Bank Diversification into the Insurance Business: The Effects of the Deregulation of the Bank-Sales Channel at Japanese Banks

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Abstract

In this paper we empirically examine the diversification effects of the deregulation of bank-sales channel into the insurance business by Japanese banks. Using the Japanese *unique* data set on fee-based revenues, we identify separate fee-based revenues, such as insurance and/or mutual fund sales. We find that banks with a higher BIS ratio, more branches, more monopolistic power in loan market, and higher loan-to-deposit ratios tend to have shifted towards an insurance fee-based business. This indicates that bank health and branch expansion can affect the fee business strategy at each bank. We also find that banks with lower mutual fund fee revenues tend to earn more insurance fee revenues, implying that a substitute relationship has developed between them after the Global Financial Crisis of 2007. We find that banks with higher insurance revenues are positively associated with return volatilities (such as ROA and/or ROE) but are not related with total risk or Z score. The results indicate that although increased fee-based activities can increase the volatility of bank earnings, they have only had a small impact on equity and/or insolvency risks at Japanese banks.

JEL classification: G21; G22; G28

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1. Introduction

The Global Financial Crisis (GFC) of 2007–2009 has brought to light the issue of bank risk diversification. Prior to the GFC, bank risk diversification had attracted the attention of both academics and practitioners, especially after the introduction of the Gramm-Leach-Bliley Act in the United States. Bank income diversification was considered at that time to contribute to increased bank stability. However, the shift toward non-interest income as opposed to the traditional interest income has brought a number of changes to the nature of banking system, and it is currently considered to be one of the causes of the GFC. Because of these factors, the ability to reduce bank risk is a topic of considerable importance for both bankers and their regulators.

The purpose of this paper is to empirically examine the diversification effects of the deregulation of the bank-sales channel in the insurance business of Japanese banks. While traditional interest income still plays an important role in the Japanese banking industry, the share of non-interest income (such as insurance sales) is steadily increasing. In this paper we are able to identify separate fee-based revenues (such as insurance and/or mutual fund sales) using the Japanese *unique* data set of fee-based revenues. Therefore, we can directly investigate the effects of *bancassurance* (i.e. bank and insurance company combinations) on bank risk diversification.[1]

Figure 1 shows that the ratio of loans to deposits has gradually decreased since the late 1990s, indicating that Japanese banks have been forced to shift from their traditional

[1] See Fields et al. (2007) and Gentay and Molyneux (1998), who define bancassurance as the sale of insurance through a bank. This might help the consumers in some situations; for example, it enables them to go *one-stop* shopping. However, some critics claim that bancassurance gives the bank too much control.

sources of revenues (such as loan issuance) and towards a fee-based businesses (such as insurance and/or mutual fund sales). After the financial crisis in the late 1990s, Japanese banks have gradually expanded into non-interest revenues. In response to this, the Japanese banking industry has been steadily increasing its fee-based activities (see Figure 2).

Insert Figure 1 and Figure 2 here

Consequently, the key questions that we have addressed in this paper are as follows:

1. What are the bank characteristics that affect the determinants of the shift for non-interest and fee-based income as a source of bank revenues (such as insurance sales)?
2. Is there a diversification effect *within* fee-based businesses?
3. Is there a substitution or complementarity relationship between insurance and mutual funds sales?
4. Do insurance sales contribute to the risk diversification in banking?

Overall, in this paper we will investigate the effects of deregulation of bank-sales channel on risk diversification effects.

To our knowledge, this is the first paper to use *directly* insurance revenues to analyze the risk effects of deregulation of the bank-sales channel. As both DeYoung and Roland (2001) and Stiroh (2004a) argued, US data on fee-based revenues combine non-interest revenues from many separate fee-based activities, and this aggregation is

unavoidable given the construction of the call reports. However, there are potential problems in the possibilities of creating a diversification effect *within* these activities. Therefore, we would like to answer this question by focusing on the Japanese banking industry, which enables us to separate insurance (i.e. both life and P/C insurance) and mutual fund sales from other non-interest fee incomes.

The empirical evidence in this paper shows that banks with a higher BIS ratio, more branches, more monopolistic power in loan market, and a higher loan-to-deposit ratio tend to shift toward insurance fee businesses. This indicates that bank health and branch expansion can affect the fee business strategy at each bank. We also find that banks with lower mutual fund fees tend to earn more insurance fees, implying that there is a substitute relationship between them after the GFC.

We find that banks with higher insurance revenues are positively associated with return volatilities (such as ROA and/or ROE) but are not related with total risk or Z-score. The results indicate that although increased fee-based activities can increase the volatility of bank earnings, they have had a small impact on equity and/or insolvency risks at Japanese banks.

The remainder of this paper is organized as follows. Section 2 discusses the relevant institutional background. Section 3 develops testable hypotheses. Section 4 explains the data, research methodology, and the variables used in our empirical study. Section 5 presents our empirical findings. Section 6 provides some concluding remarks.

2. Institutional Background

In 2000, a review of the Japanese Insurance Business Act was performed as part of the reform of the financial system, which has become known as the *Japanese version of the Big Bang*.[2] The aim of this financial reform was the revitalization of the Japanese financial market commensurate with the international markets. Enforcement was decided upon in 1997. Before this reform, the regulation of finance duties was severe in Japan and the walls of banking business, securities business and insurance business were high. This particular financial reform relaxed the regulations governing the financial business.[3][4]

As a result of this reform, Japanese banks were permitted to carry out *insurance solicitation* activities in cases where there was little risk to the protection of policyholders. Consequently, the range of the insurance products that the bank could sell was expanded progressively.

In the first stage of the reform, in April 2001 the sale of group credit life insurance as part of a mortgage for a home was accepted by the bank. Personal pension insurance and property accumulation savings began to be sold over bank counters in October 2002.

