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Impact of Japanese Banks' Strategic Stockholdings on their Cost of Capital

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Abstract

In this paper, we examine the impact of banks' strategic stockholdings on their cost of equity capital using the framework of Capital Asset Pricing Model (CAPM) theory employing panel data from 2006 to 2015 on internationally active Japanese banks. The results of our analysis show that strategic stockholdings could raise the cost of equity capital. Strategic stockholdings put upward pressure on β in CAPM theory by increasing the volatility of returns on banks' share prices, and increasing the correlation between returns on banks' share prices and returns on a market portfolio. Although it is argued that the cost of equity capital of Japanese banks is generally higher than that of U.S. banks, our estimation results suggest that if Japanese banks decreased the share of strategic stockholdings to the same level as U.S. peers, the gap between the cost of equity capital in Japan and the U.S. could reduce to a certain extent.

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1. Introduction

Since the global financial crisis in 2008, financial regulation for internationally active large financial institutions has been strengthened through the introduction of Basel III and other initiatives, and banks are required to increase their loss absorbing capacity mainly by strengthening their capital. Increasing equity funding, which is more costly than debt, would raise the total cost of bank capital, which is transferred to lending interest rates and potentially could have a negative effect on the real economy in the medium to long term. The cost of capital for banks has attracted increasing attention, and many research papers on this issue have been published, including Miles et al. (2012). In this paper, we focus on the fact that the cost of equity capital of Japanese banks is higher than that of U.S. peers (Figure 1)[1], and examine the hypothesis that the strategic stockholdings unique to the Japanese banking industry are one of the causes of this difference. Historically, the strategic stockholdings of Japanese banks expanded rapidly during the bubble period of the 1980s for the purpose of strengthening relationships with counterparts.[2] However, the banks were hit hard by those strategic stockholdings during the collapse of the bubble beginning in the 1990s when they suffered substantial unrealized losses on their stockholdings due to the significant slump in stock prices, which was one of the factors that severely impaired the financial soundness of banks.[3] The relationship between strategic stockholdings and cost of equity capital can be intuitively deduced as follows. Specifically, it is possible that investors harshly assess the rationality of banks' strategic stockholdings due to past

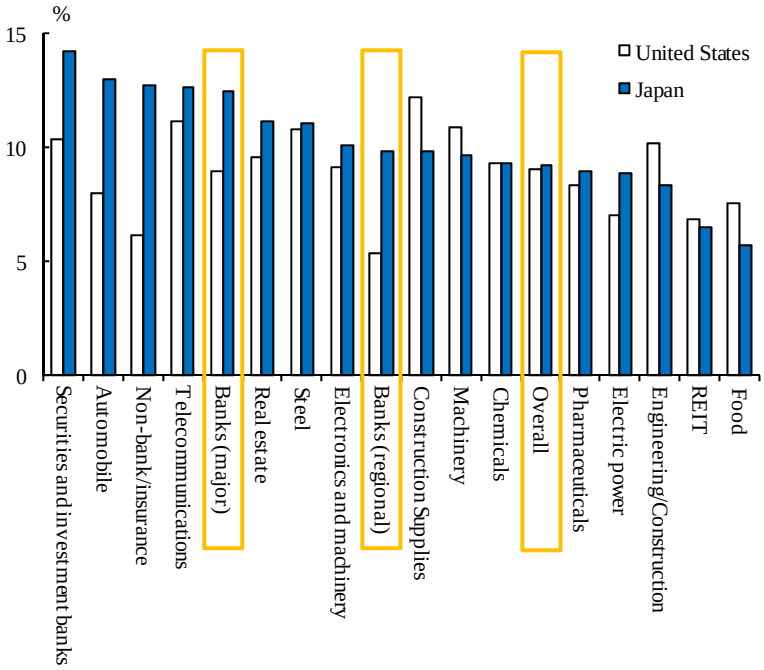
[1] Here, we show figures estimated by Damodaran (http://pages.stern.nyu.edu/~adamodar/) concerning the cost of equity capital in a variety of industries in countries worldwide.

