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*Risks and Returns in Relationship
and Transactional Banks: Evidence
from Banks' Returns in Germany,
Japan, the U.K., and the U.S.*

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Risks and Returns in Relationship and Transactional Banks:
Evidence from Banks' Returns in Germany, Japan, the U.K., and the U.S. ¹

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Abstract: This paper examines the effects of banks' organizational structures on their costs of equity capital. We test whether there is a difference in market risk and default risk exposures between transactional banks, found in the U.S. and U.K., and relationship banks, found in Japan and Germany. We find that the market risk of U.S. banks rises during periods of economic contraction, while the market risk of Japanese banks falls during these periods. (The market risk of U.K. and German banks does not change over the business cycle.) We also find that the returns of only the U.S. and U.K. banks show a significant link to default risk. Both of the results support the idea that relationship banks are more effective monitors than transactional banks.

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Abstract

This paper examines the effects of banks' organizational structures on their costs of equity capital. We test whether there is a difference in market risk and default risk exposures between transactional banks, found in the U.S. and U.K., and relationship banks, found in Japan and Germany. We find that the market risk of U.S. banks rises during periods of economic contraction, while the market risk of Japanese banks falls during these periods. (The market risks of U.K. and German banks do not change over the business cycle.) We also find that the returns of only the U.S. and U.K. banks show a significant link to default risk. Both of the results support the idea that relationship banks are more effective monitors than transactional banks.

INTRODUCTION

This paper studies the effects of organizational structure on banks' equity costs of capital. A bank's shareholders demand compensation for the forgone risk-free rate, r_f , plus premiums, I_i , for the bank's exposures, b_i , to market risk, default risk, liquidity risk, and yield curve risk.¹ Assuming a linear asset pricing model, the bank's cost of equity capital k is

$$k = r_f + b_m I_m + b_d I_d + b_l I_l + b_y I_y \quad (1)$$

The research question is whether the market risk exposure, b_m , and the default risk exposure, b_d , differ between relationship and transactional banks. We include liquidity and yield curve risk premiums as control factors.

¹ Hess and Laisathit (1996).

IMPLICATIONS OF ASYMMETRIC-INFORMATION MODELS FOR THE COEFFICIENTS

The risks that a bank's shareholders face start with the exogenous risks of the bank's on- and off-balance sheet activities. These basic risks are those that all parties would know in an economy with perfect information. These risks are compounded by asymmetric information between the bank and its counterparties.² For example, a borrowing firm has superior knowledge of the risks and returns of its projects, the work ethics of key individuals, and the willingness of management to honor their loan commitments. Banks screen potential borrowers to reduce adverse selection, and monitor borrowers to reduce moral hazard. These actions limit the borrower's ability to shirk its labor effort, and to substitute assets which transfer more than the agreed-upon risks to the lender. Through screening and monitoring, a bank can reduce risks due to imperfect information.

Do relationship banks screen and monitor better than transactional banks? Bank researchers distinguish between relationship and transactional banks as two polar-extreme organizational structures.³ Relationship banks, such as the German Hausbanks and the Japanese main banks, provide both debt and equity financing to their clients, have long-lasting ties with them, serve on their boards of directors and in some cases serve as senior managers, and renegotiate debt contracts during periods of financial stress.⁴ Transactional banks primarily provide short-term bank loans but not equity financing, monitor loan covenants, have limited interference in corporate management, and are reluctant for legal reasons to renegotiate loans of distressed firms.⁵

Aoki (1994) identifies three monitoring actions that banks take to reduce information asymmetries. Ex ante monitoring consists of credit evaluation and screening to reduce adverse selection and coordination failures across industries with jointly dependent

² Bhattacharya and Thakor (1993).

³ Allen and Gale (1995).

⁴ Allen and Gale (1995), Aoki (1994), Aoki, Patrick and Sheard (1994), Hoshi, Kashyap, and Scharfstein (1990), Prowse (1996), Steinherr and Huveneers (1994).

⁵ Prowse (1990).

production. Interim monitoring refers to the lender observing and controlling the actions of the borrower after it makes the loan but before the borrower repays it. Ex post monitoring includes verification of the borrower's financial results, punishing poor results, and renegotiating in case of temporary events outside the borrower's control that do not harm its long-run prospects. The Anglo-Saxon, market-oriented, decentralized financial system differs from the Japanese-German, relationship-banking system in who provides each of these three monitoring activities. Separate intermediaries provide specialized monitoring services in the U.K. and the U.S. In contrast, the main banks in Japan and the Hausbanks in Germany do all three types of monitoring.

Banking systems can differ in their monitoring effectiveness because they have different costs of obtaining, analyzing, and acting on information, or because they have different incentives to do so. Relationship banks may have better information about their borrowers and stronger incentives to act at each stage of monitoring than do transactional banks. In the theory of banking, relationship banks may have the same advantages over transactional banks that transactional banks have over public debt. Seward's (1990) model of corporate financing implies that it is optimal for the entrepreneur to be funded with both debt and equity. Equity financing reduces the entrepreneur's incentive to substitute high-risk for low-risk assets, and debt financing reduces the entrepreneur's incentive to lie about the project's payoff. In Aoki's three-part classification of monitoring, relationship banks' equity holdings may improve the effectiveness of their interim monitoring, and their debt holdings may improve the effectiveness of their ex post monitoring.