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[2] The ban on non-life insurance was also lifted in this reform; however, the reform schedule was gradual, as it was for life insurance-products. In this paper we have focused on over-the-counter sales of life insurance products by banks; therefore, we can only confirm the details for life insurance products in this section.

[3] Before this financial reform, in 1996 insurance companies and non-insurance companies were permitted to own mutual business entries through subsidiaries. This reform was a result of the financial business liberalization that started in April1993.

[4] Cancer insurance, care insurance and so on are categorized as insurance of the third field in Japan. The entry of Japanese life insurance companies and non-life insurance companies to this third field was limited before the start of these reforms. The entry of subsidiaries into this market was permitted in 2001.

In December 2005, the second and third stage of the reforms allowed bank counters to sell handling products that increased single premium whole life insurance and payments in full endowment insurance policies.

In December 2007, all regulation of the sale of insurance products by Japanese banks was abolished; for example, a bank could sell term life insurance and level premium whole life insurance policies if it so wished. The insurance products that the banks handled spread progressively (as mentioned above) and the ban on the sale of over the counter sale of investment trusts was lifted in December 1998.

Insert Figure 3 here

It is thought that this difference is a result of the consideration to give protection to the policyholders and management of the more traditional life insurance companies. For example, these reforms were opposed by the Japanese life insurance industry, which at that time employed approximately 400,000 people. Consequently, the reform of the Japanese insurance market that permitted banks to sell insurance products was gradually introduced.

3. Hypotheses Development

In this section we will develop our testable hypotheses.

3.1. Determinants of insurance sales

Following the experience of the financial crisis in Japan in the late 1990s, Japanese banks have attempted to change their business model (i.e. risk structure) by diversifying their risk factors (such as their loan business). To stabilize their management, Japanese banks might have been given an incentive to expand into non-interest fee businesses (such as insurance sales) thanks to the deregulation of cross-selling at bank branches, which is known as the *Japanese version of the Big Bang*. This shift in motivation is presumably strong for unhealthy banks because they have to comply with the capital adequacy requirements of the Basel Accord. It is also helpful for banks with poor prospects in their more traditional lending businesses. Actually, Japanese banks have gradually expanded into non-interest revenues, especially after the financial crisis in the late 1990s.

From the viewpoint of insurance sales, banks with many branches seem to already have a competitive advantage to sell insurance products, which is an important academic topic in the insurance field. Banks can use their branch networks to cross-sell insurance products to their customers and, therefore, can meet the broader financial service requirements from their retail customers.

In light of the above discussion, we formulate our first research hypothesis as follows:

H1: Banks with less BIS ratio, more branches and a higher loan-to-deposit ratio tend to rely on insurance sales.

3.2. Relationship between insurance and mutual fund sales

Both DeYoung and Roland (2001) and Stiroh (2004) argue that US data on fee-based revenues combine non-interest revenues from many separate fee-based activities and that

this aggregation is unavoidable given the construction of the call reports. However, there are a number of potential problems are in the possibilities of creating diversification effect *within* these activities.

Insert Figure 4 here

In this paper, we focus on the relationship between insurance and mutual fund sales. As Figure 4 shows, the direction of both insurance and mutual fund fee revenues are basically the same and are increasing, presumably because the (expected) returns of these products seem to be linked to the movement of the average stock prices (e.g. NIKKEI 225). However, after the GFC, mutual fund fee revenues have been dramatically decreasing. In contrast, insurance fee revenues are stable and have been increasing after the GFC shock event of 2007. In this sense, the link between insurance and mutual fund fee revenues are not necessarily clear and, therefore, should be empirically examined. Consequently, the preceding discussion motivates the following hypothesis.

H2: Banks with higher mutual fund fee revenues tend to expand insurance sales.

3.3. Effects of deregulation of bank-sales channel on bank risk

The shift towards non-interest income (such as insurance and/or mutual fund sales) has contributed to increasing bank revenues and, therefore, can lower the volatility of bank profit and/or bank risk. If cross-selling opportunities (such as insurance sales and interest income) are negatively correlated then the non-interest income may diversify bank revenue and reduce the bank's risk level. Another channel of reducing bank risk is that

insurance sales may be less dependent on business conditions than bank lending. Consequently, the increasing share of non-interest income (such as insurance sales) can reduce the variation in bank revenues.

On the other hand, if the conditions discussed above are not satisfied then the diversification benefits might not work well or even worsen the risk/return trade-off at each bank (Stiroh, 2006). Previous research has shown that diversification does not necessarily make banks safer (e.g. DeYoung and Roland, 2001; and Stiroh, 2004a). We support the latter view and, therefore, our empirical hypothesis is as follows.

H3: An increased reliance on insurance sales is positively associated with the level of bank risk.

4. Empirical Analyses

4.1. Sample and data

In this paper we use unbalanced panel data of Japanese banks covering the period from fiscal year 2003 through to fiscal year 2010. This sample period corresponds to that of the deregulation of bank-sales channel of insurances. Although we cover all Japanese bank types (i.e. city, regional, and trust banks), we restrict our sample to the banks from which we can collect insurance sales data. We then hand-collected the fees on insurance sales from the NIKKIN REPORT. In addition, the fees on mutual funds were hand-collected from NIKKIN INVESTMENT TRUST NEWS. We collected the data of equity volatility from Astra Manager to estimate bank risk measures. Note that our sample is automatically restricted to the listed banks. The rest of the data necessary for the

following analyses were collected from the NEES Financial QUEST database, which is a standard database that is frequently used in recent empirical studies in Japan.