[2] Miyajima and Yasuda (2015) assert that banks' motive for strategic stockholdings was to maintain business until at least the 2000s. Also, Hellman et al. (2008) analyzed the motives for investment by U.S. banks in venture companies and found that U.S. banks invested in venture companies with an aim to engage in cross-selling such as providing loans to those companies.

[3] The Bank of Japan introduced a share purchase scheme in 2002 to promote financial institutions' efforts to reduce their stockholdings, and purchased a total of 2.4 trillion yen of shares from financial institutions with current accounts at the BOJ.

experience, etc. If this is the case, the cost of equity capital of these banks is relatively high due to investors requiring a high risk premium. In fact, foreign investors have harshly criticized the rationality of strategic stockholdings by Japanese banks[4], supporting the validity of the above interpretation. In this paper, we examine the validity of the hypothesis through empirical analysis.

Figure 1: Cost of equity capital in Japanese and U.S. banks



Note: Data as at January 1, 2016.
Source: Damodaran.

The methodology of evaluating the value of banks' strategic stockholdings has become more important following the introduction of a Corporate Governance Code[5]

[4] For example, see the minutes of the third meeting of the Council of Experts Concerning the Follow-up of Japan's Stewardship Code and Japan's Corporate Governance Code, for which the Financial Services Agency and the Tokyo Stock Exchange serve as the secretariat.

[5] The Corporate Governance Code states that the medium- to long-term economic rationale and future outlook should be examined based on return and risk of stockholdings, and the aim and rationale of their holdings should be specifically explained when a listed company holds listed shares as strategic stockholdings.

by the Tokyo Stock Exchange in 2015 to encourage the disclosure of holding policies.[6] From the perspective of evaluation by the financial market (investors), clarifying the impact of strategic stockholdings on the cost of equity capital is also beneficial as a new way of assessing the value of strategic stockholdings.

The paper is organized as follows. Chapter 2 outlines the CAPM approach as a basis for the analysis in this paper, and reviews relevant literature on the cost of equity capital. Chapter 3 outlines the analytical approach and concrete implementation procedures. Chapter 4 shows the empirical results. Finally, Chapter 5 draws some conclusions.

2. Literature review

First, we outline the basic concept of CAPM and briefly review the existing literature on the cost of equity capital based on CAPM. Then, we describe the analysis approach of this paper.

CAPM is an equilibrium pricing theory for pricing risk assets and was developed by Sharpe (1964) and Lintner (1965) based on the portfolio choice theory of Markowitz (1959). According to CAPM, the expected rate of return on stocks required by investors, namely the cost of equity capital (R_i), is determined by three factors: the risk-free interest rate (R_f), the expected rate of return of a market portfolio (R_M) and the sensitivity of investment in a company to the return of a market portfolio (β_i) (Equation 1). The inherent risk of investing in a company can be distilled to the sensitivity β_i to the difference between the expected return of a market portfolio and the risk-free interest rate as described by Equation 1. β_i is the only factor that brings about differences in the cost of equity capital across companies because factors other than β_i are the same for all those companies.

[6] Major financial institutions have begun making specific efforts to reduce the amount outstanding of strategic stockholdings such as releasing future plans to reduce strategic stockholdings to less than a certain level compared to equity capital over a period of around five years.

[Sharpe-Lintner CAPM]

$$R_i = R_f + \beta_i(R_M - R_f) \qquad (1)$$

Various analyses have been conducted on the determinants of β, which plays an important role in the cost of equity capital. For example, Mandelker and Rhee (1984) stated that factors determining β are the Degree of Operating Leverage representing the structure of corporate cost (the ratio of fixed expenses in costs to total costs) and the Degree of Financial Leverage indicating the dependence on debt, and indicated their impact based on an empirical analysis of 250 manufacturing companies. Furthermore, Chung (1989), Mensah (1992), Griffin and Dugan (2003), and Schlueter and Sievers (2014) conducted an analysis focusing on the impact of business risk inherent in a specific company on β. Of these, Schlueter and Sievers (2014) conducted an empirical analysis using a sample of 200 U.S. non-financial companies, and showed that the business risk inherent in a specific company, which is captured by the risk in sales growth defined by the covariance of the sales growth rate of the company and that of the market as a whole, has an impact on β.