The literature suggests that relationship banks' have closer ties to their clients than do transactional banks. Relationship banks lend repeatedly to borrowers and maintain their borrowers' daily payment settlements. This provides them with information that reduces noise in credit evaluation. They gain additional information and control by serving on boards of directors and as senior managers. Consistent with this, Lummer and McConnell (1989) find that when a firm announces a renewal of a bank loan agreement, its stock price rises. There is no stock price change when a bank announces a new loan agreement. They view this as saying that banks gain an informational advantage as a result of a continuing

relationship with the borrower.⁶ If relationship banks have closer ties to their clients, they should have an informational advantage over transactional banks.

The biggest advantage of relationship banks may be in ex post monitoring of firms in financial distress. Borrowers enter financial distress either because the net present value of their projects has turned negative, or because of short-term liquidity problems. It is optimal to discontinue lending to negative value firms, but to keep lending to liquidity-troubled firms with positive values. Chemmanur and Fulgheri (1994) distinguish between the renegotiation decisions of single-period and multiple-period lenders. Renegotiation reputation is important to multi-period but not to single-period lenders. If relationship banks have longer lasting relationships with their borrowers than do transactional banks, they are more likely to renegotiate. This is consistent with Hoshi, Kashyap, and Scharfstein (1990) who show that financially distressed Japanese firms with a main bank are more likely to renegotiate their debt than firms without a main bank. If relationship banks deal better with financial distress, their cash flows and ex post returns will be less affected by contractions than will those of transactional banks.

Sheard (1994) argues that Japanese main banks, a representative form of relationship banks, dominate legal bankruptcy in resolving claims against and opportunities of firms in financial distress. First, main banks have better information than courts and outside claimants about why a firm became distressed, what its prospects are, and how best to resolve the distress. Second, main banks have clearer incentives. By holding numerous types of securities they avoid many of the conflicts of interest among holders of different classes of securities.⁷ They act as delegated monitors for all the claimants. Third, the principle of equitable subordination deters transactional banks from exercising influence over distressed firms for fear of losing their legal status as creditors.⁸ As a result,

⁶ Preece and Mullineaux (1994) present contrary evidence. Using U.S. data, they find that announcements of loan agreements by banks, nonbank subsidiaries of bank holding companies, and nonbanks all have significantly positive effects on borrowers' stock prices. If these lenders differ in the closeness of their relationship with borrowers, it may not be the closeness of the relationship that allows the lender to have superior information.

⁷ This is Seward's (1990) point.

⁸ Steinherr and Huvencers (1994).

relationship banks participate actively in resolving financial distress whereas transactional banks participate passively.

How do the alleged informational and incentive differences between relationship and transactional banks affect their costs of capital? Relationship banks have lower lending risks than do transactional banks. However, this does not necessarily imply that relationship banks have lower costs of capital. A bank's cost of equity capital depends on the entire composition of its on- and off-balance sheet activities. If relationship banks have lower lending risks, they may hold smaller amounts of securities and be more highly levered. Each of these increases its equity cost of capital. Thus, we are not able to predict which type of bank has a larger beta.

However, theory does help us predict changes in betas of relationship banks between booms and busts. If relationship banks are better able to judge borrowers' prospects, they may choose to finance higher-risk loans during economic booms and lower-risk loans during recessions. Let $b_{m\uparrow RI}$ be the market risk exposure during economic booms of relationship banks.⁹ The alleged better information of relationship banks leads to a market timing hypothesis which implies that the banks market risk exposures are greater in booms than they are in busts.

- Market-timing hypothesis: $b_{m\uparrow RI} > b_{m\downarrow RI}$.

Differences in the effects of monitoring abilities on the costs of capital for relationship versus transactional banks should be greater during an economic downturn when borrowers are more likely to be in financial distress. Effective monitoring matters more when the economy contracts than when it expands. Two opposing forces are at work during downturns: an adverse selection force and a monitoring force. According to Diamond's (1991) adverse-selection model, in normal economic conditions, high-quality borrowers with good credit reputations borrow directly in the credit markets where their cost of capital is lower. Low-quality borrowers without credit histories borrow from banks who are better able than outsiders to screen borrowers. Outside lenders are aware that downturns reduce borrowers' reputational benefits that stem from their consistent

⁹ We use similar notation for transactional banks and for busts.

repayment of debt. During downturns, the possibility increases that a here-to-fore high-quality credit will substitute a high-risk project for the low-risk project that was the basis of external funding. Outside lenders require higher expected returns during downturns to compensate them for this possible asset-substitution. This raises the relative cost of outside financing to high-quality borrowers, and leads them to shift to bank financing.¹⁰ Ceteris paribus, the costs of capital of transactional banks fall during a downturn.

- Adverse-selection hypothesis for transactional banks: $b_{m\uparrow Tr} > b_{m\downarrow Tr}$.

If borrowers from relationship banks have less access to public markets, as they did in Japan before financial liberalization and as they do in Germany, there is less cyclical movement of borrowers between banks and public financing. Thus, from the adverse selection perspective, the cost of capital at relationship banks should have less cyclical change than at transactional banks. This implies that during economic contractions the market risk of transactional banks falls relative to relationship banks.

