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An International Comparison of Banks' Equity Returns

This paper tests implications of banking theory and legal theory for cross-country differences in banks' equity betas and returns. Banking theory predicts different risk exposures between transactional banks, found in the United States, United Kingdom, Australia, and Canada, and relationship banks, found in Japan, Germany, Switzerland, and the Netherlands. We find strong empirical support for banking theory's prediction of different risks and returns between transactional and relationship banks. Legal theory predicts that differences in banks' equity risks depend on the nature of the legal system for protecting the interests of outside investors. We find mixed evidence that banks' returns may vary by the type of legal system.

DO BANK'S EQUITY COSTS of capital, measured as realized returns to equity owners, differ systematically across countries? Two strands of finance literature suggest that they might. First, banking theory explains the actions of banks in terms of their attempts to deal with the adverse selection and moral hazard problems that stem from asymmetric information between the bank and its customers. Allen and Gale (1995) distinguish between transactional and relationship banks. Relationship banks, such as the German Hausbanks, the Japanese main banks, and the banks in Switzerland and the Netherlands 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.[1] Transactional banks in the former English colonies 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.[2] We examine the empirical effects of these banks' different screening and monitoring functions on their equity costs of capital. Our evidence strongly supports the implications of banking theory. Equity returns differ significantly between transactional and relationship banks. Relationship banks'

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

2. Prowse (1990). Barth et al. (1997) report that Canadian banks share some characteristics with relationship banks such as the ability to hold equity in nonfinancial firms. Buckley (1997) argues that Canadian banks are more like Japanese banks than they are like U.S. banks because of Canadian bankruptcy laws. Given their historical tradition as a former English colony, we classify Canadian banks a priori with transactional banks. Our results support our classification.

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equity betas rise during economic expansions and fall during contractions. Just the opposite happens to transactional banks.

Second, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) suggest that countries' legal systems offer different degrees of protection to outside investors. If so, any differences in returns between banks in different countries may be common to all firms in the country and not specific to banks. We find some suggestive evidence that legal systems may affect returns. However, the evidence is weak and requires additional theoretical analysis to interpret.

SALIENT PORTIONS OF BANKING THEORY

A premise of finance is that shareholders demand compensation for the risks they bear in owning stocks. 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. Bhattacharya and Thakor (1993) show that these risks are compounded by asymmetric information between the bank and its counterparties. 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 that transfer more than the agreed-upon risks to the lender. Through screening and monitoring, a bank can reduce risks due to imperfect information.

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 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. An Anglo-Saxon, market-oriented, decentralized financial system exists in the United States, United Kingdom, Canada, and Australia. In these countries, separate intermediaries provide specialized monitoring services. This transactional financial system differs from the relationship-banking systems found in Japan, Germany, Switzerland, and the Netherlands where commercial banks 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.[3] 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 multiperiod 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 by 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 assessing 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. In line with Seward's (1990) model, by holding numerous types of securities they avoid many of the conflicts of interest among holders of different classes of securities. They act as delegated monitors for all the claimants. Third, Steinherr and

3. 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.

Huveneers (1994) argue that the principle of equitable subordination deters transactional banks from exercising influence over distressed firms for fear of losing their legal status as creditors. As a result, relationship banks participate actively in resolving financial distress whereas transactional banks participate passively.

IMPLICATIONS OF BANKING THEORY FOR A BANK'S EQUITY COST OF CAPITAL

How do the alleged informational and incentive differences between relationship and transactional banks affect their costs of capital? We conduct our empirical analysis using an expanded market model as our maintained hypothesis.[4] A bank's cost of capital, k, depends on the return on the market portfolio, R_m, plus premiums, λ, for the bank's exposures, β, to default risk, liquidity risk, and yield curve risk.[5] A brief motivation for this model is that the bank's stockholders bear the bank's risks. Banks manage default, liquidity, and interest rate risks for borrowers and depositors. Stockholders are aware of their exposures to these risks and require premiums above the return on the market to compensate them for bearing these risks. Banks differ in their exposures to these risks and in their abilities to manage them. Stockholders recognize these differences and charge each bank according to its exposure to each risk.

Assuming a linear asset pricing model, bank j's cost of equity capital in period t, k_{jt} is

$$k_{jt} = \alpha_j + \beta_{mj}R_{mt} + \beta_{dj}\lambda_{dt} + \beta_{lj}\lambda_{lt} + \beta_{yj}\lambda_{yt}. \quad (1)$$

The research question is whether a bank's market risk exposure, β_{mj}, and its default risk exposure, β_{dj}, differ between relationship and transactional banks. We include liquidity and yield curve risk premiums as control factors.