Furthermore, Miles et al. (2012) is an example of research on β in the banking (financial) industry which is generally treated differently from non-financial companies due to the specific characteristics of their business model and balance sheet structure. They investigated the impact of strengthening capital regulations such as Basel III on banks' cost of capital. Specifically, they used β in CAPM theory to examine the cost of equity capital in the banking industry to reveal the degree of validity in the banking sector of the MM theorem (Modigliani and Miller (1958)) which states that the cost of capital is, by definition, a weighted average of the cost of equity capital and the cost of debt (Weighted Average Cost of Capital), and is not affected by the capital structure (leverage ratio). They estimated the relationship between β and the leverage ratio for six major British banks, and empirically confirmed that raising (lowering) the leverage ratio leads to a rise (fall) in β.[7] However, their results suggest that only 45 to 75% of

[7] Miles et al. (2012) estimated the relationship between the estimates of β and the leverage ratio using the following equation:

the fall (rise) in the WACC, generated by the rise (fall) in the leverage ratio, was offset by the rise (fall) in β, and that the MM theorem does not completely hold in reality in the banking sector. In addition, the European Central Bank (2011) studied the impact of the introduction of leverage ratio regulations on β of banks using a similar approach to that of Miles et al. (2012) with a view to evaluating the costs and benefits of financial regulations which have been tightened since the global financial crisis. In addition to the leverage ratio, ROA (profitability of banks), total assets (size), and the amount of risk assets (amount of risk on the balance sheet) were used as explanatory variables to analyze 54 large financial institutions in countries including G-SIBs, and showed that a rise in the leverage ratio has a positive impact on β, and that the MM theorem only partially holds true.

As stated above, related literature on the banking industry has mainly focused on leverage as a factor affecting the cost of equity capital (β). In addition, this paper shows that the impact of strategic stockholdings unique to Japan on the cost of equity capital in the banking industry needs to be considered, and provides a new perspective on the determinants of the cost of equity capital.

3. Analytical Method

(1) Analytical Approach

In this paper, we estimate the relationship between the sensitivity β_i in CAPM theory and strategic stockholdings. We describe β_i as follows in order to interpret the relationship between the two. β_i is the regression coefficient for the difference between the expected return of a market portfolio and the risk-free interest rate ($R_M - R_f$) as indicated in Equation 1. Accordingly, β_i can be expressed as the ratio between the covariance of the rate of return on the stock price of bank *i* and the return of a market portfolio (*M*), and the variance of market portfolio (*M*). Furthermore, it can be

$$\widehat{\beta_{i,t}} = b \times Leverage_{i,t-1} + Dummy_i^{bank} + Dummy_t^{time} + \varepsilon_{i,t}$$

expressed in the form of Equation 2 using the correlation coefficient ($\rho_{i,M}$) of the rate of return on the stock price of the bank and the rate of return of a market portfolio, and the ratio (σ_i/σ_M) between the volatility (standard deviation) of the two:

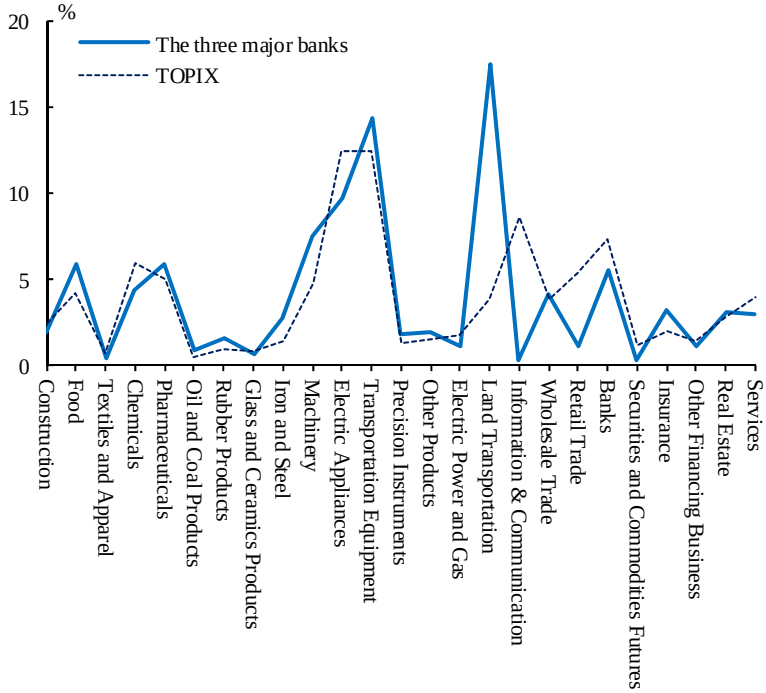
$$\beta_i = \frac{cov(R_i - R_f)(R_M - R_f)}{var(R_M - R_f)}$$

