Organizational Structure and Insurers’ Risk Taking: Evidence from the Life Insurance Industry in Japan

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1. Introduction
Motivation

- Insurance company’s risk taking behavior has an impact on
  - Stockholders
  - Policyholders
  - Employees
  - Regulators …

- Many papers: Organizational Structures and Managerial Activities

- Few papers have dealt with the relation between organizational structures and the insurer’s risk taking.

Purpose

- This study aims to examine the effects of organizational structures on an insurer’s risk taking,
  - Using data from Japanese life insurers for fiscal years between 1983 and 2007,
  - Examining if the deregulation has an effect on the relation between organizational structures and an insurer’s risk taking behavior.
Why Japan? Why Insurance?

– 2 streams of research

• To examine the relation between organizational structures and a company’ risk taking,

• Insurance companies in Japan have two interesting features:

  1. Keiretsu vs. Independent --- (Japanese Firms)
     🗒️ Hoshi/Kashyap/Scharfstein (1991), Prowse (1992), Weinstein/Yafeh (1998) ...
  2. Mutual vs. Stock--- (Insurance Firms)
     🗒️ Mayers/Smith (1981, 1986), Lamm-Tennant/Starks (1993) ...

• We integrate two streams of research related to the organizational structures.

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Related Studies – Risk Taking (Insurance)

• Lamm-Tennant/Starks (1993) --- J. of Business
  ➢ First article that directly investigates the risk taking behavior of the U.S. P/L insurance industry in terms of Underwriting Risks
  ➢ They use the standard deviation of loss ratio as risk measures which is a book-value measure because mutual companies do not have market value risk measure.

• Lee/Mayers/Smith (1997) --- JFE
  ➢ Examining P/L insurance company’s risk-taking in the U.S market in terms of changing of an asset portfolio, or Investment Risks
  ➢ They find that the shift to riskier assets, mainly stocks, following fund enactment occurs only for stock insurers.

• Ho/Lai/Lee (2012) --- JRI
  ➢ Examining the impact of organizational structure and board composition on risk taking in the U.S. property casualty insurance industry.
  ➢ They find that mutual insurers have lower total risk, underwriting risk, and investment risk than stock insurers.
Related Studies – **Keiretsu** (Business Group)

- Recently, diversified “**business groups**” around the world is receiving increasing attention in the financial economics literatures.
  - Khanna/Yafeh (2005, 2007) --- *J. of Business*
  - He et.al., (2013) --- *J. of Corporate Finance*

- The prominent role played by business groups has been discussed in a string of literatures on the Japanese bank-centered corporate groups, known as the “**keiretsu**”.

- The “**keiretsu**” is a good testing ground for discussing the relation between organizational structures and company’s risk taking behavior.

## Findings

1. First, **keiretsu** life insurers have **lower** investment (underwriting) **risk** than independent life insurers in the **post-deregulation** period.

2. Second, **keiretsu** life insurers hold **more stocks** in their asset portfolios than independent life insurers.

3. Third, **mutual** life insurers take a **lower** investment **risk** than stock life insurers in the **post-deregulation** period.

*Overall, the evidence of ex-deregulation period versus post-deregulation period implies that regulation has an impact on risk taking behavior in terms of organizational structures.*
2. Background

Japanese Insurance Market

1. Second Largest Market
2. Coexistence of Mutual and Stock
3. Keiretsu-affiliated Insurers
4. Single Regulation
5. Deregulation
(1) Second largest market

- Share of the world market was 20% in 2011

(2) Coexistence of Mutual and Stock

[N]ote: Japan Post is excluded in the data.
(3) Keiretsu

- "Keiretsu" is a special type of organizational structure in Japanese industries (incl. insurance).
- Past researches have shown that the unique organization structure (corporate groupings) in Japan known as the "keiretsu" have relatively ...
  - Low bankruptcy costs (e.g., Nakatani, 1984)
  - Low agency conflicts (e.g., Hoshi/Kashyap/Scharfstein, 1990, *JFE*)
  - Low information asymmetry (e.g., Hoshi/Kashyap/Scharfstein, 1991, *QJE*)
  - Low effective taxes (e.g., Gramlich/Limpaphayom/Rhee, 2004, *JAE*)
- Some of JP life Insurance companies belong to the “keirestu”.
(4) Single regulation

- Japanese life insurance industry is regulated by single insurance business law, the authorities, and tax code,
  - while in U.S. the insurance is sold in different states and regulated by the law of various states.
  - The results are reliable.