Relationship banks may have lower lending risks than 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.

Diamond's (1991) adverse selection model of borrowers' choices between bank loans and market debt is the base for our analysis of potential differences between the betas of transactional and relationship banks. A key insight of his model is that the exogenous risks of transactional banks change between economic booms and busts. During prosperous economic times, high-quality borrowers with good credit reputa-

4. At least since Bildersee (1973) researchers have added an interest rate variable to the market model. Flannery and James (1984) provide early empirical evidence that interest rates affect banks' stock returns separately from the effects of the return on the market portfolio of equities. Recently, Fama (1996) provides a theoretical motivation of a multifactor approach to pricing stock.

5. Hess and Laisathit (1997) provide an explicit derivation of this model and link the coefficients to variables in the bank's on- and off-balance sheet activities.

tions 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. Economic downturns reduce borrowers' reputational benefits that stem from their consistent repayment of debt. During downturns, the possibility increases that a heretofore high-quality-credit borrower will substitute a high-risk project for the low-risk project that was the basis of external funding. Outside lenders are aware of this potential asset substitution and require higher expected returns during downturns to compensate them for their greater risk exposure. This raises the relative cost of outside financing to high-quality borrowers, and leads them to shift to bank financing during downturns.[6] Thus, during downturns, a greater share of transactional banks' borrowers are high quality. Consequently, transactional banks' risks and returns from adverse selection fall during economic downturns.

We use the symbol $\beta_{m\uparrow Tr}$ to represent the market beta of transactional banks during an economic upturn, and similar symbols for downturns and relationship banks. Table 1 reports the predictions of banking theory for market betas. Diamond's model, when applied to transactional banks, suggests the hypothesis: $\beta_{m\uparrow Tr} > \beta_{m\downarrow Tr}$. This is the first entry in the first row of the table.

Diamond's model may not apply to relationship banks if borrowers in relationship-bank nations have less access to public markets, as they did in Japan before financial liberalization and as they do in Germany. If so, there may be little or no cyclical movement of borrowers between banks and public financing, $\beta_{m\uparrow Rl} \geq \beta_{m\downarrow Rl}$. This gives the second entry in the first row of Table 1. We focus on the relative changes between booms and busts for transactional versus relationship banks. Based on borrowers' abilities to switch between banks and public debt, the cost of capital at relationship banks should have less cyclical change than at transactional banks. This gives the entry in the last row of Table 1, which is the relationship that we test. The adverse selection hypothesis says that the ratio of transactional banks' betas to relationship banks' betas is higher during booms than during busts. This is because the numerators of the two ratios are more variable than the denominators.

Moral hazard can differentially affect the betas of relationship and transactional banks during booms and busts. For both types of banks we expect equity betas to increase during busts because more of their borrowers will be in financial distress. The first two entries in the second row of the table do not allow us to distinguish between transactional and relationship banks since $\beta_{m\uparrow Tr} < \beta_{m\downarrow Tr}$ and $\beta_{m\uparrow Rl} < \beta_{m\downarrow Rl}$. However, the moral hazard story suggests that the cyclical changes in betas differ in size between the two types of banks. Differences in the effects of monitoring abilities on the costs of capital for relationship versus transactional banks should be greater during an economic downturn. Effective monitoring matters more when the economy contracts than when it expands. 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 rela-

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

TABLE 1

BETA DIFFERENCES BETWEEN RELATIONSHIP AND TRANSACTIONAL BANKS DURING BOOMS AND BUSTS

	Transactional banks	Relationship banks	Comparative effects
Adverse selection effects	$\beta_{m\uparrow Tr} > \beta_{m\downarrow Tr}$	$\beta_{m\uparrow RI} \geq \beta_{m\downarrow RI}$	$\frac{\beta_{m\uparrow Tr}}{\beta_{m\uparrow Rel}} > \frac{\beta_{m\downarrow Tr}}{\beta_{m\downarrow Rel}}$
Moral hazard effects	$\beta_{m\uparrow Tr} < \beta_{m\downarrow Tr}$	$\beta_{m\uparrow RI} < \beta_{m\downarrow RI}$	$\frac{\beta_{m\uparrow Tr}}{\beta_{m\uparrow Rel}} < \frac{\beta_{m\downarrow Tr}}{\beta_{m\downarrow Rel}}$

tive to those of relationship banks in downturns, $\beta_{m\uparrow Tr}/\beta_{m\uparrow Rel} < \beta_{m\downarrow Tr}/\beta_{m\downarrow Rel}$. This is the relationship that we test.