$$= \rho_{i,M} \times \frac{\sigma_i}{\sigma_M} \qquad (2)$$

Therefore, the relationship between β_i (cost of equity capital) and strategic stockholdings can be interpreted as follows by investigating how either or both of the above correlation coefficient and/or volatility ratio could be affected by the strategic stockholdings.

First, it is generally recognized that the purpose of strategic stockholdings is to cultivate transactional relationships including the expansion of lending share, and that they provide loans to companies whose stocks they also hold. In fact, Kan et al. (2012) analyzed the relationship between the stockholdings of banks and lending, and indicated that outstanding loans to companies with strategic stockholdings in the lending bank are larger than those for companies without such strategic stockholdings, and that there is a positive correlation between the amount of strategic stockholdings and outstanding loans. In this way, banks that have strategic stockholdings provide exposures in the form of both equity and loans to companies. Therefore, the structure of a bank's lending portfolio should become more similar to the market portfolio when the bank's portfolio of stockholdings is more similar to the market portfolio, and the correlation coefficient for returns on bank share prices and returns on the market portfolio could rise toward 1. Assuming that σ_i is constant, the strategic stockholdings by banks may increase the cost of equity capital by increasing β_i through the increase in the correlation coefficient. In fact, when looking at the large stock exposures of the three major banks, the composition of their portfolios is very similar to that of the market portfolio (Figure 2).

Figure 2: Composition of the stock portfolios of the three major banks by industry



Note: Data as at March 31, 2015. The data is for shares held for purposes other than pure investment, for which securities reports have been disclosed.
Sources: Tokyo Stock Exchange; Published accounts of each bank.

In addition, the amount of losses arising from bankruptcies of counterparts whose shares banks hold increases as the amount of stockholdings becomes larger. Furthermore, because strategic stockholdings are assumed to be long-term holdings in contrast to pure investment, there is a greater risk of banks' losses expanding when the market deteriorates. Due to widespread market recognition of these points, banks with more strategic stockholdings have higher volatility of the return on share price, and assuming that $\rho_{i,M}$ is constant, this increases the level of β_i.[8] Meanwhile, if strategic stockholdings have a cross-stockholding structure and the company also holds shares of the bank, a channel in the opposite direction to that described above may exist, which means the cost of equity capital decreases as a result of reduced volatility of the bank's

[8] The distribution of losses of banks with strategic stockholdings may have a fatter tail than that of banks without strategic stockholdings due to the low recovery rate (high loss rate) of stocks compared to loans in the event of liquidation due to bankruptcy, etc. and the difficulty of dynamic sale of strategic stockholdings by banks.

share prices brought about by the presence of a stable shareholder.[9]

As illustrated above, strategic stockholdings are expected to have effects that both increase and decrease β_i, which is a determinant of the cost of equity capital. Taking this into account, we estimate which of the above effects is greater.

