Do Bubbles Equally Affect Japanese Bank Performance?

A.A.AZEEZ

University of Colombo, Sri Lanka
E-mail: aazeez@webmail.cmb.ac.lk

YASUHIRO YONEZAWA

Yokohama National University, Japan

ABSTRACT

Japanese banks experienced severe adverse shocks during the post bubble period due to the collapse of the so-called bubble economy. This paper investigates the performance of Japanese bank stocks in the bubble period and post-bubble period. We show in this article that in the case of Japan there is a clear unequal link between bubbles and the post bubble period's bank stock performance. We found that banks that did better during'the bubble period performed worse over the 1990-1998 period. This result must be'dependent on the lending behavior of banks during the bubble economy.

1. INTRODUCTION

In recent years, the issue of bad performance of Japanese banks is of major interest to regulatory and academic communities. This issue attracted a tremendous amount of attention not only in Japan but also internationally because of the near collapse of the banking industry and several bank failures brought largely by the collapse of the bubble economy, especially, by the lending behavior of the banking institutions during the bubble period.

In the 1980s, the expansionary monetary policy of Japan's Ministry of Finance and the easy credit conditions offered by financial institutions helped fuel higher Japanese stock and real estate prices. After enjoying an extra ordinary speculative boom starting in the mid-1980s, in 1990 Japan experienced a dramatic bust, often referred to as the collapse of the bubble economy. Using the Nikkei stock average, one may observe the severity of the Collapse. The Nikkei index of stock prices reached a maximum of approximately \39,000 in December 1989 and it plunged to \28000 by the beginning of October 1990 and continued to fall to \14,000 in August 1992. As a consequence, the collapse of the bubble economy has brought about the 60% fall of

the Nikkei Index between 1989 and 1992, causing a dramatic decline in tier 2 capital[1], given that Japanese banks hold approximately 20% of Japanese common stock (Kenneth R.French and James M. Poterba, 1991). Large cross-holdings of Japanese corporate stocks by Japanese banks make these banks susceptible to downturns in the stock market[2].

Therefore, it is of great interest to know whether the Japanese banking industry was affected by the collapse of the bubble economy that occurred after 1990. This article aims to examine whether recent failures and poor stock performance of the banking industry in Japan brought about by the burst of the bubble. We investigate the performance of Japanese bank stocks in the bubble period and post-bubble period.

Three alternative hypotheses are formulated for the purpose of this study. To test the hypotheses, we use the Capital Asset Pricing Model (CAPM) for a sample of monthly time series data over the period 1984 to 1998. We define 1984-1989 as a bubble period and 1990-1998 or 1996-1998 as a post bubble period in order to compare the risk-adjusted rate of returns of bank stocks. The main findings of the article are consistent with the view of "Bubbles unequally affect the performance of banks". In other words, Japanese banks that had better stock performance during the bubble period tend to perform worse after the collapse of the bubble economy on a risk-adjusted basis. This result must be dependent on the lending behavior of banks during the bubble economy.

This article is organized as follows. The following section explains the performance of Japanese banks along with a brief review on bank lending and bubbles. Section 3 explains the basic hypotheses used for this study. Section 4 describes the data and methodology used in the performance tests. Section 5 includes the main results and discussion. Section 6 contains concluding remarks.

2. Performance of Japanese Banks

Table 1 reports the average returns[3] of banks over the bubble and post-bubble periods and the number of banks selected in each kind of bank. According to this, the average raw returns of all banks in the bubble period were 3.2% while post-bubble period's average returns were −0.81% and −1.44% for the periods 1990-1998 and 1996-1998 respectively. The figures in this table suggest that well-performed banks during the bubble period have suffered seriously in the post bubble period. For example, long-term credit banks show higher mean returns in the bubble period and lower mean returns in the post-bubble period. In the mean time, the stock performance of regional banks was low compared to other banks during the bubble period whereas their performances are not severely affected, like long-term credit banks or city banks, in the post-bubble period.

Bank lending behavior and Bubbles

To begin, let us note that by the "bubble" we mean the very rapid increase, which appeared during the latter half of the 1980s against a backdrop of widespread easy money financing in the value of assets, primarily land prices and stock prices, far in excess of the growth rate of the real economy.

Between January 1986 and February 1987, the Bank of Japan lowered the official discount rate from 5% to 2.5%, its lowest

A. A. Azeez, Yasuhiro Yonezawa

level in the postwar period. As a consequence, bank loans were available for as little as 4% to their best corporate customers. This sowed the seeds for super easy credit that led to the Bubble Economy. Even better that, publicly quoted companies could exploit a rising stock market by raising money using the neat trick of issuing Eurobonds with warrants attached in London's offshore Euro market, the world's largest debt market, and swapping the dollar back into Yen. Money became virtually free in Japan. At its center lay the economy's main engine of credit creation, the banks. They were able to use a rising stock market literally to create bank capital and thus boost their lending. That extra credit was funneled back into the main markets (shares and property), boosting the value of the bank's favored collateral'(shares and property) against which to lend still more money.

The fact that Japan's banks have lent heavily against both property and shares during the bubble period is not contested. At the end of June 1991, a total of \116 trillion had been lent directly to the property and construction sectors. City Banks' outstanding domestic loans, collateralized by land, stood at about 50% of Japan's GNP. In the boom years of 1987 and 1988, loans collateralized by property accounted for more than half of city banks' incremental loan growth. That growth has since come to a grinding halt because of the Tokyo Stock Market crash and tougher international capital adequacy standards for banks. Figure 1 shows the stock market crash and poor performance of the banking industry index after 1990.