- Adverse-selection hypothesis for different bank types: $\frac{b_{m\uparrow Tr}}{b_{m\uparrow Rel}} > \frac{b_{m\downarrow Tr}}{b_{m\downarrow Rel}}$.

However, ceteris is not paribus during a downturn. During downturns more borrowers enter financial distress. Since a bank's riskiness is derived from the risk profile of its borrowers, this suggests that a bank's risk profile should rise in a downturn. If relationship banks are more likely to identify distressed firms, help them change their operating decisions, and renegotiate their debt, they should have fewer defaults. On this account, the risks of transactional banks should rise relative to those of relationship banks in downturns. This gives us the moral-hazard hypothesis.

- Moral hazard hypothesis: $\frac{b_{m\uparrow Tr}}{b_{m\uparrow Rel}} < \frac{b_{m\downarrow Tr}}{b_{m\downarrow Rel}}$.

Thus, the existing theories give us two models with opposite predictions. Each can be compared to the null hypothesis of no difference between booms and busts in the ratios of the betas of transactional and relationship banks.

¹⁰ Stiglitz and Weiss (1981) discuss the adverse selection problems that result from lenders raising the interest rate to compensate for higher perceived lending risks.

- $H_0: \frac{b_{m\uparrow Tr}}{b_{m\uparrow Rel}} = \frac{b_{m\downarrow Tr}}{b_{m\downarrow Rel}}$.

Which of the two offsetting effects, the adverse selection effect or the moral hazard effect, is larger is an empirical issue to which we now turn.

Different monitoring skills and incentives should also affect banks' exposure to default risk. We would expect to find that the superior monitoring capabilities of relationship banks should be associated with lower exposure to default risks than transactional banks.

DATA AND EMPIRICAL TESTS

We use two different measures of banks' stock returns to estimate their equity costs of capital. In the first, we construct a value-weighted portfolio of monthly returns for the largest, "most representative" banks in that system. For Germany, we use the three major Hausbanks: Deutsche Bank, Dresdner, and Commerzbank. For Japan, we use the 6 banks that form the center of the 6 main keiretsu industrial groups: DKB, Fuji, Mitsubishi, Mitsui (Sakura after 4/90), Sanwa, and Sumitomo. For the U.K., we use the Big Four clearing banks: Barclays, National Westminster, Lloyds, and Midland (HSBC after 10/92). For the U.S., we select the 11 banks highlighted as "too big to fail" in the Wall Street Journal (9-20-84) and O'Hara and Shaw (1990): Bank of America, Bankers Trust, Citibank, Chase, Chemical, Continental, First Chicago, JP Morgan, Manufacturer's Hanover, Security Pacific, and Wells Fargo. Our second measure of bank returns is Datastream's Retail Bank Industry Index for each country. These indices are value weighted indices of stock returns for all the commercial or "retail" banks in that country. Table 1 describes these and other measures used in the analysis.

We also draw our explanatory variables from Datastream. While services like Datastream have made large amounts of international data available to researchers, we still experience problems finding directly comparable series across all four countries. The primary goal in selecting data series for this study is to get variables that measure similar

rates or fundamentals. As we describe each variable below, we highlight some compromises that we made.

The variable for market returns should represent a broad measure of market activity. As a result, we calculate stock market returns from the Commerzbank Index in Germany, the Tokyo NSE Index in Japan, the FT All Share Index in the U.K., and the S&P Composite Index in the U.S.

Our measure of default risk equals a corporate lending rate minus a long term government rate. For Germany, we take this from the average lending rate for current account credits of DM1-5 million minus the weighted average yield on government and public authority bonds with a life over 3 years. For Japan, the default risk variable is the end-of-period interest rate on corporate bonds (12 years) minus the end-of-period yield on 8-10 year government benchmark bonds. For the U.K., the default risk variable is the end-of-month London clearing bank base rate minus the long-term government bond yield. For the U.S., the default risk variable is the average prime rate minus the yield on 10-year Treasury bonds. The lack of a consistent corporate lending rate and the inability to match perfectly the terms of the corporate and government loans makes our default measure an imperfect proxy for the credit risk faced by banks¹¹.

We measure the premium that investor receive for bearing liquidity risk as a deposit rate minus a government rate of the same (or close) maturity. For Germany, this equals the average 3-month deposit rate minus the annualized discount rate on new issues of 3-month Treasury bills. For Japan, we measure liquidity risk as the end-of-period interest rate on 3-month time deposits minus the end-of-period yield on 60-day short-term government securities. The U.K. measure of liquidity risk equals the end-of-period interest rate on 3-month deposits minus the end-of-period 3-month Treasury bill rate. The U.S. liquidity measure equals the monthly average interest rate on 3-month CDs minus the end-of-period 3-month Treasury bill rate.

¹¹ Two alternative default risk proxies were estimated. U.K.: end of month London clearing bank base rate minus the short term government bond yield. U.S.: BAA corporate lending rate (from the Federal Reserve) minus the yield on 10-year Treasury bonds. Neither of these proxies showed significant links to bank returns.