In this estimation, the Tier 1 ratio and total assets are used as explanatory variables along with strategic stockholdings based on related literature. The relationship between these variables and β_i can be interpreted as follows. First, the Tier 1 ratio is the inverse of the leverage ratio, and a decline in the Tier 1 ratio of a bank means that the bank's loss absorption buffer declines, and also has a negative relationship with β_i because the accumulation of leverage results in increased volatility of the bank's earnings. Also, total assets are a metric which represents the scale of the bank, but could also be a factor for increased earnings volatility if the expansion of business scale leads to a more complex risk profile, and also could be a factor for decreased volatility of earnings if it conversely has the effect of diversifying business. When the market is pricing in other factors such as the too-big-to-fail problem, a decline in the risk of business failure may lead to a lowering of the required rate of return.[10] Based on the above, the sign of the Tier 1 ratio is basically expected to be negative, but it is difficult to ascertain the sign of total assets in advance.

(2) Data and Methodology

In this paper, we proceed with the analysis with a sample of internationally active

[9] Brochet et al. (2012), who analyzed the management stance of companies and their cost of capital, performed estimation for 6,102 companies mainly in the United States from 2002 to 2008, and found that although share price volatility is increased by myopic corporate management attracting short-term investment, an increase in the ratio of long-term investors contributes to lowering of share price volatility.

[10] The European Central Bank (2011) suggests that the coefficient for total assets is negative, and an increase in size results in a decrease in β. One possible interpretation of such results is that they may reflect the fact that investors are pricing in a bailout by the government in the event of a deterioration of large financial institutions.

Japanese banks (as of December 31, 2015)[11] over the past ten years (from 2006 to 2015). The analytical approach used to evaluate the relationship between banks' β and strategic stockholdings with reference to Miles et al. (2012) is as follows.

First, we use the monthly rate of return on the share price of individual banks ($R_{i,t}$), the monthly yield of 10-year JGBs as the risk-free interest rate ($R_{f,t}$)[12], and the monthly rate of return on TOPIX (market portfolio ($R_{M,t}$)) to estimate the $\beta_{i,t}$ of each bank using Equation 3 below. Here, we postulate $\beta_{i,t}$ is time-varying, and employ a rolling regression using 24 months of observations following Kashyap et al. (2010).[13]

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,t}\left(R_{M,t} - R_{f,t}\right) + u_{i,t} \qquad (3)$$

Next, panel analysis is implemented using the estimates of $\widehat{\beta_{i,t}}$ for each bank calculated using Equation 3 to estimate the impact of strategic stockholdings. Here, the size of stockholdings in relation to the capital buffer (Tier 1 capital) is assumed to be a criterion for investors' valuation, and the ratio of strategic stockholdings to Tier 1 capital (Stock/Tier 1) based on book value is used as an explanatory variable.[14] In addition, the Tier 1 ratio (Tier 1/Risk Asset)[15], total assets (Asset), the fixed effect of each bank ($Dummy^{bank}$) and the time effect ($Dummy^{time}$) are also used as explanatory variables to estimate the fixed effect model (Equation 4).[16, 17]

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[11] As at December 31, 2015, there were 16 internationally active banks in Japan, but the estimate must be based on a consolidated basis for the financial holding company or a consolidated basis for the banking group due to the use of share price data. For this reason, the analysis covers 14 banks.

[12] Following BIS (2009), the yield of 10-year JGBs is used as the risk-free interest rate when estimating β.

[13] In the rolling window estimation, data from 2004 is used to estimate β from 2006.

[14] Here, the balance of shares in other securities is used as the strategic stockholdings.

[15] For banks that made the transition from domestically active banks to internationally active banks during the sample period, the Tier 1 ratio prior to the transition is calculated using Tier 1 capital based on domestically active banks.

[16] Because the frequency of disclosure of financial data such as the Tier 1 ratio is quarterly, the monthly β for each bank obtained by estimation is averaged over the period to conduct panel analysis on a quarterly basis.

[17] Historically, the data set contains unbalanced panel data due to the presence of financial

$$\widehat{\beta_{i,t}} = a \times LN\left(Asset_{i,t-1}\right) + b \times \left(\frac{Tier\ 1_{i,t-1}}{Risk\ Asset_{i,t-1}} \times 100\right) + c \times \left(\frac{Stock_{i,t-1}}{Tier\ 1_{i,t-1}} \times 100\right) + Dummy_i^{bank} + Dummy_t^{time} + \varepsilon_{i,t} \quad (4)$$

Here, ahead of the estimation procedure, we see that the correlation matrix of each variable (Figure 3) shows that β and the ratio of strategic stockholdings to Tier 1 capital has a positive correlation (0.51) and β and the Tier 1 ratio has a negative correlation (-0.25) which is consistent with the signs predicted in the previous section. Furthermore, we can also confirm that there is a strong positive correlation (0.75) between β and total assets.