The second event during the bubble period is a sea change in the cost of the banks' deposits caused by deregulation of interest rates. Predictably, the Japanese finance ministry gave its charges, the banks, several years to prepare for this momentous transition. Deregulation of interest rates began in 1985 and was not completed until April 1991, when all deposits over \500,000 began to earn money market rates. However, the banks chose not to respond to this manner by passing on the cost to borrowers by charging them more. Instead, they ignored the blow to their profitability and kept on pursuing asset growth in order to boost their share of the market. They were able to do this only because of the buoyant Tokyo Stock Market. As more and more of their deposits were deregulated, banks filled the widening hole in their operating profits by recording capital gains from the sales of stock held in their huge portfolios. The extent to which this went on during the late 1980s' bull market was truly remarkable. In the financial year ending on March 31, 1989, an average of 42% of the reported profits of Japan's city banks came from securities gains. Between 1984 and 1990, Japanese banks reported an average annual profit increase of 13%. However, if profits from the sales of long-term shareholdings and short-term stock market deals are excluded, the annual average increase in profit earned by the banks on their underlying business was only 1% according to Mckinsey calculation. This is a pathetic performance considering the banks were enjoying booming asset growth at the time.

However, so long as the Tokyo Stock Market kept going up the banks did not fret about capital ratios set by the Bank for International Settlements (BIS). Rather, they used the bull market ruthlessly to boost their own capital by issuing new shares, which in turn allowed them to keep expanding their assets. Between 1987 and 1989, city banks issued some \6 trillion of cheap equity and equity-related

finance. No longer, the stock market crash of 1990 meant that many investors were not prepared to buy any more bank share issues, since they were already loaded to the gills with the stuff and that the value of their hidden reserves, and so their capital, fell. Basically, these events occurred as a result of financial deregulation. Kindleberger, C.P (1995) reports that rises and declines in asset prices in the 1970s and 1980s were brought about not by changes in the money supply, but by changing credit conditions including, especially on the upside, deregulation of financial restrictions and financial innovation. Deregulation was especially responsible for asset inflation of the Nordic countries-Sweden, Norway, and Finland- and of Japan, in which inflation went far wider than that in the other countries covered.

Loans for the real estate, construction, and non-bank financial institutions became the mainstay of bank lending in the 1980s. Following the increase in the value of the yen that resulted from the Plaza Accords, the share of bank loans going to these three sectors increased even further, and the rate of increase in funds loaned to other sectors of the economy declined.

Moreover, after the tight-money initiatives of May 1989, borrowers scurried to obtain quick loans in advance of expected interest rate increases. Therefore, the fact that interest rate levels were too low became a destabilizing factor when at the point regulatory initiatives were introduced. It became common practice for banks to loan money to real estate holders using real estate as collateral for additional real estate acquisitions and to loan money for further stock purchases to stockholders securing their loans with shares of stock. The intermediary role played by non-bank

lenders[7] in this bank behavior is undeniable. The large banks used them as an indirect way to lend to risky borrowers.

By means of the April 1990 "Regulations on Real Estate Lending," the amount of funds loaned was curbed. Looking at the growth rate of lending in city banks, long-term credit banks, and trust banks, we see that loans for the real estate, construction, and to non-bank lenders in December 1990 were up 7.6% over the same period the previous year. However, this rate of increase was reduced to 4.1% by the end of June 1991 and to 1.5% by the end of September 1991. Adjustment of real estate lending was abandoned in January 1992, but from the origin of the bubble economy until its demise, real estate lending was significantly out of balance. It is suitable to mention that Ito Takatoshi and Tokuo Iwaisaku (1996) examined the behavior of stock and land prices during the bubble economy of the second half of the 1980s and found asset price inflation was caused by a sharp increase in bank lending to the real estate sector.

As we have seen already, the exposure of Japanese financial institutions to property is enormous. Any precipitous decline in land values would threaten the balance sheets of Japan's lending institutions even more than the stock market's decline, because property market is so much larger[8]. One scary figure provided by a research institute backed by Mitsubishi Bank was that a 50% decline in land values over four years could trigger \10 trillion of bad debts. This later seemed to be a very conservative estimate. This situation occurred not only in Japan but other countries also had similar experiences in the late 1980s. Bartholomew (1994) reports that deflation of real estate values hit the banking systems in

A. A. Azeez, Yasuhiro Yonezawa

the United States, Canada, Sweden, Norway, Denmark and Finland. Moreover, there was a more general phenomenon of property boom in the world, in which the asset price inflation in Japan was more severe. Ball (1994) suggests that a property boom swept across a number of countries, especially Australia, Britain, and Japan. One of the outstanding features of the 1980s property boom was the central role played by banks and mortgage institutions using short-term financial assets as a means to fund their long-term mortgage and other property-related loans rather than there being an emphasis on institutions using capital market instruments as their sources of funds.

In brief, an initial shock in asset prices seems to stir a sudden increase in bank loans. This may have been caused by monetary policy, which allowed credit expansion, or by financial deregulation, which allowed banks to diversify and expand their loan portfolios. Then an initial shock of increased loans prompted an increase in demand for fixed investment and land, which in turn led to higher stock and land prices. Increases in stock prices made it possible to raise more funds by direct financing and invest more, which increased demand for land. Increases in land prices raised collateral values that helped firms to borrow more and invest more. Once this process continues for several periods, one might expect that markets attract some speculative behavior.