4.2. Methodology

To explore these questions we will first investigate the determinants of the degree of the shift toward non-interest and fee-based activities as a source of bank revenues, especially focusing on the share of insurance fee revenues. To examine the economic determinants of the degree of non-interest revenues and/or insurance fee revenues, we estimate the following regression model using panel data techniques with individual fixed effects:

$$\begin{aligned} \textit{Ratio-Fees-Ins}_{i,t} = {} & \alpha + \beta_1 \textit{BIS}_{,t} + \beta_2 \textit{Loan-Deposit}_{,t} + \beta_3 \textit{Branch}_{i,t} + \beta_4 \textit{Employee}_{i,t} \\ & + \beta_5 \textit{HHI-Loan}_{i,t} + \beta_6 \textit{Jgb-at}_{i,t} + \beta_7 \textit{Stock-at}_{i,t} + \beta_8 \textit{Asset}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where *Ratio-Fee-Ins* is the ratio of insurance fee income to fees and commission income; *BIS* is the capital ratio under Basel Accord guideline; *Loan-deposit* is the ratio of total bank lending to deposits; *Branch* is the natural logarithm of the number of bank branches; and *Employee* is the natural logarithm of bank employees. These variables are proxies for examining the importance of branch expansion for insurance sales at banks. It should be noted that the fee business does not require assets, as would a loan business. Therefore, banks can have an incentive to shift toward fee-based activities (such as insurance sales) if they do not have enough capital for the requirement.

The other variables are basically control variables. *HHI-Loan* is the loan market share at each bank as measured by a Herfindahl-Hirschman Index (HHI). The loan market environment might affect the competition for insurance sales. *Jgb-at* is the ratio

of Japanese government bond holding to assets. *Stock-at* is the ratio of stock holding to total assets. *Asset* is the natural logarithm of total assets.

We then move on to examine the relationship *within* fee-based activities for testing H2 by adding a mutual fund variable to equation (1) to determine whether the diversification effect actually works between insurance and mutual fund sales. To escape the mechanical relationship *within* fee-based activities, we use the natural log of insurance fee revenues (*Fees-Ins*) instead of the "ratio" variable of *Ratio-Fee-Ins*:

$$\begin{aligned} \textit{Fees-Ins}_{i,t} = {} & \alpha + \beta_1 \textit{BIS}_{i,t} + \beta_2 \textit{Loan-Deposit}_{i,t} + \beta_3 \textit{Branch}_{i,t} + \beta_4 \textit{Employee}_{i,t} + \beta_5 \textit{HHI-Loan}_{i,t} \\ & + \beta_6 \textit{Fees-Mfund}_{i,t} + \beta_7 \textit{Jgb-at}_{i,t} + \beta_8 \textit{Stock-at}_{i,t} + \beta_9 \textit{Asset}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where *Fees-Mfund* is the natural log of mutual fund fee revenues. The other variables are the same as equation (1). If insurance fee revenues complement (substitute) mutual fund sales, then we expect a positive (negative) coefficient of *Fees-Mfund*.

Finally, we investigate the effects of deregulation of bank-sales channel on bank risk diversification, as follows:

$$\begin{aligned} \textit{Bank-Risk}_{i,t} = {} & \alpha + \beta_1 \textit{Ratio-Fees-Ins}_{i,t} + \beta_2 \textit{BIS}_{i,t} + \beta_3 \textit{HHI-Loan}_{i,t} + \beta_4 \textit{Jgb-at}_{i,t} + \beta_5 \textit{Stock-at}_{i,t} + \\ & + \beta_6 \textit{Asset}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where the dependent variable is the measure for the level of bank risk; the four risk measures are *Total risk*, *σ(ROE)*, *σ(ROA)*, and *Z-score*; the total risk is defined as the standard deviation of a bank's daily stock returns for each fiscal year; *σ(ROE)*(*σ(ROA)*) is the standard deviation of ROE (ROA) for the past 3 years; the ordinary profit is used for calculating profit of both ROE and ROA, and we exclude the top 1% samples of these

profits to control the extraordinary numbers; the *Z-score* is defined as ROA plus equity to assets, divided by the standard deviation of ROA ($\sigma(ROA)$). This basically follows the concept of the previous research (e.g. Stiroh, 2004a and 2004b). If the diversification effect works, then the coefficient of *Ratio-Fee-Ins* should be negative and statistically significant. On the other hand, if fee-based activities promote bank risk-taking, then we expect the coefficient to be positive.

5. Empirical Results

5.1. Summary statistics

Table 1 provides the descriptive statistics for the variables used in the following analyses. The average ratio of insurance sales to fees and commission income is about 7.5%, indicating that there might be room for more growth as a new source of revenue. The average ratio of the revenues from fees and commission to operating income is about 12.3%. As already pointed out in Figure 2, the Japanese banking industry is steadily increasing its fee-based activities. The average of *Fees-Ins* is about 538 million yen, and the average of *Fees-Mfund* is about 854 million yen from the original data in our sample.

The average of $\sigma(ROA)$ is about 0.3% and the standard deviation is 0.4%, both of which imply that the *ROA* is stable across banks. In contrast, the average of $\sigma(ROE)$ is about 9.7%, but the standard deviation is about 15%, indicating that ROE is different across banks. The average of total risk is about 2%, and the standard deviation is small; therefore, the total risk is stable across all of the banks.

The average of *BIS* is about 10%, which is higher (much higher) than the required level of 8% (4%) under the international (domestic) standard. The average *Loan-Deposit*

is about 76%. As already discussed in Section 1, *Loan-Deposit* has wide ranging distribution across all of the banks. The original data show that the average number of branches is about 112; however, the number seems to be different across banks.