We measure term risk with the slope of the yield curve, using a long-term government yield minus a short-term government yield. For Germany, this is the end-of-period yield on 7-15 year secondary market public bonds minus the annualized discount rate on new issues of 3-month Treasury bills. For Japan, the yield curve measure equals the end-of-period yield on 8-10 year government benchmark bonds minus the end-of-period yield on 60-day short-term government securities. For the U.K., the slope is the long-term government bond yield minus the end-of-period 3-month Treasury bill rate. For the U.S., the yield curve slope is the monthly average yield on 10-year Treasury bonds minus the end-of-period 3-month Treasury bill rate. Our inability to match exactly the points on the yield curve from which we select rates across the four countries hurts the effectiveness of this measure¹².

In order to examine the risk and returns of bank stocks across business cycles we must identify the growth and contractionary periods in each economy. We do this using leading economic indicators. The indicators are the Manufacturing Trade Production Expectations for Germany, the Composite Leading Index for Japan, the Central Statistical Office's Long Leading Indicator for the U.K., and the Conference Board's Leading Indicator for the U.S. The Japan, U.K., and U.S. measures all represent weighted indices of various economic variables. A comparable indicator for Germany is not available on Datastream. The German measure represents the results of a survey of manufacturing managers. A negative value indicates a majority of respondents were pessimistic about future (3 month) growth prospects.

The business-cycle dating convention in the U.S. is 2 quarters of consecutive growth (contraction) to signal an expansion (recession). To parallel this convention, we look for 6 consecutive months of increase (decrease) in the leading indicator to indicate a switch out of a contractionary- (expansionary-) period. (For the German indicator, we look for 6 consecutive months of positive or negative values.) We date the beginning of

¹² One alternative proxy was available for the German yield curve risk: the end-of-period yield on 7-15 year secondary market public bonds minus the average 3-month deposit rate. This proxy was never significant in any of the regression specifications.

an expansion as the first of the six consecutive months of growth in the indicator.¹³ Figure 1 depicts the Leading Indicators for each country, highlighting the periods of expansion and contraction. From the beginning of 1984 through March 1996, we have three contractionary periods in Germany and Japan, 4 in the U.K., and 2 in the U.S.¹⁴

Our data include monthly observations over January 1984 through March 1996. We begin in January 1984 because the Japanese bank stocks did not actively trade in the early 1980s. Pettway, Tapley, and Yamada (1988) document the inactivity of Japanese bank stocks during that period and their more active trading after early 1984. They argue that the primary force for increased trading activity was financial deregulation that began in the late 1907s and increased throughout the early 1980s.

As noted at the beginning of the paper, the research question we address is whether the market risk exposure, \mathbf{b}_m , and the default risk exposure, \mathbf{b}_d , differ between relationship and transactional banks. We are particularly interested in the difference in market risk during periods of economic contraction. We test these relationships across the four countries with a seemingly unrelated (SUR) regression specification which allows for nonconstant disturbances and contemporaneous correlation across countries. Specifically, our specification is:

$$r_{nt} = \mathbf{b}_n + \mathbf{b}_{m\uparrow} I_{n\uparrow} R_{mnt} + \mathbf{b}_{m\downarrow} I_{n\downarrow} R_{mnt} + \mathbf{b}_d R_{dnt} + \mathbf{b}_l R_{lnt} + \mathbf{b}_y R_{ynt} + \mathbf{e}_{nt} \quad (2)$$

where:

r_{nt} = the monthly market return for our constructed bank portfolio or Datastream's Retail Bank Index for country n.

n = 1, 2, 3, or 4, for Germany, Japan, the U.K., or the U.S. respectively

t = 1, 2,...147 for monthly observations from January, 1984 through March, 1996

\mathbf{b}_n = the intercept coefficient for the bank portfolio in country n

$I_{n\uparrow}$ = a binary variable set equal to 1 for expansionary periods in country n

¹³ If we stick with the rule of 6 consecutive months for Japan, there are no contractions in the 1984-96 period. As a result, for Japan, we use a 5 month rule.

¹⁴ We also tried a measure of economic expansion (contraction) which equaled one in any month when the leading indicator increased (decreased) and zero otherwise. This measure yields very similar results to the one above, but with less power.

$b_{m\uparrow}$ = estimate of the sensitivity of country n's bank portfolio returns to country n's equity market index returns during periods of economic expansion

R_{mnt} = the monthly rate of return on country n's equity market index

$I_{n\downarrow}$ = a binary variable set equal to 1 for contractionary periods in country n

$b_{m\downarrow}$ = estimate of the sensitivity of country n's bank portfolio returns to country n's equity market index returns during periods of economic contraction

b_d = estimate of the sensitivity of country n's bank portfolio returns to country n's credit default risk

R_{dnt} = country n's default risk measure

b_l = estimate of the sensitivity of country n's bank portfolio returns to country n's liquidity risk

R_{lnt} = country n's liquidity risk measure

b_y = estimate of the sensitivity of country n's bank portfolio returns to country n's yield curve risk

R_{ynt} = country n's yield curve risk measure

Table 2 reports the results of the SUR regressions. Panel A reports the results for our constructed portfolios of large banks, while Panel B reports the results with Datastream's retail bank indices. In both Panels, the market betas are statistically equal to or greater than one for every country in both expansions and contractions. The default risk and yield curve risk variables are significant only for the U.K. and the U.S., and the liquidity risk measure is only significant for Japan using the retail bank indices.¹⁵