Thus, the existing theories give us two models with opposite predictions for changes in the relative betas over the business cycles. The adverse selection hypothesis says that the beta ratio increases during booms, and the moral hazard hypothesis says that it decreases. 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. 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 expect that because of their superior monitoring capabilities, relationship banks have less exposure to default risks than do transactional banks.

DATA DESCRIPTION

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 banks in that system. For Australia, we use the Big Trading Banks: Australia and New Zealand Banking Group, Westpac, and National Australia Bank (Commonwealth Bank of Australia is not included because stock price data are not available on Datastream). For Canada, we use the Big 6 Schedule One Banks: Royal Bank of Canada, Canadian Imperial Bank of Commerce, Bank of Montreal, Bank of Nova Scotia, Toronto Dominion Bank, and National Bank. For Germany, we use the three major Hausbanks: Deutsche Bank, Dresdner, and Commerzbank. For Japan, we use the six banks that form the center of the six main keiretsu industrial groups: DKB, Fuji, Mitsubishi, Mitsui (Sakura after 4/90), Sanwa, and Sumitomo. For the Netherlands, we use ABN Bank and Amro Bank. (Stock price data for the other large Dutch bank, Rabobank, are not available on Datastream.) For Switzerland, we use three of the "Big 4" banks: Union Bank of Switzerland, Swiss Banking Corporation, and Credit Suisse. Stock price data for Swiss Volksbank, much smaller than the other three, are not available on Datastream. For the United Kingdom, we use the Big Four clearing banks: Barclays, National Westminster, Lloyds, and Midland (HSBC after

10/92). For the United States, we use the eleven 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.

We draw our explanatory variables from Datastream International. The variable for market returns should represent a broad measure of market activity. As a result, we calculate stock market returns from the All Ordinary Index for Australia, the Toronto Stock Exchange 300 Composite Index for Canada, the Commerzbank Index in Germany, the Tokyo NSE Index in Japan, the CBS All Share General Index in the Netherlands, the Swiss Bank Corp. General Index for Switzerland, the FT All Share Index in the United Kingdom, and the S&P Composite Index in the United States.[7] As most of our large banks do business internationally, we also included a world equity market index as a regressor (Morgan Stanley Capital International World Market Index). This variable is never significant and does not affect the coefficient estimates or the standard errors of the remaining regressors. As a result, we report results without this regressor.

Unless otherwise noted, our interest rate measures are all taken from the International Monetary Fund's IFS (International Financial Statistics) data set, available on Datastream. Drawing data for all eight countries from the same source ensures comparability across the measures. The cost of this method is some imprecision in the measures. Our measure of default risk equals a corporate lending rate (average prime lending rate) minus a long-term government rate (government bond yield for ten-year constant maturities). We measure the premium that investors receive for bearing liquidity risk as a deposit rate (three-month unregulated time deposit) minus a government rate of the same maturity (discount rate on a three-month Treasury bill).[8] We measure term risk with the slope of the yield curve, using a long-term government yield (government bond yield for ten-year constant maturity) minus a short-term government yield (discount rate on a three-month Treasury bill).

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. Where possible, we use indicators provided by the individual countries: the Composite Index of Ten Leading Indicators for Canada, the Composite Leading Index for Japan, the Central Statistical Office's Long Leading Indicator for the United Kingdom, the Conference Board's Leading Indicator for the United States. Local series are not available for Australia, Germany, the Netherlands,

7. Five of the indices (Canada, Germany, Japan, United Kingdom, and United States) include dividends, while three (Australia, Netherlands, Switzerland) do not.

8. The deposit rates are not available on IFS for the United States. We use the three-month CD rate in the United States, also available on Datastream. The short term government T-bill rates in IFS are not available for Japan and the Netherlands. We use local deposit rates, three months for the Netherlands, sixty days for Japan, available elsewhere on Datastream, for these two countries.

and Switzerland. For these countries, we use the OECD's Composite Leading Economic Indicators.