The variable of *HHI-Loan* reflects the degree of competitiveness in loan market and its average is 0.25, indicating that the monopolistic power seems to be low. The average of *Jgb-at* is about 9.8% and its range is wide, reflecting the gap between loans to deposit (as shown in Figure 1). The average of *stock-at* is only about 2%, and therefore, the impact of stock holdings on bank management seems to be small even though Japanese banks are allowed to hold equities on their balance sheet. The asset size is very different across banks, presumably because we include all types of Japanese banks.

Insert Table1 here

5.2. Regression Results

Table 2 shows the results of the multivariate analysis based on equation (1) and/or (2). We have tried several specifications of the model that differ by the dependent variables and the explanatory variables. Column 1 shows the results of determinants of the shift toward insurance fee businesses. Column 2 used *Fee-Ins* instead of *Ratio-Fees-Ins* as the dependent variable. Columns 3 to 6 show the results of the link between insurance and mutual fund sales at the bank-sales channel. Column 4 and Column 6 add the quadratic term of BIS to Column 3 to account for a possible nonlinear effect. Columns 3 and 4 are the results for full sample period, and Column 5 and 6 show the results for the subsample period after the complete removal of bank-sales channel of insurances.

In row 1, the coefficient of *BIS* is interestingly positive and statistically significant at the 1-5% level. The result in column 1 implies that *Ratio-Fees-In*s increases by 0.18% for every additional 1 bank capital. This result indicates that the more healthy banks in terms of the capital ratio tend to earn more insurance fees. In this sense, the results disagree with the idea that the shift motivation is strong for unhealthy banks because they need to maintain their capital adequacy requirement.

We find that in column 1 the coefficient of *Loan-deposit* is positive but statistically insignificant. However, the results of column 3 and 4 are statistically significant. These results agree with the idea that Japanese banks are trying to change their risk structure by diversifying risk factors (such as their loan business) following their experience of recent financial crises in Japan. Overall, the shift in the Japanese banking industry seems to be still weak.

In row 4, the coefficient of *Branch* is positive and weakly significant for columns 1 2 and marginally significant for columns 3 and 4. The result in column 2 implies that *Ratio-Fees-In*s increases by 0.83% for the 1% change in the number of bank branches. This result shows that banks with many branches have expanded insurance sales, indicating that the branch expansion is one of the important factors in insurance distribution.

In column 1 of row 5 the coefficient of *Employee* is negative but statistically insignificant. In this sense, the result might fail to capture the number of employees as a potential source for insurance sales. Note that the coefficient is statistically significant in columns 3 and 4 in different specifications. However, the results in column 5 and 6 fail to

become significant again in the same specification, although the subsample period is the same as those of columns 3 and 4.

With respect to our second hypothesis, the coefficients of *Fees-Mfund* are positive in columns 3 to 4 but statistically insignificant. However, if we restrict our sample periods to those after the completion of deregulation of insurance products and after the GFC shock (i.e. fiscal years 2008 to 2010) then the coefficient of *Fees-Mfund* is negative and statistically significant at the 5% level. These results imply that insurance sales have *substituted* mutual fund sales after the GFC. Note that the coefficient of *Fees-Mfund* is the estimated elasticity of insurance fees with respect to mutual fund fees. Therefore, the result implies that a 1% decrease (increase) in mutual fund fees increases (decreases) insurance fee revenues by about 0.4%. The results agree that banks promote insurance sales since mutual fund fee revenues are dramatically decreasing owing to the GFC shock. The coefficient of BIS in column 5 is the opposite sign when compared with the other specifications. However, the quadratic specification of *BIS* is statistically significant in column 6, indicating that banks with high BIS ratio still have the same effects as shown in other columns, although some banks with a low BIS ratio are positively associated with insurance sale revenues. This is partly consistent with the idea that the shift motivation for fee businesses is strong for unhealthy banks.

With respect to the control variables, the banks' stock holdings are negatively associated with insurance sales but their government bond holdings are not related with insurance fee revenues. Bank size seems to be negatively related with insurance sales, indicating that smaller banks (regional banks) are selling insurance more aggressively when compared with larger banks.

Insert Table 2 here

Table 3 shows the results of the analysis based on equation (3), which aims to examine the effects of bank-sales channel of insurances on bank risk. The estimated coefficients shown in Table 3 were obtained by Instrumental Variables (IV). Estimation via instrumental variables may be warranted for one or more reasons. Perhaps the most compelling reason for using IV is that some of the omitted variables that are compounded into the disturbance term in equation (3) are also likely to affect the volume of *Ratio-Fees-Ins* at the same bank. Hence, we have tried to strip *Ratio-Fees-Ins* of its correlation with the disturbance via IV estimation.

We have used the variables in the specification of column 1 in Table 3 as instruments. The key instrument we added in the specification here is the *Aged-population* variable, which is the share of elderly persons and is defined as the share of 50- to 64-year-olds in each prefecture level. One rationale is that this age group has more demand for saving-type insurance policies in preparation for their retirement. In addition, this age group seems to have more loyalty to banks when compared with other age groups, partly because when they were younger these banks played an active part in Japan's rapid economic development (which is known as the main bank system). Therefore, we expect that *Aged-population* is correlated with insurance sales but is not correlated with the error terms in equation (3) since the variable is constructed from a demographic factor that is not directly to the business risk factors.

Column 1 of Table 3 shows the result of the first-stage regression. As we expected, the coefficient of *Aged-population* is positive and statistically significant at the 1% level. Note that the other variables still retain similar results when compared with column 1 in Table 2.