We test whether the market betas differ across countries during expansions. The calculated value of the Wald statistic is significant at a p-value of 5 percent with the constructed portfolios and 1 percent with the retail bank indices. We take this as evidence

¹⁵ In separate tests, we also split the default, liquidity, and yield curve risk measures into expansionary and contractionary periods. For all four countries, the beta estimates for these risk measures never differ across the two periods at the 5 percent level. The only exception is the sensitivity of U.K. bank returns (Datastream's Retail Bank Index only) to credit and yield curve risk is higher in contractions than in expansions at the 5 percent level.

of cross-country variation in banks' costs of equity capital. As theory suggests, the costs of capital do not line up neatly between relationship and transactional banks. U.K. and U.S. banks are generally regarded as transactional banks while German Hausbanks and Japanese main banks are the epitome of relationship banks.¹⁶ In Panel A, U.K. banks have the lowest cost of equity capital in expansions and Japanese and U.S. banks have the highest, while in Panel B, German banks have the lowest and Japanese banks the highest cost of equity capital in expansions.¹⁷

If Sheard is right about relationship banks handling financial distress better than transactional banks, the major difference in costs of capital should occur during economic recessions. We next test whether the market betas differ across countries during contractions. The calculated Wald statistic is significant at a 10 percent in Panel A and at 5% in Panel B. It appears that banks' equity costs of capital differ across countries during contractions. In both Panels, U.S. banks have the highest betas, while Japanese (German) banks have the lowest beta in Panel A (B).

The Japanese market betas for booms and busts are significantly different from each other at the 5 percent level in both Panels, while the U.S. betas are significantly different from each other at the 10 percent level in Panel A and at the 5 percent level in Panel B. The decrease in the equity cost of capital for Japanese banks from expansions to contractions is consistent with the market-timing hypothesis for relationship banks, while the increase in U.S. banks cost of capital is inconsistent with the adverse-selection hypothesis for transactional banks. The market beta estimates for Germany and the U.K. do not change over the business cycle.

A possible explanation for the lack of change in the German estimates over the business cycle is a weak proxy for dating expansions versus contractions. As noted above, dating of the German business cycles is based on the results of a survey of managers, rather than on an index which represents a weighted composite of various economic variables. Economic Cycle Research Institute (ECRI) provided us a leading economic

¹⁶ See Mayer and Alexander (1990) and Steinherr and Huvneers (1994) for the U.K. and Germany, and Aoki (1994) for the U.S. and Japan.

¹⁷ The estimated market betas during expansions for Japanese and U.S. banks are not statistically different from each other in the constructed portfolio regressions in Panel A.

indicator for Germany, constructed in an analogous manner to the Japan, U.K., and U.S. Leading Indicators. According to the ECRI measure, Germany had no period over 1984-96 with 6 (or even 5) consecutive months of contraction. This suggests the entire period in our study might constitute an expansion for Germany.

Table 3 presents the formal test of our central hypotheses. There we look at changes in the market risk betas of transaction banks relative to relationship banks in expansions versus contractions. The adverse-selection model predicts that the ratio of transaction to relationship bank betas falls from expansion to contraction as the high quality borrowers return to the transaction banks. The moral-hazard model predicts that the ratio rises from expansion to contraction as the superior monitoring capabilities of relationship banks reduces their overall riskiness during economic downturns. Since we have data on banks from two transaction and two relationship countries, we have four separate tests for each set of SURs: U.K. versus Germany, U.K. versus Japan, U.S. versus Germany, and U.S. versus Japan. The chi-square test statistic is based on a Wald test for non-linear restrictions. Table 3 shows that in 7 out of the 8 tests the relative beta ratios rise as the countries move from expansion to contraction. This evidence is consistent with the moral-hazard model. The difference in market betas is significant at the 1 percent level for U.S. versus Japan (using returns from Datastream's retail bank indices), 5 percent level for U.S. versus Japan (constructed portfolios), 10 percent level U.S. versus Germany (bank indices), and 15 percent level for U.K. versus Japan (both SURs) and U.S. versus Germany (constructed portfolios).

The results are consistent with Sheard's contention. However, they are contrary to the prediction of Diamond's one-period loan model that the riskiness of (transactional) banks should fall in economic downturns as the more creditworthy customers shift towards banks. As Diamond suggests, the difference could reflect the increased defaults of outstanding loans overwhelming the lower credit risk of new loans. New loans are a small fraction of the total loans of the bank. Nevertheless, it is interesting that the U.S. bank risk rises during economic contractions, while the Japanese bank risk falls.