More recently, a number of studies have produced evidence suggesting that the banking crisis of Japan over the 1990s were mainly caused by the collapse of asset prices. Tamin Bayoumi (2001) concludes that the central driver behind the slow growth in Japanese economic activity during the 1990s

had been a disruption of financial intermediation, largely operating through the impact of changes in domestic asset prices on bank lending, and suggest fixing the financial problems of the banks is likely to be important for generating a long-term sustained recovery. Ueda (2000) reports the heart of the banking problem in the 1990s to have been the speculative real estate related lending of the 1980s, which turned bad when urban land prices declined in the 1990s. Takeo Hoshi (2001) argued that the slow and incomplete deregulation of the financial system in the 1980s was the most important factor behind the Japanese banking troubles in the 1990s. Meanwhile, Ito and Harada (2000) analyzed how financial weakness among Japanese banks in the 1990s were viewed by the market using the two indicators of the Japan premium and the stock price index of banking sector. They found that bank failures in 1997 brought down stock prices of other banks, and increased the spread between the bank stock index and the general stock index, and pushed up the Japan premium. Although these authors have analyzed the poor performance of banking industry in the 1990s in different ways, we extend this by examining the performance of bank stocks in the bubble period and post-bubble period.

Were there Bubbles?

Stock prices today reflect the expectation of future changes in fundamentals as well as fundamentals today, so the entire future paths of interest rates and dividend growth from tomorrow affect asset prices today. Under this framework, it is assumed that investors in the market would have expected that the lending behavior of banks will create dividend growth in the future or lower interest rates will

continue forever. Many argued that all the wild fluctuations in stock and land prices in the second half of the 1980s could be explained by the changes in interest rates. However, this argument is not correct unless all participants thought that the interest rate was a "once-and-for-all" type change, i. e. a permanent change to a new lower level from a higher level.

Real interest rates were already at record low levels in 1987, and became even lower in 1988 and 1989. Although real interest rates still declined due to higher inflation, investors should have anticipated coming nominal interest rate hikes. Thus, it was natural to assume that future monetary tightening by the Bank of Japan had been expected, so that at least no further prolonged interest rate declines should have been expected. Also, dividend growth was stagnant in 1988 and 1989 compared with the period 1985-1987. Overall, it is safe to say that further increase in stock prices in this period cannot fully be justified by the change in fundamentals. Asako et al (1990) try to identify rational bubbles in the Japanese Stock Price Index by distinguishing the explosive price path, however they found very limited evidence. They concluded that the source of the asset price boom in Japan was more likely to be irrational bubbles rather than rational bubbles.

One possible explanation for the sharp increase in asset prices from 1986 to 1989 was that the public held irrational expectations about future real interest rates; if the decrease in real interest rates was thought to be permanent, this explanation seems to fit the behavior of asset prices in the 1980s. Asset prices should have increased sharply in 1986-1987, and then remain at high

levels. A believer in fundamentals might justify the increase in asset prices in this period by invoking rational expectations regarding the expansion of the economy in the following years, but then it is difficult to justify the failure in foreseeing the crash at the beginning of the 1990s. On this occasion it is suitable to mention that once sown, the seed of speculation bubbles proceeded to grow, purely on expectations of further bubbles, until the crash came in the early 1990s.

As shown in Table 1, the negative average of banks in the post bubble period gives further evidence for the investor's irrational expectations. The investors did not forecast the future stock performance of banks rationally. In other words, the market could not determine the value of share prices of banks accurately during the bubble period.

3. BASIC HYPOTHESES

The following alternative hypotheses were developed to study the effect of bubbles on the performance of the banking industry.

Hypothesis 1: Bad performance of Japanese banks in the post-bubble period is driven by the lending behavior of banks during the bubble period. The banks in the Japanese banking industry may relatively be classified as either bubbly banks or sound banks in terms of their lending behavior during the bubble period. The banks, which had aggressively lent/invested in land or stocks, may be defined as bubbly banks. The banks, which had lent/invested in safe companies, may be defined as sound banks. During the bubble period, the bubbly banks had high stock performance while sound banks had normal stock performance. After the bubble crash, the bubbly banks' stocks were severely

A. A. Azeez, Yasuhiro Yonezawa

affected and hence had low stock performance which caused these banks to become weak or troubled banks in the post-bubble period. In the mean time, sound banks' stock performance continued to be normal even after the crash that was higher than bubbly banks' stock performance. In other words, bubbly banks were more adversely affected than sound banks in the post-bubble period. This situation shows that the stock performance of banks has a negative relationship between the bubble period and post bubble period.

Hypothesis 2: Superior performance of banks in the bubble period compensates poor performance of those banks after the bubble crash. As bubbly banks had heavily invested in land or stocks during the bubble period, they had not only high stock performance but also high abnormal profits while sound banks had normal profits as well as normal stock performance. The high abnormal profits of bubbly banks earned during the bubble period compensated the low profits of those banks after the bubble crash and hence had high stock performance in the post-bubble period which means the high abnormal profits of the bubble period saved bubbly banks for a certain period even after the bubble crash by contributing to those banks to have high stock performance continuously. Meanwhile, as sound banks had normal profits during the bubble period, they continue to have normal stock performance in the post-bubble period too. In this case, we would expect the positive correlation between the banks' stock performance of the bubble period and the post-bubble period.

Hypothesis 3: Stock performance of banks in the bubble period is not associated with the stock performance of banks in the post-

bubble period. As investors are rational, the market evaluates the lending behavior of banks rationally during the bubble period. In other words, the market operated efficiently.

These hypotheses imply the following tests:

Hypothesis (1): Risk adjusted rates of return on bank stocks are negatively correlated between the bubble period and post bubble period. Banks, which had high risk adjusted expected rates of return on stocks during the bubble period brought about low risk adjusted rates of return after the bubble period.