(5) Deregulation

- The regulation of the post-war life insurance industry was characterized by the so-called convoy system until the mid-1990s.
  - By utilizing the convoy system, after the war, the government tried to revitalize existing companies by limiting competition and forbidding new entries into the market, thus sheltering the industry.

- The Japanese government initiated a sweeping relaxation of regulations from the mid-1990s. In 1995, the insurance business law of Japan was drastically amended for the first time in 56 years.
  - One of the primary purposes of the new law, which went into effect in April 1996, is to promote competition among insurers.

- Differential managerial activities (e.g., risk taking) cannot (can) be observed in the ex (post) deregulation period.
3. Hypothesis Development

Keiretsu vs. Independent

Mitsubishi 三菱  Mitsui 三井  Yasuda 安田  Sumitomo 住友
Keiretsu Effects

- In general, shareholders can increase their wealth by taking more risk because of the limited liability provision.
- On the other hand, there is less incentive for shareholders to expropriate wealth from other stakeholders (policyholders, bondholders, and so on) in Keiretsu insurance companies.
- In other word, shareholders of Keiretsu affiliate insurance companies do not take too much risk at the expense of other stakeholders.

Aspect of Policyholder

<table>
<thead>
<tr>
<th>Policyholders</th>
<th>Purchasing insurance products</th>
<th>Holding much stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keiretsu Insurance Company</td>
<td>Other keiretsu member Company</td>
<td></td>
</tr>
</tbody>
</table>
Aspect of Owner

Owner

Keiretsu Insurance Company

Underwriting
(1) Subordinated bond
(2) Mutual insurance fund (Mutual form)
(3) Stocks (Stock form)

Other keiretsu member Company

Holding much stocks

The link between owner and policyholder in the ‘Keiretsu’ could cause the ‘Keiretsu’ affiliated insurance companies taking less risks than independent insurance companies.
Keiretsu vs. Independent

Hypothesis #1

• “Keiretsu” life insurers tend to take less risk than independent insurers.

Robustness: Stock holdings (H3)

• A keiretsu life insurer usually is a large shareholder (royal shareholder) of its keiretsu member firms and provide stability for the member firms.

• The member firms underwrite equity funds, subordinate bonds of the insurer, and purchase insurance from the insurer in return.

Hypothesis #2

• “Keiretsu” life insurers hold more stocks in their asset portfolios than independent life insurers do.
Stock vs. Mutual

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Stock Insurers

- Shareholders (and Managers) could take too much risk at the expense of policyholders (debt holders).
- Potential conflict

Managers ↔ Shareholders

Policyholders (Debt holders)

Too much risk taking

Principal of Limited Liability

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Mutual Insurers

Less risk taking
(than in the case of stock insurers)

- Mutual life insurance companies take less risk because potential conflict between owners and policyholders are eliminated in mutual company.

Mutual vs. Stock

- Stockholder
- Take much risk at the expense of policyholders!
- Managers

- Mutual
- Policyholders
- Not take much risk!

Hypothesis #3

- Mutual life insurers take less risk than stock insurers.
4. Data and Methodology

Data

• Source:
  ➢ *Statistics of Life Insurance Business in Japan [SLBJ]*  
    research Institute (Tokyo, Japan).
    ✓ All data is set up by manual entry.

• Sample:
  ➢ The sample consists of all existing licensed life insurance  
    “companies” with complete records during FY1983-FY2007 (for 25 years).
  ✓ Including both public and private companies
  ✓ Insurers which do business as a branch operation by a foreign insurers  
    (e.g., ALICO Japan, AFLAC, et.al) are excluded from the sample.
  ✓ When insurers were involved in M&A deals, we have to identify the new insurers  
    after the deals for an analysis in panel data set. In this study, we identify (legal)  
    surviving insurers as the new insurers.
Scope of the sample

- There are mutual-type organizations similar to a mutual-type insurance company, called cooperative insurers. Since there are many differences between insurance companies and the cooperative insurers in terms of disclosure requirements, capital requirements, and so on, the cooperative insurers are not generally classified as part of the insurance industry.

- This study uses just the data of mutual-type licensed insurance companies in Japan and does not include the data of the cooperative insurers because consistent data are not available for both organizations, which is a limitation of our analysis.