With respect to the effects of insurance fee revenues on bank risk, the coefficient of *Ratio-Fees-Ins* is positive and statistically significant at the 5% level in columns 2 to 4, indicating that a marginal increase of *Ratio-Fees-Ins* is positively associated with bank risk when we use the volatility of *ROA* and/or *ROE* as a bank risk measure. A one standard deviation increase in *Ratio-Fees-Ins* (from 7.5% to 12.8%) is associated with an increase of $\sigma(ROA)$ (from 0.3% to 0.52%). Similarly, a one standard deviation increase in *Ratio-Fees-Ins* (from 7.5% to 12.8%) is associated with an increase of $\sigma(ROE)$ (from 9.7% to 23.7%). Therefore, the results indicate that insurance sales are having more impacts on bank risk through a different channel than traditional sales are having through bank returns. In this sense, the results of our second hypothesis are worth noting when considering bank profit stability, in the sense of determining whether the diversification-effects *within* fee businesses work well or not.

The coefficient is not statistically significant for the *Total Risk* measure, indicating that the difference of insurance sale volumes *per se* did not affect bank risk. This presumably happened because the share of insurance fee revenues is still not the main source for fee revenues at Japanese banks, even if the degrees of business expansions are growing more diverse. The same logic seems to be true for the *Z-score*, whose result indicates that insurance fee volumes did not affect the probability of bank failures.

In column 2, the coefficient of *BIS* is negative but insignificant. However, the quadratic specification of *BIS* is statistically significant in columns 3 and 4. The inflection point (i.e. 24% to 26%) and the average number of the BIS ratio (i.e. 10%) from Table 1 shows that the impact on bank risk is generally negative, indicating that bank health presumably decreases bank risk. Interestingly, the quadratic specification of *BIS* is statistically significant in column 9. Bearing in mind that the sign of *Z-score* is opposite to other risk measures, the result implies that the BIS ratio is negatively associated with the insolvency risk of Japanese banks.

The degree of loan market competition does not affect bank risk level. In contrast, the coefficient of *Jgb-at* and *Stock-at* are positive and statistically associated with bank risk when we use the volatility of *ROA* and/or *ROE.* This indicates that government bond investment and/or stock holdings can contribute to the profitability of these banks, presumably through the channel of the risk-return trade-off. It should be noted that bank stock holdings increase bank insolvency risk. Therefore, this evidence can contribute to the arguments for the desirability of the regulation of bank stock holdings. The coefficients of *Assets* are generally and/or mildly negative and agree with the ironical doctrine of *too big to fail*.

Insert Table 3 here

Table 4 shows the results of the analysis based on equation (3) when we use *Ratio-Fees* as the dependent variable instead of *Ratio-Fees-Ins* when examining the effects of fee-based activities on bank risk. Column 1 of Table 4 shows the result of the

first-stage regression, the coefficient of *Aged-population* is positive and statistically significant at the 1% level.

Insert Table 4 here

With respect to the effects of fee-based revenues on bank risk, the coefficient of *Ratio-Fees* is positive and statistically significant at the 1% level in columns 2 to 4, indicating that a marginal increase of *Ratio-Fees* is positively associated with bank risk when we use the volatility of *ROA* and/or *ROE* as bank risk measure. A one standard deviation increase in *Ratio-Fees* (i.e. from 12.3% to15.8%) is associated with an increase of $\sigma(ROA)$ (i.e. from 0.3% to 1.1%). Similarly, a one standard deviation increase in *Ratio-Fees* (i.e. from 12.3% to15.8%) is associated with an increase of $\sigma(ROE)$ (i.e. from 9.7% to 39.4%). Presumably, the impact of total fee-based activities is greater than that of insurance fee revenues since it consists of only about 7.5% of the fee-based activities. In contrast to the result of Table 3, the coefficient of *Total Risk* is positive and statistically significant at 10%. In this sense, an increase in the share of fee-based activities can affect the level of bank equity risk. In addition, the degree of loan market competition is positively associated with bank risk.

6. Conclusion

In this paper we have empirically examined the diversification effects of the deregulation of bank-sales channel into the insurance business at Japanese banks. The main results obtained in this paper are summarized as follows:

(1) We found that banks with a higher BIS ratio, more branches, more monopolistic power in loan market, and a higher loan-to-deposit ratio have tended to move towards the insurance fee business. This indicates that bank health and branch expansion can affect the fee business strategy at each bank.

(2) We found that banks with lower mutual fund fees tended to earn more insurance fees, implying that there has been a substitute relationship between the two following the GFC.

(3) We also found that banks with higher insurance revenues were positively associated with return volatilities (such as ROA and/or ROE) but were not related with total risk or the Z score. These results indicate that although increased fee-based activities can increase the volatility of bank earnings, they have only had a small impact on equity and/or insolvency risks at Japanese banks.

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Figure 1
Ratio of loans to deposits