Hypothesis (2): Risk adjusted rates of return on bank stocks are positively correlated between the bubble period and the post-bubble period. Banks, which had high risk adjusted expected rates of return on stocks during the bubble period brought about high-risk adjusted rates of return after the bubble period.

Hypothesis (3): Risk adjusted rates of return on bank stocks are not correlated between the bubble period and the post- bubble period

4. TESTING METHOD

Data

The sample consists of 56 bank stocks traded on the Tokyo Stock Exchange. The market model regression of CAPM is estimated using monthly data over the period January 1984 to December 1998. The data on individual bank stock returns and market returns were taken from the Japan Securities Research Institute (JSRI) files. These files contain monthly total returns (capital gains or losses, plus dividends paid) for all the securities listed on the first section of the Tokyo Stock Exchange. The data on the risk free rate of return were taken from the financial and

economic statistics monthly report of the Bank of Japan. Data on land prices were obtained from the survey conducted by the Real Estate Institute of Japan. The original series is semiannual, so we interpolate linearly to obtain the monthly series.

The sample consists of the Japanese banks that have complete data over the sample period. As a result, we exclude the banks, which were acquired or have missing data during this period. The sample period are divided into three. The first period runs from January 1984 to December 1989, which is the bubble period and is used as the base. The second period is the post-bubble period, which runs from January 1990 to December 1998. The third period is a sub period of the post bubble period, which runs from January 1996 to December 1998. We define this as sub-period because in this period several bank failures and mergers have occurred due to the poor performance of banks. In other words, the collapse of the bubble economy affected the banking industry severely during this period.

Testing Procedure

We estimated the following CAPM run by Black et. al (1972) to derive alphas (abnormal returns) and betas (relative risks) for 56 banks to compare bank stock performance between the bubble and post-bubble periods.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$$

(1)

Where;

R_{it} = return on ith bank in month t;

R_{ft} = risk free rate of return in month t;

R_{mt} = return on the market portfolio m in month t;

α_i = measure of abnormal performance of ith stock for the relevant period;

β_i = measure of systematic risk of ith stock for the relevant period;

ε_{it} = the residual return of the ith bank during the month t;

Jensen (1969) creates an unconditional measure of abnormal performance by estimating a regression of the excess return of portfolio on the market factor using historical data. Jensen's alpha has become one of the standards for measuring performance. In the above model coefficient α_i is the Jensen measure of performance. A positive is usually interpreted as a measure of superior performance and a negative as reflecting poor performance.

In order to test the alternative hypotheses the following three testing steps are used:

(1) Simple Correlation Test of Average Return or α (or β)

In the first step, we estimate the equation (1) separately for each bank stock return using the Ordinary Least Squares (OLS) method and derive alphas and betas for each period separately. Also, we calculate average stock returns of banks for each period. Then, correlations between the bubble period and the post bubble periods are estimated for average returns, alphas and betas in order to find out the relationship of these variables between the two periods.

(2) Correlation Test of Average Return or α (or β) with Statistical Significance Level

In the second step, we employ the Seemingly Unrelated Regression (SUR) methodology

A. A. Azeez, Yasuhiro Yonezawa

for the cross-sectional data of banks derived from the estimation of equation (1) to test correlation of average returns, abnormal returns and risks between the bubble period and the post-bubble period using t-statistics as the significance level. We use the SUR considering there may be correlation among the residual of equations. This procedure adjusts for the cross-sectional correlation in the residual returns across the equations. The following model is estimated for this purpose;

$$\overline{R}_{it} = a_0 + a_1 \overline{R}_{it-1} + e_{it}$$
$$\beta_{it} = b_0 + b_1 \beta_{it-1} + u_{it} \qquad (2)$$
$$\alpha_{it} = c_0 + c_1 \alpha_{it-1} + v_{it}$$

Where;

$t=$ post-bubble periods (1990-1998 or 1996-1998);

$t-1=$ bubble period;

$\overline{R}_i =$ average returns of bank i;

$e_{it}, u_{it}, v_{it} =$ residual returns

(3) Effect on Risk Adjusted Rate of Return Test

In the third step we employ the CAPM method to check the plausibility of relationship between bubbles and performance of banks over the post-bubble period. Here, we test the effect of bubbles on the risk-adjusted rate of returns of banks in the post-bubble period. For this purpose, the Two-Pass Regression methodology of Fama and MacBeth (1973) was adopted. Accordingly, in the first stage, β and α are estimated from the equation (1) for each period separately. In the second stage, the following cross-sectional regression equation is estimated for each month. The

additional variable $\hat{X}_{t-1}$ is included in this equation in order to examine the bubble effect.

$$R_{it} = a_{0t} + a_{1t} \hat{\beta}_{it} + a_{2t} \hat{X}_{it-1} + w_{it} \quad (3)$$

Where; in the bubble period;

Where; $\hat{X}_{it-1} = \hat{\alpha}_{i,} \hat{\beta}_{i,} \overline{R}_i$ in the bubble period;

$t=$ post-bubble periods (1990-1998 or 1996-1998);

$t-1=$ bubble period

$R_{it}=$ monthly returns of bank i in the post-bubble periods;

$\hat{\beta}_i =$ systematic risks of bank i in the post-bubble periods;

$w_{it}=$ residual returns.

Equation (3) is estimated by the OLS[2], which gives estimates a_{0t}, a_{1t}, a_{2t} for each month in the post bubble period. The average values of the monthly coefficients ($\overline{a}_0, \overline{a}_1, \overline{a}_2$) are calculated, and the average value can be tested to see if it is significantly different from zero using the t- test of Fama and MacBeth (1973).

If the CAPM is valid, then the empirical results should be consistent with the following conditions.