The number of Life Insurers in Japan

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Ownership</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mutual</td>
<td>Stock</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>16</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>16</td>
<td>7</td>
<td></td>
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<td>1995</td>
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<td>8</td>
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<td>1996</td>
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<td>1999</td>
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<td>2000</td>
<td>16</td>
<td>11</td>
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<td>2001</td>
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<td>2007</td>
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<tr>
<td>2008</td>
<td>16</td>
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<tr>
<td>2009</td>
<td>16</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>16</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>
Regression

\[
LHS = \alpha_i + \beta_{1,i} ASSET + \beta_{2,i} BOARD + \beta_{3,i} GROWTH + \beta_{4,i} HH1 + \beta_{5,i} ID + \beta_{6,i} IA + \beta_{7,i} GD + \beta_{8,i} LEV + \beta_{9,i} SOLVEN + \beta_{10,i} ORG + \varepsilon_{t,j}
\]

(1) S.D. of loss ratio as the underwriting risk to test (H1,H3)
(2) S.D. of the rate of return on investment to measure investment risk to test (H1, H3)
(3) A ratio of stock holding to total marketable securities as a dependent variable to test (H2)

We treat ownership structures as exogenous variables (e.g., Saunders/Strock/Travlos (1990))

Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underwriting risk</td>
<td>Standard deviation of loss rate ([t+1])</td>
<td>(+/+)\</td>
</tr>
<tr>
<td>Investment risk</td>
<td>Standard deviation of the rate of return on investment ([t+1])</td>
<td>(+/+)\</td>
</tr>
<tr>
<td>Stock holdings</td>
<td>A ratio of stockholding to total marketable securities at the end of each fiscal year</td>
<td>(-)</td>
</tr>
<tr>
<td><strong>Independent Variables:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSET</td>
<td>Logarithm natural of the amount of total asset that is deflated to real 2005 values using the Consumer Price Index</td>
<td>(+/+)\</td>
</tr>
<tr>
<td>BOARD</td>
<td>Total number of directors in the board</td>
<td>(+/+)\</td>
</tr>
<tr>
<td>GROWTH</td>
<td>The average growth rate of premium income each year</td>
<td>(+)</td>
</tr>
<tr>
<td>HH1</td>
<td>Herfindel-Hirschman index across the line of business in premium income</td>
<td>()</td>
</tr>
<tr>
<td>ID</td>
<td>A proxy variable for the proportion of individual insurance to total premium income</td>
<td>()</td>
</tr>
<tr>
<td>IA</td>
<td>A proxy variable for the proportion of individual annuity to total premium income</td>
<td>()</td>
</tr>
<tr>
<td>GD</td>
<td>A proxy variable for the proportion of group insurance to total premium income</td>
<td>()</td>
</tr>
<tr>
<td>GA</td>
<td>A proxy variable for the proportion of group annuity to total premium income</td>
<td>()</td>
</tr>
<tr>
<td>LEV</td>
<td>Debt to asset ratio</td>
<td>(+)</td>
</tr>
<tr>
<td>SOLVEN</td>
<td>A dummy variable = 1 (if a fiscal year is after 1996)</td>
<td>(-)</td>
</tr>
<tr>
<td>ORG</td>
<td>A dummy variable = 1 if a insurer is a mutual company</td>
<td><strong>H1: Negative</strong></td>
</tr>
<tr>
<td>MUTUAL</td>
<td>A dummy variable = 1 if a insurer is a mutual company</td>
<td><strong>H2: Negative</strong></td>
</tr>
<tr>
<td>KERKESU</td>
<td>A dummy variable = 1 if a insurer is a binational-affiliated company</td>
<td><strong>H3: Positive</strong></td>
</tr>
</tbody>
</table>

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Empirical Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Underwriting Risk</th>
<th>Investment Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSET</td>
<td>0.086</td>
<td>0.233</td>
</tr>
<tr>
<td>BOARD</td>
<td>-0.013</td>
<td>-0.069</td>
</tr>
<tr>
<td>LEV (leviathan equity)</td>
<td>-1.129</td>
<td>[0.662]</td>
</tr>
<tr>
<td>SIZEN</td>
<td>0.283</td>
<td></td>
</tr>
<tr>
<td>KEIRETSU</td>
<td>-2.124</td>
<td>[2.172]</td>
</tr>
<tr>
<td>Number of observations</td>
<td>718</td>
<td>325</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.139</td>
<td>0.246</td>
</tr>
</tbody>
</table>

The coefficient on KEIRETSU in column (3) is negative (-2.354) and significant at the 1% level, while that in column (2) is not strong significant.