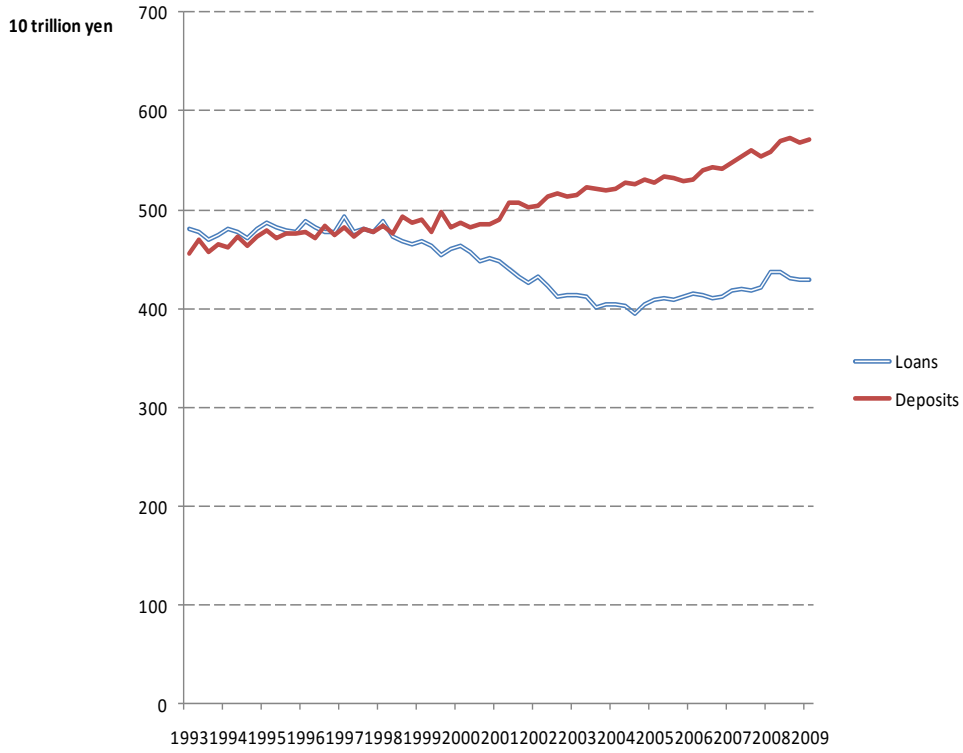


Figure 2
Share of noninterest revenue

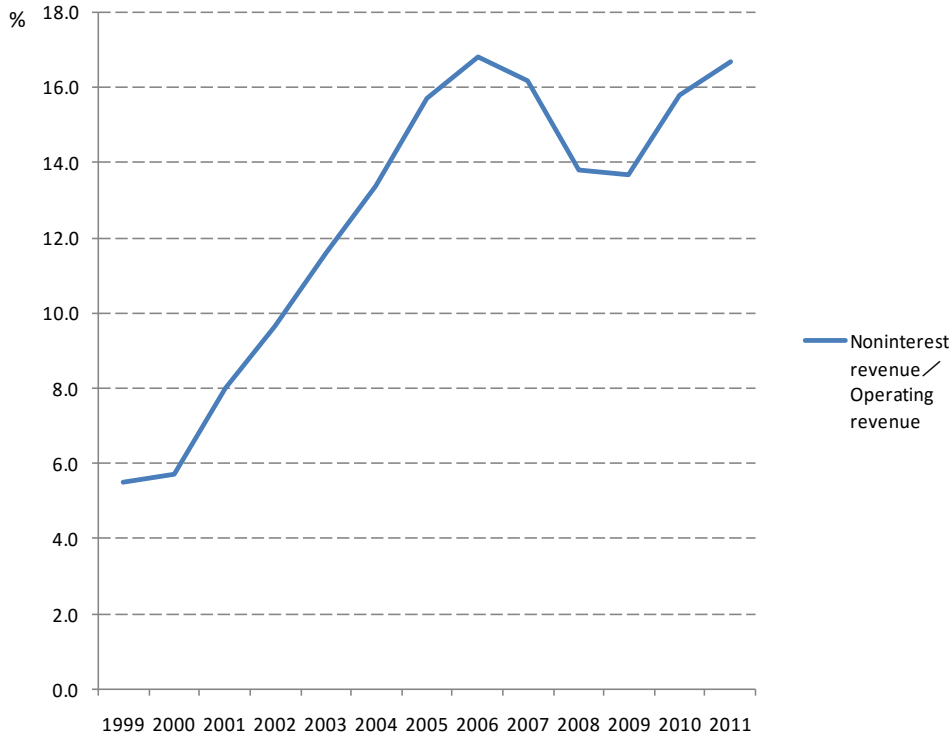
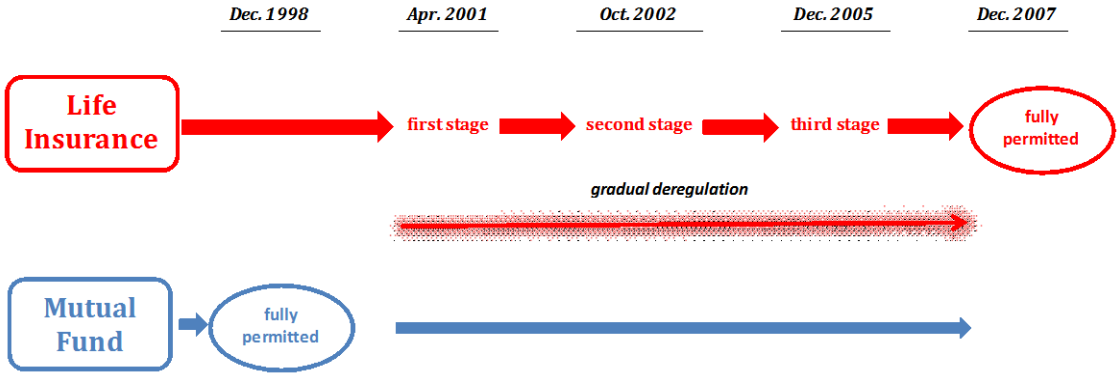


Figure 3
Deregulation process of bank fee businesses



Deregulation schedule of insurance products

May 2000	Revision to Insurance Business Act which permit banks to sell insurance products
Apr. 2001	Deregulation -first stage-
Oct. 2002	Deregulation -second stage-
June 2005	FSA determined the complete removal of restrictions on the sales of insurance products by banks, etc.
Dec. 2005	Deregulation -third stage-
Dec. 2007	Deregulation -fully permitted-

Deregulation of mutual funds

Apr. 1993	Removal of the ban of entry into each other's business sphere by subsidiaries of banks and securities firms
Dec. 1998	Removal of the ban on over-the-counter sales of the investment fund in a bank
Dec. 2004	Removal of the ban of the stock brokerage businesses by banks etc.