(1) The intercept term $\overline{a}_0$ should not be significantly different from the average risk less rate over the post-bubble period ($\overline{a}_0 = R_f$).

(2) The coefficient of beta should be equal to the average market excess return over the post-bubble period ($\overline{a}_1 = \overline{R}_{mt} - R_{ft}$).

(3) The beta should be the only risk factor that explains the difference in the rate of return among the banks. Other factors

should have no bearing on the outcome $(\overline{a}_2 = 0)$.

We use this method to test whether the average returns, risks, and abnormal returns of banks over the bubble period brought about any impact on the risk-adjusted rate of returns of banks in the post-bubble period. In the above model, if the coefficient of $\hat{X}_{t-1}$ is significantly different from zero, then we can assume some factors of bubbles have affected the performance of banks in the post-bubble period.

5. MAIN RESULTS

Table 2 summarizes the Jensen measures based on the unconditional benchmark[4] in equation (1). This also explores the relationship between the abnormal performances of banks grouped according to bank type. The unweighted averages of the individual bank stock returns in each bank group are used to estimate the CAPM model for each type of bank. The first column of the table shows alphas for each type of bank with t-statistics. The alphas of banks in all categories are consistently positive with numbers ranging from 0.355 to 1.24% per month, over the bubble period. The positive, significant value of all bank alpha suggests that, on average, the sample of bank stocks provided abnormally high returns in the 1984-89 period, yielding returns in excess of what would be predicted by the basic CAPM. Moreover, the alphas of banks in each category are consistently negative during the post-bubble period 1990-98 with numbers ranging from –0.311% to –1.59% per month but only–long-term credit bank's alpha is statistically significant at 5% level. This means long-term credit bank stocks provided abnormally low returns (relative to

the predictions of the theoretical Asset Pricing Model) after the bubble crash even though they have performed well during the bubble period. The estimation of alphas over the sub-period 1996-1998 also presents similar impressions as in the full post-bubble period.

Table 3 shows the results of the Simple Correlation Test employed to calculate the cross-sectional correlation of the individual bank's monthly average returns, betas and alphas between the bubble and post-bubble periods. The correlation of average monthly returns between the two periods is –0.36, which shows monthly average returns of banks have a negative relationship between the two periods. This is in accordance with the hypothesis of highly performing banks during the bubble period were under performing in the post-bubble period or vise versa. In the mean time, the correlation of alphas is -0.02 between the two periods, suggesting that the abnormal returns of banks have a slightly negative relationship between the two periods. However, betas of banks show strong positive relationship between the two periods. This suggests the fact that banks that lent excessively performed well during the bubble period and poorly after the crash raising concern that these banks might have high beta coefficients.

Table 4 shows the results of the SUR test using cross- sectional data of banks for the variables average returns, betas and alphas, which are derived from the estimation of equation (1). These variables for the post bubble period are regressed on the same variables of the bubble period. In line with the results of this model, average returns of the post-bubble period are reliable and negatively related to average returns of the

A. A. Azeez, Yasuhiro Yonezawa

bubble period with a 1 % significant level while beta variable had a positive coefficient, which was also significant at the 1 % level. During the bubble period the market performed well, so high beta bank stocks had better performance on average than low beta bank stocks. Hence, when we regress returns during the period 1990-98 on past returns, we effectively regress returns on beta. If the beta is constant overtime, since the market performed poorly during the post bubble period, one would expect high beta bank stocks to perform poorly. Our results of positive beta correlation and negative return correlation are perfectly consistent with the above argument. In other words, this is consistent with our hypothesis of the risk-adjusted rates of return of bank stocks having a negative correlation between the bubble and post bubble periods. Although the sign of the coefficient for abnormal return is negative, it is only marginally significant. Anyhow, this support our hypothesis that abnormally performed banks during the bubble period are poorly performing in the post bubble period or vise-versa. Furthermore, the strong significant negative relationship between bubble period returns and post bubble period returns indicates the rejection of the third hypothesis that risk-adjusted rate of returns are not correlated between the two periods.

The sub-post bubble period results of this table also give evidence in favor of bubble effects on the stock performance of banks, as in the full sample, however the only difference was that effect was high. It means when we calculate only for a 3 year period samples, negative coefficients of average returns increase from −0.241% to −1.03%. The hypothesis that lending behavior of banks in the bubble period accelerates the

bad performance in the post-bubble period can be accepted at a 1 % significant level. In contrast, the hypothesis that superior performance in the bubble period compensates for poor performance in the post-bubble period can be rejected at a 1% level in each post-bubble period. As a whole, these results suggest that bubbles related directly to lending behavior of banks have the main effect on the stock prices of banks after the bubble crash.

Table 5 shows the results of the CAPM method test in which the CAPM model was tested for the cross sectional data in the post-bubble period adding the cross-sectional data of the bubble period as an extra variable as shown in the equation (3). In order for the CAPM not to be rejected, the intercept should not differ significantly from zero, and the slope should not be significantly different from the mean excess returns on the market index, especially since we used the excess return form and the coefficient of extra variables (variables for the bubble period) had to be equal to zero. We regressed for average returns, betas and alphas separately using the Fama and MacBeth method. As table 5 shows, the coefficient of average returns is −1.23 for the post-bubble period 1996-1998. It shows not only negative results but also returns are statistically different from zero at the 5% significant level. This is consistent with the hypothesis of risk-adjusted rates of return are negatively correlated between the bubble period and post-bubble period. However, when the whole post-bubble period is taken into consideration, the results are significant only at the 10% level. Furthermore, the coefficient of beta variables of the bubble period is −1.52 for the 1996-98 period. Even though this is significant at the 5% level, coefficients of

the 1990-98 period is not statistically significant even at the 10% level. This may be due to multicollinearity between the variables β_{it} and β_{it-1} because simple correlation test reports that betas of banks have strong positive correlations between the bubble and post-bubble periods. In case of abnormal returns, the coefficient is marginally significant ,and its value is -1.22. In addition, the sub-period results in Table 5 strongly suggests the significance of the bubble effect on the risk-adjusted rates of return of banks in the post-bubble period rejecting the third hypothesis of risk-adjusted rates of return having no correlation between the two periods.