These results suggest that the keiretsu effect on underwriting risk is strongly driven by the results of the post-deregulation period.

The coefficient on KEIRETSU in column (6) is negative (-0.054) and significant at the 5% level, while that in column (4) is not significant.

These results suggest that the keiretsu effect on investment risk is also strongly driven by the results of the post-deregulation period.
The coefficient on **keiretsu** in column (3) is positive (14.546) and significant at the 1% level, while that in column (2) is not strong significant.

These results imply that keiretsu-affiliated companies tend to hold more stocks especially in the post-deregulation period.

The coefficient on **mutual** in column (6) is negative (-0.096) and significant at the 1% level, while that in column (4) is insignificant.

This suggests that the negative effect of **mutual** on insurers’ investment risk is strongly contingent upon the results of the post-deregulation period.
Conclusion

Organizational Structures

- Mutual
- Keiretsu

Less Risk taking

In the post-deregulation period

More stocks in the asset portfolio

Further issue

- We need to address the following explanation in the future study.
- We find that...
  - (1) Keiretsu insurance companies take relatively low investment risk.
  - (2) Keiretsu insurance companies hold relatively high stock holdings.
- Generally speaking,
  - An investment for stocks relatively correlates with a high investment risk of an investor (an insurance company in this study).
- So,
  - Can we explain the above findings (1) & (2)?
  - It’s a our one of the future tasks.
Thank you!

Welcome your comments!

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RESPONSE TO THE COMMENTS
Suggestions

• Motivation / Contribution
  – What does the analysis of stock vs. mutual risk taking add to the literature?
    • Lamm-Tennant and Starks (1993)
    • Lee, Mayers, & Smith (1997)
  – The keiretsu insurer structure is similar to the alliance governance. This may provide additional and possibly stronger motivation for your hypothesis 2 and provide you a broader audience

• Yes, I know that the analysis of stock vs. mutual risk taking has no additional contribution except using out of the sample Japanese data. Absolutely, I agree with you. So, I try to more strengthen the analysis of the “keiretsu effect” rather than “mutual effect”.

Suggestions

• Organization
  – Shorten the introduction by 1-2 pages
  – Move the description of the keiretsu organization into one subsection and provide details and cites
  – Greater description of the empirical methods in the paper
    • Type of regression analysis
    • Diagnostics

• Yes, I’ll make clear the description of the keiretsu organization, and strengthen description of the empirical methods in the paper for readers.
Suggestions

• Empirical (1)
  – Inclusion of the four life insurance segments creates a linear dependence
  • Actually, there are other segments but the four segments in the data book, including health, disability, and so on. Also, I checked the correlation matrix among the 4 variables, but I am little concern about a perfect linear dependence.
  • However, for robustness, I will check the results dropping one or two insurance segment variables in the regression.

Suggestions

• Empirical (2)
  – Hausman test – You state that individual effects are correlated with explanatory variables. Shouldn’t this indicate a need for a fixed effects model?
  • Sorry about my sentence in the footnote(22) is confusing. Yes, your mention is absolutely right. But, actually, my regression results come from the random effects model. Thank you, I will make clear in the sentence for the methodology.
Suggestions

- **Empirical (3)**
  - Define the leverage variable. What are debt and equity in this case?

  - Definition of the leverage variable is very simple in this study. Due to the disclosure problem, I can consistently get the amount of total liabilities and the total asset in book value. So, I just calculated the leverage as (total liabilities) over (total asset minus total liabilities).

Suggestions

- **Empirical (4)**
  - Are the stock holdings of life insurers regulatory limited? Is there a risk based capital requirement? How does this influence hyp. 3?

  - Before the deregulation age, the Insurance Business Law (IBL) had regulations for insurers’ asset allocation, therefore, the stock holdings were in effective limited.

  - In the deregulation period, on the one hand, the regulations of insurers’ asset allocation have been loosened. On the other hand, the solvency margin regulation, a kind of a risk based capital requirement, introduced to the industry. That’s why I need to control the solvency margin regulation, and so this study conducts a dummy variable for implementation of the solvency regulation.

  - Of course, for more robustness, I try to conduct an additional regression using a control variable for a ratio of solvency margin of each firm.