Figure 3: Correlation matrix of variables

	β	Ratio of strategic stockholdings to Tier 1 capital	Tier 1 ratio	Total assets
β	1.00			
Ratio of strategic stockholdings to Tier 1 capital	0.51	1.00		
Tier 1 ratio	-0.25	-0.68	1.00	
Total assets	0.75	0.41	-0.16	1.00

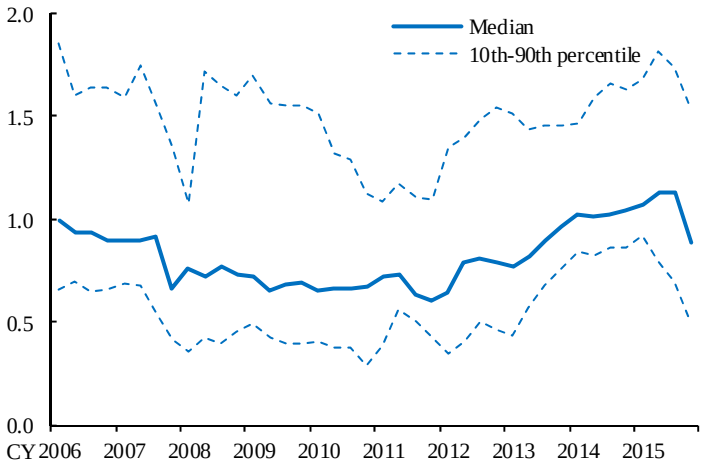
Note: Quarterly data for the period from 2006 to 2015. Data is for 14 internationally active banks in Japan as at December 31, 2015.

4. Estimation results

This section presents the estimation results for Equations 3 and 4, and confirms that the results of subsample estimates also verify the robustness of the estimation. Figure 4 shows the movement in β obtained from Equation 3. Although the level of β was on an upward trend from 2012, it started to decline at the end of the period.

institutions that do not have share price data as a result of events such as mergers or the formation of holding companies.

Figure 4: Time-series of β



Note: Quarterly data for the period from 2006 to 2015. Data is for 14 internationally active banks in Japan as at December 31, 2015.

Estimate 1 in Figure 5 shows the estimation results for Equation 4. Looking at the elasticity of β to the ratio of strategic stockholdings to Tier 1 capital, it takes a positive value (0.013) and is statistically significant at the 5% level. This suggests that strategic stockholdings contribute to bolstering β. Therefore, our estimation results indicate that banks' strategic stockholdings do play a role in increasing their cost of equity capital in aggregate. For the elasticity to the total assets and the Tier 1 ratio, the estimates are not statistically significant.

To verify the robustness of our estimation results, we conduct a subsample estimation by splitting the period into first and second halves. The estimation results are shown in Estimate 2 and Estimate 3 in Figure 5. As shown, the elasticity to the ratio of strategic stockholdings to Tier 1 capital during the two periods is positive and statistically significant. Looking at this in more detail, whereas the elasticity is relatively small during the first half of the period, although the statistical significance reduced somewhat during the second half, the elasticity is relatively large. This can be interpreted that market participants have focused on the strategic stockholdings of banks in recent years. The fact that β decreases at the end of the estimation period in Figure 4 suggests a positive market reaction to banks' efforts to reduce their strategic stockholdings.