The results in Table 3 are driven by changes in the U.S. and Japanese market betas over the business cycle. Changes in the composition of banks' balance sheets may explain

the changes in their betas. Increases in U.S. banks' market risks could reflect higher leverage or an increase in loans versus less risky securities. Decreases in Japanese bank market risk could be driven by a decrease in leverage or a shift out of loans into securities. To examine this, we collected accounting data on the banks included in our constructed portfolios for each year from 1984 through 1995.¹⁸ We classified each fiscal year as a contractionary year if 7+ months in that year are classified as contraction based on our method above or if the last 6 months in the year are classified as a contraction. Table 4 reports the results for changes in the mean levels of two accounting ratios, Loans/Total Assets and Total Assets/Equity. For the German and U.K. banks, neither ratio exhibits a significant change between expansionary and contractionary years. The U.S. banks show significant changes in the both ratios across the business cycle. The data indicate that U.S. banks shift into loans and increase in leverage in the contractionary periods. Both of these changes could contribute to their higher market betas during economic downturns. Japanese banks also increase their loan to asset ratio in downturns. This shift, however, is inconsistent with both the market-timing hypothesis and with their lower market betas during contractions. Consistent with the lower betas, the Japanese banks do show lower point estimates of leverage during contractions, but the difference is not significant at the 10 percent level. These accounting data, then, provide some alternative evidence for the change in U.S. betas, but little help in understanding the change in Japanese betas over the business cycle.

The asymmetric information models discussed above also provide implications for differences in the sensitivity of relationship versus transactional banks to default risk. The results in Table 2 on the default risk variable are consistent with the hypothesis that arms-length or transactional banks show stronger credit risk sensitivity. In Table 2, a Wald test rejects equality of the 4 country default risk betas at the 5 percent level with the constructed portfolios and at the 1 percent level with the retail banks indices. Only the transactional banks in the U.K. and U.S. banks show significant sensitivity to the default risk measure.

¹⁸ The German and U.K. bank accounting data are from Datastream, the U.S. and Japanese bank accounting data are from Moody's.

CONCLUSION

Our results provide evidence consistent with Sheard's contention that relationship banks handle financial distress better than transactional banks. We find that the cost of equity capital falls for Japanese main banks and retail banks during contractionary periods, while the cost of equity capital rises for U.S. banks during economic downturns. The U.S. results are consistent with the decrease in the exogenous risks predicted by Diamond's model being overwhelmed by the concurrent increase in the ex post default risks of existing borrowers. The finding of significant default risk for only the U.S. and U.K. banks supports the notion that transactional banks manage credit risk less effectively than relationship banks.

REFERENCES

- Allen, Franklin, and Gale, Douglas. 1995. "A welfare comparison of intermediaries and financial markets in Germany and the U.S." *European Economic Review*
- Aoki, Masahiko, 1994. "Monitoring characteristics of the main bank system: An analytical and developmental view." In Masahiko Aoki and Hugh Patrick, (eds.) *The Japanese Main Bank System* New York: The Oxford University Press.
- Aoki, Masahiko, Patrick, Hugh, and Sheard, Paul. 1994. "The Japanese main bank system: An introductory overview." In Masahiko Aoki and Hugh Patrick, (eds.) *The Japanese Main Bank System* New York: The Oxford University Press.
- Bhattacharya, Sudipto, and Thakor, Anjan V. 1993. Contemporary banking theory. *Journal of Financial Intermediation* 3: 2-50.
- Chemmanur, Thomas J., and Fulghieri, Paolo. 1994. "Reputation, renegotiation, and the choice between bank loans and publicly traded debt." *Review of Financial Studies* 7: 475-506.
- Diamond, Douglas W. 1991. "Monitoring and reputation: The choice between bank loans and directly placed debt." *Journal of Political Economy* 97: 828-862.
- Hess, Alan C., and Laisathit, Kirati. 1996. "A market-based risk classification of financial institutions." Presented at the Wharton Financial Institutions Center "Risk Management in Banking" conference, October 1996.
- Hoshi, Takeo, Kashyap, Anil, and Scharfstein, David. 1990. "The role of banks in reducing the costs of financial distress in Japan." *Journal of Financial Economics* 27: 67-88.
- Lummer, Scott L., and McConnell, John J. 1989. "Further evidence on the bank lending process and the capital-market response to bank loan agreements." *Journal of Financial Economics* 25: 99-122.
- Mayer, Colin and Alexander, Ian. 1990. "Banks and securities markets: Corporate financing in Germany and the United Kingdom." *Journal of the Japanese and International Economies* 4: 450-475.
- O'Hara, Maureen and Wayne Shaw. 1990. "Deposit insurance and wealth effects: The value of being 'Too Big to Fail.'" *The Journal of Finance* XLV: 1587-1600.

- Pettway, Richard H., Tapley, T. Craig, and Yamada, Takeshi. 1988. "The impacts of financial deregulation upon trading efficiency and the levels of risk and return of Japanese banks." *The Financial Review* 23: 243-268.
- Preece, Dianna C., and Mullineaux, Donald. 1994. "Monitoring by financial intermediaries: Banks vs. nonbanks." *Journal of Financial Services Research* 8: 193-202.
- Prowse, Stephen D., 1990. "Institutional investment patterns and corporate financial behavior in the United States and Japan." *Journal of Financial Economics* 27: 43-66.
- Prowse, Stephen D., 1996. "Corporate finance in international perspective: Legal and regulatory influences on financial system development." *Economic Review* Federal Reserve Bank of Dallas Third quarter: 2-15.
- Seward, James K. 1990. "Corporate financial policy and the theory of financial intermediation." *Journal of Finance* 45: 351-377.
- Sheard, Paul. "Main banks and the governance of financial distress." In Masahiko Aoki and Hugh Patrick, (eds.) *The Japanese Main Bank System* New York: The Oxford University Press.
- Steinherr, A. and Huvencers, Ch. 1994. "On the performance of differently regulated financial institutions: Some empirical evidence." *Journal of Banking and Finance* 18: 271-306.
- Stiglitz, Joseph H., and Weiss, Andrew. 1981. "Credit rationing in markets with imperfect information." *American Economic Review* 71: 393-410.