In both the full and sub-sample of the post bubble-periods, the hypothesis that lending behavior of bank in the bubble period affected the performance of banks after the bubble crash could not be rejected at the 5% level of significance. The estimation results indicate that bubbles affect bank stock returns significantly in the post-bubble period, especially, the 1996-98 period. The estimated coefficients imply that a 1% increase in returns during the bubble period causes stock prices (returns) in the post bubble period to fall by about 1.2%. At the same time, a 1-percentage point bubble surprise in the systematic risks results in a decline in the systematic risk of the post bubble period by about 1.52%. Also, surprises in the abnormal returns of the bubble period are negatively related to the abnormal returns of the post-bubble period.These results strongly support to the argument that the better performed banks during the bubble period are worsely affected after the bubble crash.

DISCUSSION

The results of this study raise another issue. The results suggest that because of heavier lending by the city banks and long- term credit banks more so than regional banks during the bubble period, the stock performance of those banks are affected more seriously than regional banks in the post- bubble period. Here, the issue is why city banks and long-term credit banks should have lent so heavily against real estate than regional banks during this period? One possible explanation might be the rapid increase in land prices of urban areas would have raised the collateral value of land in the larger cities. This suggests the land collateral hypothesis of "Land price increase in the urban areas raises the collateral value of land in major cities which cause city banks and long-term credit banks to speed-up their loans on a great scale during the bubble period and becoming weak banks after the collapse of the bubble economy. On the other hand, as land prices in the rural areas were stable, regional banks did not increase their lending during this period. Therefore, they became strong banks in the post-bubble period".

This study did not set out to prove the above mentioned relationship between land prices and bank lending, but by using historical data of the commercial land price index and bank lending of city banks and long-term credit banks, the study has been able to explore how causality relationship exist between the land prices and bank lending. Thus, are land prices driving bank lending, or the other way around?

A. A. Azeez, Yasuhiro Yonezawa

Causality Tests

This section examines land price's influence on bank lending through the Granger Causality Testing method[6]. The directions of causation may be examined based on the following equation:

$$\Delta lp = \alpha + \sum_{i=1}^{k1} \beta_i \Delta lp_{t-1} + \sum_{i=1}^{k2} \phi_i \Delta bl_{t-1} + \varepsilon_t \quad (4)$$

Where; lp is the land price measure and bl is bank lending measure. The variables are expressed in their first differences since they are non-stationary. From the equation, the null hypothesis of no causation from, bl to lp, $\Sigma\phi = 0$, can be tested using standard F tests. The reverse causation from bl to lp may also be evaluated by reversing the role of bl to lp in the equation. From the tests, four alternative patterns of causality may be observed: (1) unidirectional causality from bl to lp (2) unidirectional causality from bl to lp (3) bi-directional causality, and (4) no causality. In the implementation of equation (4), Schwarz's Bayesian Information Criterion (SBIC) is used to determine the lag lengths of the right hand-side variables.

The results for the bivariate VAR are given in Table 6. Accordingly, the null hypothesis of no causation from land prices to bank lending is rejected at conventional levels of significance. By contrast, the null hypothesis of no causation from bank lending to land prices cannot be rejected. This shows a strong evidence that land price Granger caused bank lending, but bank lending does not Granger cause the land price. The causality test is carried out for the bubble period and the post-bubble period separately in order to examine the consistency of results

between the two periods. However, the results were the same in the post bubble period as well. Therefore, this result is one indication to support the argument of heavy lending by the city banks and long-term credit bank was caused by high land prices of urban areas.

Cross-Sectional Regression Analysis

We now turn to the question whether land prices in fact show a statistically significant correlation with bank stock performance in the bubble period. The channel through which land prices are supposed to be connected to bank stock returns is that the positive effect of expected growth rates of land prices on future cash flows through high collateral value for bank lending which, in turn, increases stock prices (and stock returns). Ueda (2000) found prefecture land price increase to be one of the most important determinants of real estate lending but no one tested the relationship between prefecture land prices and bank stock returns so far. In this section, we investigate the relationship between all the sample banks' stock returns and land prices of the prefectures where the headquarters of the banks are located using a Cross-Sectional Regression Analysis. The estimated equation is

$$\overline{R}_{it} = a + b\overline{X}_{it} + \varepsilon_{it} \quad (5)$$

where, $\overline{X}_{it}$ stands for average of land price growth rates in the bubble period for the prefecture where the ith bank's headquarters is located. $\overline{R}_{it}$ stands for average returns of ith bank in the bubble period. The results of the cross-sectional analysis are displayed in Table 6. The estimated coefficient on land price growth is positive and highly significant, suggesting the strong influence of land prices on the bank stock returns in

the bubble period. Thus, the higher bank performance in the late 1980s was positively influenced by the appreciation of prefecture land prices where the headquarters of banks are located. These results provide further evidence for the robustness of our results found in the previous section.

