance premium income or market share.
- Insurers suppress sales of saving products, develop diverse protection products.
- In recent years, major insurers advance their business diversification, including overseas expansion by M&A.

<Taiwan>

- Major insurers develop products that emphasize new business value and reduce capital burden, as far as checking IR materials.
- As financial conglomerate, the holding companies of major insurers proceed to diversify their business.

<Germany>

- Major insurers have shifted rapidly from traditional products to lightly capitalized products and they ensure new business value.
- As global insurance group, the holding companies of major insurers proceed to diversify their business internationally.

<Korea>

- Major insurers emphasize on new business value rather than insurance premium income and provide various products, even declining their market shares.

- For increasing corporate value, major insurers focus on reducing operational costs and maintaining persistency rate.

Regulatory Environment

- Japan FSA is still considering solvency margin regime based on economic value. Application of IFRS is optional.
- Taiwan regulators are also considering new RBC regulation based on economic value. Application of IFRS is mandatory for listed companies.
- German regulator BaFin has already introduced economic value-based solvency regulation (EU Solvency II) in 2016. Application of IFRS is mandatory for listed companies.
- In Korea, IFRS is forced to apply and Korean regulator is considering to support toward a smooth transition of new insurance accounting.

Looking at the product strategy, both the major life insurers in the four countries emphasize expansion of new business value and reduction of their capital burden. Although it is important for insurers to acquire insurance premium income and keep their market share traditionally, the mind of major life insurers may have changed.

On the other hand, although the insurers of four countries tend to take large interest rate risks, considering their business environment, some kind of differences are seen in correspondence to interest rate risk. German major insurers seem to consider it is important to control the interest rate risk directly. In contrast to this, other insurers in three countries seen to secure accounting profit by taking investment risks for improving their asset yield, rather than control the interest rate risk from the mainly viewpoint of economic value, as a result.

2. Background of the Difference to Interest Rate Risk Management

I have considered the manly 3 backgrounds of the difference major German insurers from other three countries' insurers.

First, there are differences in solvency regulation. In Germany, economic value-based solvency regulation (EU Solvency II) has been already introduced in 2016 ahead of the other three countries. Solvency II has been under consideration for more than 10 years, during which the Quantitative Impact Study (QIS) has been conducted several times, allowing insurers to prepare for the introduction.

Second, it is considered the degree of penetration for management based on economic value. As I mentioned earlier, the current insurance accounting has not been able to capture the impact of insurance companies' interest rate fluctuations well. Of course, insurance companies have tried to grasp the influence of interest rate fluctuation by cash flow testing or recently introducing new management framework on economic value base. However, published financial statements are under the current accounting system, so external stakeholders including the media tend to pay attention to accounting profit and loss. In the result, management team may not to ignore accounting profit and loss.

On the other hand, in Europe, insurance companies have worked on to disclose of their actual business situation for external understanding such as publishing EV / EEV, ESR from an early stage.

Third, it is considered to be important a development of ERM, enterprise risk management. Insurance industry is progressing to introduce ERM framework as an evolutionary form of risk management. Unlike traditional risk management focusing on loss avoidance and keep their soundness, the target of ERM is clearly increasing corporate value. Under the ERM framework, insurance company sets a risk taking policy and an allowable loss, increases profitability while ensuring soundness. It is similar to the concept of risk appetite framework, recently taken in by the major banks.

Major European (re)insurance group such as Allianz and Munich Re have been working on the construction and promotion of ERM framework from the beginning of the 2000s, and have been pursuing the balance between "risk", "capital" and "return". It seems that Japanese insurers have started working on ERM seriously in the past 10 years, no matter how long, and in Taiwan and Korea, insurance regulator promote to ERM prior to the industry.

V. Conclusion

This paper is a case study which analyzes and examines interest rate risk correspondence to life insurance companies under the ultra-low interest rate environment, based on limited public information. Some analyses based on "insufficient evidence", "expert judgment" due to restrictions on materials, etc.

Nonetheless, in this paper I have shown that there are differences in management behavior, even though there are common business environment that is likely to have large interest rate risk. As a background to this, I cited three points, "solvency regulation", "business management based on economic value", "ERM", but they are not simply meaning as the importance of frameworks and tools themselves. It is considered that the differences will appear in actual management behavior depending on the degree of penetration of such a framework and tool within their management.

Main references (excluding IR materials)

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