Figure 5: Estimation results

	Estimate 1 Entire sample	Estimate 2 First half (2006-2011)	Estimate 3 Second half (2012-2015)
Total assets (log)	0.243	-0.259	0.831
	(0.288)	(0.434)	(0.861)
Tier 1 ratio	0.003	-0.026 *	0.049
	(0.024)	(0.016)	(0.054)
Ratio of strategic stockholdings to Tier 1 capital	0.013 **	0.005 **	0.047 *
	(0.006)	(0.003)	(0.027)
R^2 within	0.476	0.412	0.577
R^2 between	0.871	0.553	0.788
R^2 overall	0.746	0.230	0.641
Number of samples	511	287	224
Fixed effect	yes	yes	yes
Time effect	yes	yes	yes

Note: Quarterly data for the period from 2006 to 2015. Data is for internationally active banks in Japan as at December 31, 2015.
The standard deviation is shown in parentheses. The standard deviation is calculated using the bootstrap method (1,000 trials).
* and ** indicate statistical significance with a level of significance of 10% and 5% respectively.

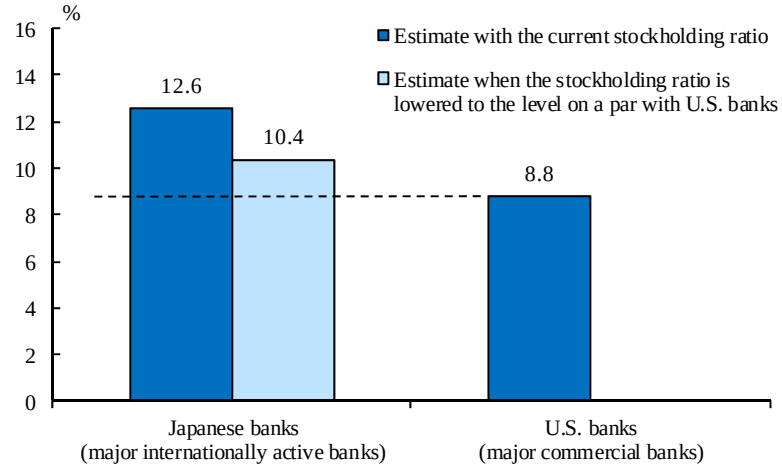
Finally, the sensitivity of β to the ratio of strategic stockholdings to Tier 1 capital obtained in Estimate 1 is employed to simply estimate the size of the decrease in the cost of equity capital if the ratio of strategic stockholdings was reduced to the same level as that of U.S. banks (major banks).[18] First, when the cost of equity capital as at December 31, 2015 computed based on Equation 3 is compared for major banks in Japan and the U.S.[19], Japanese major banks have a relatively higher cost of equity capital, which is generally consistent with Figure 1 (estimate by Damodaran). Next, when lowering the ratio of strategic stockholdings to Tier 1 capital as at December 31, 2015 (averaging around 20 percent for the four major internationally active banks) to around 1 percent on a par with U.S. banks, the cost of equity capital for the four major banks could fall by 17% from the level of 12.6% as at December 31, 2015 to 10.4%.

[18] The equity risk premium here is based on Dimson et al. (2011). Furthermore, the risk-free interest rate is the 10-year JGB interest rate as at December 31, 2015.

[19] Comparison of the four major internationally active banks in Japan and four major U.S. commercial banks.

The magnitude of this reduction is equivalent to approximately 60% of the difference in the cost of equity capital between major banks in Japan and the U.S.

Figure 6: Estimate of the effect of reducing stockholdings



Note: The estimate of the cost of equity capital is the simple mean for each bank. Data as at December 31, 2015. The equity risk premium is based on Dimson et al. (2011). The risk-free interest rate is the 10-year JGB interest rate as at December 31, 2015.

5. Conclusion

According to our analysis in this paper, Japanese banks may have increased their own cost of equity capital by increasing β as a result of large strategic stockholdings. The implication of this finding is that strategic stockholdings by banks may be assessed negatively by equity investors in terms of requiring a higher return corresponding to the risk of the stockholdings. Therefore, the cost of equity capital can be lowered by further reducing the balance of strategic stockholdings. Since the Stewardship Code was introduced in June 2015, banks have made plans to reduce their strategic stockholdings, such as disclosing their plans to reduce the balance of strategic stockholdings to a certain proportion of their equity capital. This paper has confirmed the importance of implementing such efforts for reducing the effect of strategic shareholdings on the cost of equity capital.

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