Figure 4
Relationship between insurance fee revenues and mutual fund fees

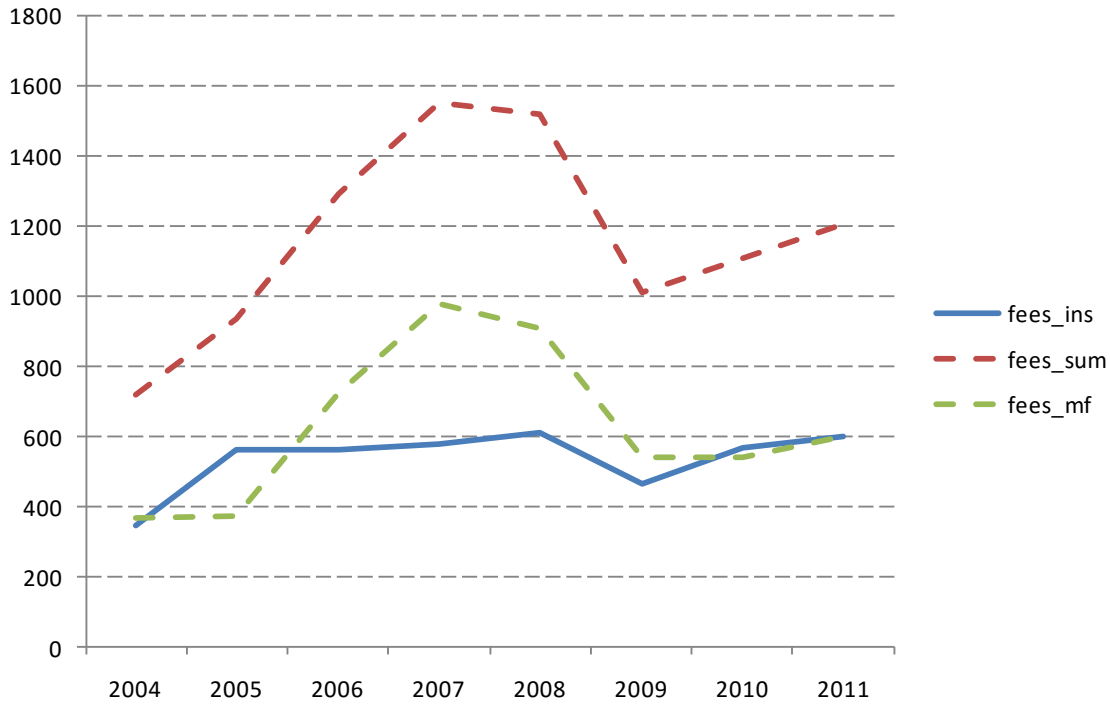


Table 1: Descriptive Statistics

Variable	*Obs*	*Mean*	*Std.Dev*	*Min*	*Max*
Ratio-Fees-Ins	622	0.075	0.053	0.002	0.300
Ratio-Fees	622	0.123	0.035	0.051	0.238
Fees-Ins	622	5.496	1.325	0.506	9.285
Fees-Mfund	517	6.001	1.236	1.746	9.127
σ(ROA)	618	0.003	0.004	0.000	0.022
σ(ROE)	609	0.097	0.149	0.004	1.084
Total Risk	373	0.020	0.007	0.002	0.043
Z-score	618	35.192	38.129	0.656	569
BIS	622	0.100	0.024	0.022	0.462
Loan-Deposit	622	0.764	0.096	0.574	1.442
Branch	600	4.387	0.477	2.833	6.452
Employee	603	7.040	0.640	5.652	9.800
HHI-Loan	611	0.250	0.098	0.145	0.659
Jgb-at	613	0.098	0.036	0.030	0.236
Stock-at	613	0.020	0.013	0.002	0.093
Asset	622	14.252	0.930	12.119	18.071

Table 2: Determinants of insurance fee businessses by Japansese banks, Fixed effects of banks

					2009-2011	
	Ratio-Fees-Ins	*Fee-Ins*	*Fees-Ins*	*Fees-Ins*	*Fees-Ins*	*Fees-Ins*
	(1)	(2)	(3)	(4)	(5)	(6)
BIS	0.183	3.337	2.659	-0.329	-14.48	-91.74
	(2.21) **	(3.11) ***	(2.46) **	(-0.06)	(-2.47) **	(-2.54) **
BIS^2				6.400		393.5
				(-0.62)		(2.27) **
Loan-Deposit	0.076	1.636	2.615	2.644	8.235	8.548
	(1.01)	(1.27)	(1.77) *	(1.82) *	(3.75) ***	(3.96) ***
Branch	0.049	0.830	0.706	0.670	2.942	3.057
	(1.70) *	(1.90) *	(1.56)	(1.47)	(1.88) *	(1.98) **
Employee	-0.019	-0.626	-1.251	-1.357	-1.396	-1.590
	(-0.45)	(-1.00)	(-1.82) *	(-1.96) **	(-0.87)	(-1.03)
HHI_Loan	0.381	5.659	1.335	1.235	-19.06	-20.26
	(2.29) **	(1.94) *	(0.46)	(0.42)	(-4.41) ***	(-4.88) ***
Fees-Mfund			0.127	0.125	-0.401	-0.422
			(1.32)	(1.30)	(-1.85) **	(-2.02) **
Jgb-at	-0.096	-1.852	-2.238	-2.214	1.465	1.181
	(-0.96)	(-1.23)	(-1.41)	(-1.40)	(0.46)	(0.38)
Stock-at	-0.617	-10.31	-15.66	-15.93	-30.20	-30.02
	(-1.79) *	(-1.87) *	(-2.72) ***	(-2.72) **	(-2.06) **	(-2.11) **
Asset	-0.134	-1.259	-0.690	-0.653	-3.490	-2.999
	(-2.61) ***	(-1.63) *	(-0.90)	(-0.85)	(-1.57)	(-1.36)
Const	1.717	20.82	17.46	18.07	55.10	52.97
	(2.85) ***	(2.32) **	(2.10) **	(2.15) **	(1.58)	(1.53)
year dummies	yes	yes	yes	yes	yes	yes
F-value	8.63	7.67	7.97	8.19	5.35	5.36
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Adjusted R^2	0.58	0.82	0.81	0.81	0.92	0.92
Obs.	587	587	502	502	191	191

Columns 1 to 6 show the results of determinants of insurance fee revenues for an unbalanced panel data in the Japanese banking industry. Robust standard errors are used to calculate t statistics.