Table 1: Description of Variables used in the Analyses

Datastream International is the source for all data, except the U.S. Constructed Portfolio returns (1984-94 only), which are from CRSP. All data series are available from January, 1984 through March, 1996.

Variable	Germany	Japan	U.K.	U.S.
Banks included in Constructed Portfolios	Deutsche Bank, Dresdner Bank, Commerzbank	DKB, Fuji, Mitsubishi, Mitsui (Sakura), Sanwa, Sumitomo	Barclays, Lloyds, Midland (HSBC), Nat'l Westminster	Bank of America, Bankers Trust, Citibank, Chase, Chemical, Continental, First Chicago, JP Morgan, Man. Hanover, Security Pacific, Wells Fargo
Market Index (R_m)	Commerzbank Index	Tokyo NSE Index	FT All Share Index	S&P Composite Index
Default Risk Measure (R_d)	Corporate lending rate - weighted average yield on government and public authority bonds (> 3 years)	Corporate bond rate (12 years) - yield on government benchmark bond (8-10 years)	London clearing bank base rate - long term government bond yield	Average prime rate - yield on Treasury bonds (10 years)
Liquidity Risk Measure (R_l)	Deposit rate (3 months) - annualized discount rate on new issues of Treasury Bills (3 months)	Deposit rate (3 months) - yield on short term government securities (60 days)	Deposit rate (3 months) - Treasury bill rate (3 months)	CD rate (3 months) - Treasury Bill rate (3 months)
Yield Curve Measure (R_t)	Yield on second market public bonds (7-15 years) - annualized discount rate on new issues of Treasury Bills (3 months)	Yield on government benchmark bonds (8-10 years) - yield on short term government securities (60 days)	Yield on long term government bonds - Treasury bill rate (3 month)	Yield on government bonds (10 years) - Treasury bill rate (3 month)

Table 2: Seemingly Unrelated Regression (SUR) Results for Bank Returns Against Explanatory Variables

$$\text{Model: } r_{nt} = \mathbf{b}_n + \mathbf{b}_{m\uparrow} I_{n\uparrow} R_{mnt} + \mathbf{b}_{m\downarrow} I_{n\downarrow} R_{mnt} + \mathbf{b}_d R_{dnt} + \mathbf{b}_l R_{lnt} + \mathbf{b}_y R_{ynt} + \mathbf{e}_{nt}$$

Table reports results for two seemingly unrelated regressions. Dependent variable equals a value weighted return of a constructed portfolio of banks (Panel A) and Datastream's value weighted return for each country's Retail Bank Index (Panel B). Explanatory variables defined in Table 1. Data cover monthly observations from January, 1984 through March, 1996 (N=147 for each country). T-statistics reported in parentheses. *, **, and *** Denote significance at the 10, 5, and 1 percent levels, respectively.

	\mathbf{b}_n	$\mathbf{b}_{m\uparrow}$	$\mathbf{b}_{m\downarrow}$	\mathbf{b}_d	\mathbf{b}_l	\mathbf{b}_y	Adj. R2
<u>Panel A: Constructed Bank Portfolios</u>							
Germany	0.016 (1.400)	1.085*** (18.191)	1.073*** (12.751)	-0.004 (-1.332)	-0.002 (-0.249)	-0.005 (-1.370)	0.762
Japan	-0.030 (-0.844)	1.345*** (13.599)	0.981*** (7.632)	0.005 (0.317)	-0.009 (-1.195)	0.012 (1.063)	0.605
U.K.	-0.015* (-1.692)	1.055*** (15.217)	1.080*** (9.902)	0.028** (2.470)	0.011 (0.646)	0.030** (2.533)	0.682
U.S.	-0.041** (-1.970)	1.253*** (13.296)	1.637*** (7.773)	0.014* (1.862)	-0.003 (-0.384)	0.018** (2.297)	0.607
Wald Test	7.930**	8.909**	7.617*	11.038**	1.255	13.325***	

Table 2: Seemingly Unrelated Regression (SUR) Results for Bank Returns Against Explanatory Variables

$$\text{Model: } r_{nt} = \mathbf{b}_n + \mathbf{b}_{m\uparrow} I_{n\uparrow} R_{mnt} + \mathbf{b}_{m\downarrow} I_{n\downarrow} R_{mnt} + \mathbf{b}_d R_{dnt} + \mathbf{b}_l R_{lnt} + \mathbf{b}_y R_{ynt} + \mathbf{e}_{nt}$$

Table reports results for two seemingly unrelated regressions. Dependent variable equals a value weighted return of a constructed portfolio of banks (Panel A) and Datastream's value weighted return for each country's Retail Bank Index (Panel B). Explanatory variables defined in Table 1. Data cover monthly observations from January, 1984 through March, 1996 (N=147 for each country). T-statistics reported in parentheses. *, **, and *** Denote significance at the 10, 5, and 1 percent levels, respectively.