6.Concluding Remarks

This study has examined the performance of the Japanese banking industry under the CAPM framework in order to see whether bubbles have equally affected the stock performance of those banks. Because it is difficult to pre specify theoretically the correct relationship between bubbles and bank stock returns, it is important to verify that any relationships that are uncovered are not merely statistical artifacts. Accordingly, this paper takes great care to apply alternative estimation methods, for a comprehensive, high quality data set that extends from January 1984 to December 1998. Three alternative hypotheses were formulated to test the relationship between bubbles and bank performance. The CAPM method test statistically confirms that risk adjusted rates of return of banks during the bubble period are negatively correlated with the risk-adjusted rates of return of bank stocks over the post-bubble period.

We accept the first hypothesis that lending behavior of banks during the bubble period drives bad performance of Japanese banks in the post bubble period. In the mean time, our results confirm that banks that performed well during the bubble economy have under performed during the post-bubble period. This is an indication of higher performance in the bubble period could not compensate the bad performance of the same banks after the bubble crash. Therefore, we reject the second hypothesis. We also reject the third hypothesis on the basis that investors during the bubble time have evaluated bank-lending behavior irrationally as they could not foresee the bubble crash in the future.

Our findings are suggestive of the existence of an unequal bubble effect on the stock performance of banks in the post-bubble period, although no clear-cut evidence could be discovered. Because, banks that performed well were affected more severely than banks that performed poorly, after the bubble crash. For example, as regional banks did not lend to bubbly assets during the boom period, performances of those banks were lower than long-term credit banks or city banks in that period while stock returns of regional banks are better than city banks or long-term credit banks during the recession. As the initial seed of bubbles was most likely sown by a sharp increase in bank lending in the real estate sector, it is reasonable to say that the demise of bubbles hit again on the performance of banks. Our results statistically support this argument.

A. A. Azeez, Yasuhiro Yonezawa

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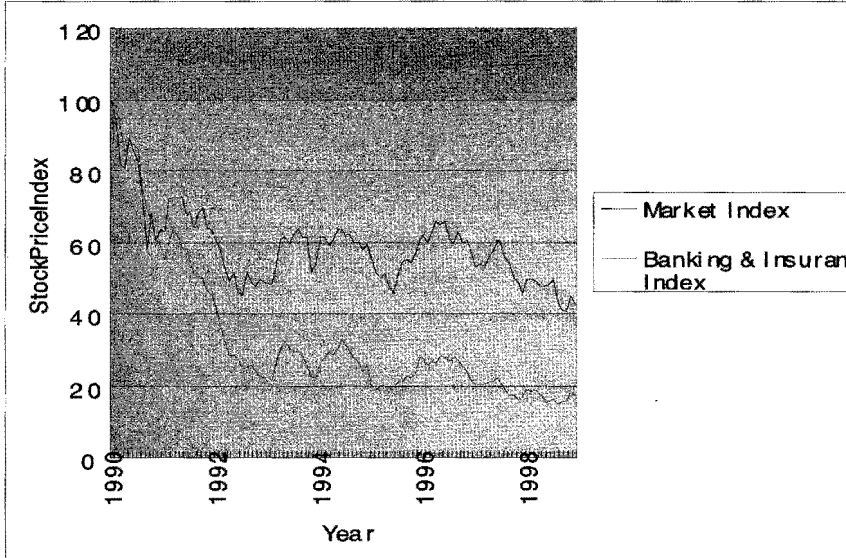
A Short Bio of Athambawa Abdul Azeez

Athambawa Abdul Azeez is an Senior Lecturer in Finance, Faculty of Management and Finance, University of Colombo, Sri Lanka. He earned his Ph.D. in Finance from Yokohama National University, Japan, an MBA from University of Colombo, Sri Lanka. His research interests include capital markets, asset pricing models, and Corporate Finance. He has published papers in refereed journals and conference proceedings.

A Short Bio of Yasuhiro YONEZAWA

Yasuhiro YONEZAWA is a professor of Finance and he has Ph.D. from Osaka University and M.A. from Tokyo University. He has published a lot of articles locally and internationally. Research interest capital markets, asset pricing models, anomallies and International Finance. He has contributed much to the International conferences in Finance. He has attached to Graduate School of Finance, Accounting & Law, Waseda University, Japan.

FIGURE 1

**Trend of Market Index and Banking & Insurance Index* for the Period
1990 -1998**

* This index includes the banks, security companies and all insurance companies except life insurance.

Table 1

Average Returns of Japanese Banks

Bank type	No of banks*	1984-1989 (%)	1990-1998 (%)	1996 -1998 (%)
Long-term credit	03	4.07	-2.02	-4.63
City	07	3.47	-1.36	-3.18
Trust	06	4.51	-1.28	-2.42
Regional	40	2.9	-0.58	-0.75
Total	56	3.2	-0.81	-1.44

Note: * Only the banks with complete data within the period of study are considered. In order to calculate the average returns of each bank group, first, average monthly returns are calculated for each bank. Then, unweighted average returns are computed across banks in each bank group.

Table 2
Measures of performance using Jensen's method

The coefficients and are the intercept and slope coefficients in the following regression:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$$

Whereis monthly returns on bank i and is the return of market index. is the risk-free rate. The t-values are shown as t(.). The unweighted averages of the individual bank stock returns in each bank group are used to estimate the model for each type of bank.