***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 3: Effects of insurancee fee business on bank risk (IV estimate), Fixed effects of banks

	First-Sgate								
	Ratio-Fees-Ins	*σ(ROA)*		*σ(ROE)*		*Total Risk*		*Z_score*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Aged-population	1.341								
	(3.34) ***								
Branch	0.046								
	(1.72) *								
Employee	0.009								
	(0.22)								
Ratio-Fees-Ins (instrumented)		0.04504	0.040	2.628	2.395	0.183	0.204	112.0	169.0
		(2.37) **	(2.16) **	(2.08) **	(2.00) **	(1.29)	(1.31)	(0.87)	(1.28)
BIS	0.169	-0.0038	-0.047	-0.314	-2.568	-0.015	0.273	33.10	666.43
	(2.13) **	(-0.48)	(-2.24) **	(-0.67) *	(-1.82) *	(-0.20)	(0.83)	(0.38)	(3.83) ***
BIS^2			0.096		4.882		-1.431		-1388
			(2.3) **		(1.93) **		(-1.00)		(-4.44) ***
HHI-Loan	0.187	0.012	0.013	-0.053	0.026			-28.89	-46.58
	(1.09)	(0.7)	(0.84)	(-0.06)	(0.03)			(-0.34)	(-0.55)
Jgb-at	-0.120	0.020	0.020	0.958	0.971	0.051	0.058	4.939	-0.818
	(-1.18)	(2.95) ***	(3.1) ***	(2.01) **	(2.10) **	(1.18)	(1.22)	(0.05)	(-0.01)
Stock-at	-0.699	0.084	0.076	3.852	3.418	0.066	0.063	-762.5	-654.0
	(-2.12) **	(3.38) ***	(3.26) ***	(2.96) ***	(2.92) ***	(0.6)	(0.53)	(-2.17) **	(-1.78) *
Asset	-0.138	-0.0091	-0.010	-0.176	-0.232	-0.040	-0.038	17.42	34.07
	(-2.75) ***	(-2.33) **	(-2.57) ***	(-0.87)	(-1.14)	(-1.98) *	(-1.78)	(0.76)	(1.46)
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-value	10.37								
(p-value)	0.00								
Hansen J-Statistics		2.18	4.76	0.94	2.00	3.40	2.77	0.63	0.50
(Chi-sq(2) p-value)		0.34	0.09	0.63	0.37	0.18	0.25	0.73	0.78
Obs.	579	579	579	570	570	360	360	579	579

Columns 1 to 6 show the bank risk level for an unbalanced panel data in the Japanese banking industry. Robust standard errors are used to calculate t statistics.

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Table 4: Effects of fee business on bank risk (IV estimate), Fixed effects of banks

	First-Sgage								
	Ratio-Fees	*σ(ROA)*		*σ(ROE)*		*Total Risk*		*Z_score*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Aged-population	0.520								
	(4.61) ***								
Branch	0.013								
	(1.52)								
Employee	-0.036								
	(-2.61) ***								
Ratio-Fees (instrumented)		0.151	0.122	5.616	5.926	0.524	0.489	322.0	234.5
		(2.74) ***	(3.54) ***	(2.95) ***	(3.02) ***	(1.69) *	(1.63) *	(1.22)	(0.89)
BIS	0.234	-0.004	-0.058	-0.158	-2.486	-0.032	0.152	29.37	661.1
	(3.07) ***	(-0.58)	(-3.37) ***	(-0.50)	(-2.64) ***	(-0.60)	(0.86)	(0.34)	(3.63) ***
BIS^2			0.116		4.876		-0.941		-1349
			(3.61) ***		(2.58) ***		(-1.14)		(-4.19) ***
HHI-Loan	-0.033	0.023	0.022	0.694	0.662	-0.007	-0.002	-4.690	6.657
	(-0.73)	(1.91) *	(1.91) *	(1.69) **	(1.66) *	(-0.11)	(-0.04)	(-0.06)	(0.08)
Jgb-at	0.050	0.008	0.009	0.230	0.289	0.019	0.020	-25.7	-36.08
	(1.67) *	(1.47)	(1.62) *	(0.94)	(1.14)	(0.81)	(0.87)	(-0.26)	(-0.37)
Stock-at	-0.142	0.068	0.063	2.778	2.511	0.023	0.011	-798.7	-735.7
	(-1.45)	(4.15) ***	(3.74) ***	(3.95) ***	(3.49) ***	(0.26)	(0.13)	(-2.30) ***	(-2.06) **
Asset	-0.066	-0.004	-0.004	0.001	-0.003	-0.012	-0.011	33.45	35.80
	(-4.26) ***	(-1.09)	(-1.14)	(0.00)	(-0.02)	(-0.71)	(-0.69)	(1.10)	(1.23)
year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-value	22.51								
(p-value)	0.00								
Hansen J-Statistics		0.031	0.571	0.749	0.394	1.321	1.559	0.068	1.937
(Chi-sq(2) p-value)		0.98	0.75	0.69	0.82	0.52	0.46	0.97	0.38
Obs.	579	579	579	570	877	360	360	579	579

Columns 1 to 6 show the bank risk level for an unbalanced panel data in the Japanese banking industry. Robust standard errors are used to calculate t statistics.

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