	\mathbf{b}_n	$\mathbf{b}_{m\uparrow}$	$\mathbf{b}_{m\downarrow}$	\mathbf{b}_d	\mathbf{b}_l	\mathbf{b}_y	Adj. R2
<u>Panel B: Retail Bank Indices</u>							
Germany	0.013 (1.541)	0.943*** (20.803)	0.947*** (14.804)	-0.003 (-1.348)	0.0001 (0.018)	-0.005 (-1.620)	0.809
Japan	-0.032 (-1.086)	1.306*** (16.082)	0.985*** (9.337)	0.011 (0.736)	-0.011* (-1.739)	0.010 (1.130)	0.686
U.K.	-0.016* (-1.942)	1.056*** (17.348)	1.042*** (10.800)	0.025** (2.443)	0.016 (1.029)	0.027** (2.443)	0.738
U.S.	-0.047*** (-3.216)	1.086*** (16.301)	1.421*** (9.471)	0.014*** (2.722)	-0.003 (-0.462)	0.019*** (3.471)	0.706
Wald Test	14.125***	16.360***	8.562**	14.779***	3.259	20.331***	

Table 3: Hypothesis Test Of Change In Relative Market Betas Over The Business Cycle

$$\text{Model: } r_{nt} = \mathbf{b}_n + \mathbf{b}_{m\uparrow} I_{n\uparrow} R_{mnt} + \mathbf{b}_{m\downarrow} I_{n\downarrow} R_{mnt} + \mathbf{b}_d R_{dnt} + \mathbf{b}_l R_{lnt} + \mathbf{b}_y R_{ynt} + \mathbf{e}_{nt}$$

$$H_0: \frac{\mathbf{b}_{m\uparrow Tr}}{\mathbf{b}_{m\uparrow Rl}} - \frac{\mathbf{b}_{m\downarrow Tr}}{\mathbf{b}_{m\downarrow Rl}} = 0$$

Where: \mathbf{b}_m = the market beta; $\uparrow \downarrow$ represent estimations during expansions and contractions, respectively; and Tr. designates Transaction Banks and Rl. designates Relationship Banks. Numbers in table based on results reported in Table 2. Chi-square test statistic is from a Wald test for non-linear restrictions.

$$\text{Adverse Selection Prediction: } \frac{\mathbf{b}_{m\uparrow Tr}}{\mathbf{b}_{m\uparrow Rl}} - \frac{\mathbf{b}_{m\downarrow Tr}}{\mathbf{b}_{m\downarrow Rl}} \geq 0$$

$$\text{Moral Hazard Prediction: } \frac{\mathbf{b}_{m\uparrow Tr}}{\mathbf{b}_{m\uparrow Rl}} - \frac{\mathbf{b}_{m\downarrow Tr}}{\mathbf{b}_{m\downarrow Rl}} \leq 0$$

	Transaction Banks	
	UK	US
<u>Relationship Banks</u>		
<u>Constructed Portfolios:</u>		
GERMANY		
- Hypothesis	$\frac{1.055}{1.085} - \frac{1.080}{1.073} = -0.0341$	$\frac{1.253}{1.085} - \frac{1.637}{1.073} = -0.3707$
- Chi-Square Statistic	0.048	2.131
- P-value	(0.824)	(0.144)
JAPAN		
- Hypothesis	$\frac{1.055}{1.345} - \frac{1.080}{0.981} = -0.3166$	$\frac{1.253}{1.345} - \frac{1.637}{0.981} = -0.4072$
- Chi-Square Statistic	2.619	5.355
- P-value	(0.105)	(0.020)
<u>Bank Indices:</u>		
GERMANY		
- Hypothesis	$\frac{1.056}{0.943} - \frac{1.042}{0.947} = 0.0195$	$\frac{1.086}{0.943} - \frac{1.421}{0.947} = -0.3488$
- Chi-Square Statistic	0.018	2.826
- P-value	(0.892)	(0.092)
JAPAN		
- Hypothesis	$\frac{1.056}{1.306} - \frac{1.042}{0.985} = -0.2492$	$\frac{1.086}{1.306} - \frac{1.421}{0.985} = -0.6110$
- Chi-Square Statistic	2.319	7.230
- P-value	(0.127)	(0.007)

Table 4: Mean Values Of Accounting Ratios For Banks In Our Constructed Portfolios

Numbers equal the mean value of accounting ratios across the banks included in our Constructed Portfolios, identified in Table 1. Means calculated for years designated Expansion or Contraction according to the country's Leading Indicator. Accounting data are from Datastream (Germany and the UK) and Moody's (Japan and the US). *, **, and *** Indicate significant difference based on a T-test for difference in means at the 10, 5, and 1 percent levels, respectively.

	<u>Expansion</u>	<u>Contraction</u>	<u>Difference</u>
<u>Loans/Total Assets</u>			
- Germany	0.833	0.826	0.007
- Japan	0.539	0.599	-0.059***
- UK	0.387	0.377	0.010
- US	0.568	0.647	-0.079**
<u>Total Assets/Equity</u>			
- Germany	29.48	28.55	0.93
- Japan	40.94	36.83	4.10
- UK	22.19	22.33	-0.14
- US	18.28	20.20	-1.92**

Figure 1: Leading Economic Indicators for Germany, Japan, U.K., and U.S.