Bank Type	α_i	$t(\alpha_i)$	β_i	$t(\beta_i)$
(A) Averages of individual banks for the period 1984-1989				
Long-term	0.746	2.848	00 1.72	10.2
City	0.464	1.534	0 01.53	9.23
Trust	0.355	0.367	0 2.21	11.7
Regional	1.24	1.75	0.7320	5.38
Total	1.05	2.04	1.03	8.48
(B) Averages of individual banks for the period 1990-1998				
Long-term	-1.59	-2.22	01.15	10.46
City	-0.517	-1.894	1.10 0	12.46
Trust	-0.154	-0.233	1.47	14.62
Regional	-0.311	-1.14	0.609	14.64
Total	-0.3880	-2.41	0.794	18.79
(C) Averages of individual banks for the period 1996-1998				
Long-term	-0.207	-1.727	1.17	9.61
City	0.117	0.136	0.921	8.72
Trust	-0.287	-0.353	1.18	11.88
Regional	-0.429	-0.823	0.647	10.16
Total	-0.33	-1.696	0.767	13.08

A. A. Azeez, Yasuhiro Yonezawa

Table 3
Results of Simple Correlation Test

Correlation between bubble and post-bubble periods	Correlation Coefficient
(a) 1984-89 and 1990-98	
Average return	-0.36
Beta	0.82
Alpha	-0.02
(b) 1984-89 and 1996-98	
Average return	-0.41
Beta	0.64
Alpha	-0.07

Note-

Correlation Coefficients are calculated between bubble and post-bubble periods' average returns, betas and alphas over 56 banks. Input data for these calculations are shown in Tables 1 and 2.

Table 4
Results of Seemingly Unrelated Regression Test

The Constant and Coefficient columns of the table are derived estimating the following system of equations for the cross section of data.

$$\overline{R}_{it.} = a_0 + a_1 \overline{R}_{it-1} + e_{it}$$
$$\beta_{it} = b_0 + b_1 \beta_{it-1} + u_{it}$$
$$\alpha_{it} = c_0 + c_1 \alpha_{it-1} + v_{it}$$

Where is average return in the post-bubble period and is average return in the bubble period. indicates relative risks in the post-bubble period while indicates relative risks in the bubble periods. is abnormal return in the post-bubble period and is abnormal return in the bubble period. Numbers in parentheses are t-values of estimated coefficients.

Dependent Variable	Constant	Coefficient
(a) Bubble and post-bubble period (1990-98)		
Average return	-0.039	-0.241*
	(-0.233)	(-5.47)
Beta	0.612	0.369*
	(18.67)	(9.79)
Alpha	-0.5010	-0.125
	-4.60)	(-1.46)
(b) Bubble and Post-bubble period (1996-98)		
Average return	1.87	-1.03*
	(1.90)	(-3.43)
Beta	0.645	0.242*
	(17.53)	(5.74)
Alpha	-0.526	-0.287
	(-2.05)	(-1.937)**

Note: * Indicates significance at 1% level, ** Indicates significance at 10% level

A. A. Azeez, Yasuhiro Yonezawa

Table 5
Results of CAPM Method Test

Post-bubble periods	Constant	Coefficients	
	a_0	a_1	a_2

(a) Estimated equation: $R_{it} = a_{0t} + a_{1t}\beta_{it} + a_{2t}\overline{R}_{it-1} + \varepsilon_{it}$

Post-bubble periods	a_0	a_1	a_2
1990-1998	0.485	-0.310	-0.335 *
	(0.677)	(-0.386)	(-1.79)
1996-1998	2.32	-0.852	-1.23**
	(1.29)	(-0.943)	(-2.10)

(b) Estimated equation: $R_{it} = a_{0t} + a_{1t}\beta_{it} + a_{2t}\beta_{it-1} + u_{it}$

Post-bubble periods	a_0	a_1	a_2
1990-1998	-0.354	-0.472	-0.215
	(-0.897)	(-0.596)	(-0.543)
1996-1998	-0.511	-0.473	-1.52**
	(-0.697)	(-0.711)	(-2.07)

(c) Estimated equation: $R_{it} = a_{0t} + a_{1}\beta_{it} + a_{2t}\alpha_{it-1} + v_{it}$

Post-bubble periods	a_0	a_1	a_2
1990-1998	-0.074	-0.741	-0.223
	(-0.121)	(-0.883)	(-0.565)
1996-1998	0.978	-2.03	-1.22
	(0.735)	(-1.41)	(-1.84)*

Note: **
Indicates significance at 5% level. * Indicates significance at 10% level. Numbers in parentheses are t-values of estimated co-efficient. = alphas in the bubble period.= betas in the bubble period. = betas in the post-bubble period.= average returns in the bubble period. = monthly returns in the post bubble period.

Table 6
Results of Granger Causality Test

Hypothesis	F value	p value	Decision ($\alpha = 0.05$)	Direction of Causality
1984-1989				
$lp \blacklozenge bl$	11.4 (2)	0.000	Reject	Unidirectional
$bl \blacklozenge lp$	0.259 (2)	0.772	Do not reject	causality from lp to bl
1990-1998				
$lp \blacklozenge bl$	15.98 (2)	0.000	Reject	Unidirectional
$bl \blacklozenge lp$	0.409 (2)	0.665	Do not reject	causality from lp to bl

Note: lp = land price, bl = bank lending. The numbers in the brackets are the optimal lag lengths of the causal variable as chosen by the SBIC. Data on land prices were obtained from the survey conducted by the Real Estate Institute of Japan. The original series is semiannual, so we interpolate linearly to obtain the monthly series.

Table 7
Results of Cross-Sectional Regression Analysis for the Period 1984-1989

Independent variable	coefficients	t-value
Constant	2.66**	23.8
Land price	0.053**	6.66
Adjusted R^2		0.44

Note: **0Indicates significance at 1% level. Land price is the average of land price growth rates in the bubble period for the prefecture where ith bank's headquarters is located. The dependent variable is average stock returns of ith bank for the bubble period.