The business cycle dating convention that we use is two quarters of consecutive growth (contraction) to signal an expansion (recession).[9] We look for six consecutive months of increase (decrease) in the leading indicator to indicate a switch out of a contractionary- (expansionary-) period. We date the beginning of an expansion as the first of the six consecutive months of growth in the indicator.[10] From the beginning of 1984 through March 1996, we have four contractionary periods in the United Kingdom, three in Australia, Germany, Japan, and the Netherlands, two in Canada and the United States, and one in Switzerland.[11]

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 1970s and increased throughout the early 1980s.

EMPIRICAL MODEL AND RESULTS

As noted at the beginning of the paper, the research question we address is whether a bank's equity market risk exposure, β_m, and its default risk exposure, β_d, differ between relationship and transactional banks. We are particularly interested in the difference in equity market risk during periods of economic contraction. We test these relationships across the eight countries with a seemingly unrelated (SUR) regression specification which allows for nonconstant disturbances and contemporaneous correlations across countries. Our empirical model is

$$k_{nt} = \alpha_n + \beta_{m\uparrow} I_{n\uparrow} R_{mnt} + \beta_{m\downarrow} I_{n\downarrow} R_{mnt} + \beta_d R_{dnt} + \beta_l R_{\mathrm{lnt}} + \beta_y R_{ynt} + \varepsilon_{nt} \qquad (2)$$

where

k_{nt} = the monthly market return for our large bank portfolio or Datastream's Retail Bank Index for country n;

9. The Sachs and Larrain *Macroeconomics* (1993, p. 517) textbook notes "In informal usage, the U.S. economy is often judged to be in recession when there are two consecutive quarters of decline in GNP." Both the NBER and the OECD use a wide variety of indicators, with no pre-set rules, to classify economic cycles. The relevant perspective for our test, however, is the ex ante expectations of local investors, not the ex post dating of business cycles by NBER or other government organizations. In addition, for clarity and consistency, we need to adopt one dating rule and apply it equally to all countries. As a result, we adopt the "informal usage" rule because we believe it complies most closely with what individual investors might believe.

10. For three countries, Canada, Japan, and the Netherlands, there are no periods of six consecutive months of decline in the Leading Economic Indicator over the sample period of January 1984 through March 1996. As a result, we use a five-month rule for Canada and Japan. For the Netherlands, we must use a four-month rule.

11. We also conduct the following tests with expansion defined as any month in which the leading economic indicator increases and contraction as any month in which the indicator falls. The results are generally consistent with those reported in the paper, with less precision.

n = 1, 2, up to 8, for Australia, Canada, Germany, Japan, the Netherlands, Switzerland, the United Kingdom, or the United States, respectively;
t = 1, 2, . . . 147 for monthly observations from January 1984 through March 1996;
α_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;
$\beta_{m\uparrow}$ = 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;
$\beta_{m\downarrow}$ = estimate of the sensitivity of country n's bank portfolio returns to country n's equity market index returns during periods of economic contraction;
β_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;
β_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;
β_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. For both portfolios, the market betas are significantly greater than zero at the 1 percent level for every country in both expansions and contractions. The default risk variable is significant for Canada and the United States in both portfolios and for the U.K. retail bank index. Equity returns of retail Swiss banks show significant connection to default risk at only the 10 percent level. This is the only one of the eight possible default risk coefficients that is significant for relationship banks. There are no economically meaningful liquidity risk coefficients. Yield curve risk variables affect the returns of Canadian and U.S. banks in both portfolios. and the returns of retail U.K. banks.

We report our findings in a series of hypothesis tests of increasing complexity. First, we examine whether there are cross-country differences in banks' market betas. We do this separately for booms and busts. The second and third columns of Table 2 report our estimates.

We find strong evidence of cross-country differences during booms. The estimated values of the Wald statistic in the bottom rows of panels A and B of Table 2 are significant at a p-value of 1 percent for both portfolios. For large banks (panel A) the average boom-beta for transactional banks is 1.002 and for relationship banks it is 1.067. For retail banks (panel B) the average boom-beta is 0.97 for transactional banks and 1.007 for relationship banks. During booms, the point estimates for the average market risk of relationship banks exceed those of transactional banks.

TABLE 2

SEEMINGLY UNRELATED REGRESSION (SUR) RESULTS FOR BANK RETURNS AGAINST EXPLANATORY VARIABLES

$$k_{nt} = \alpha_n + \beta_{m\uparrow} I_{n\uparrow} R_{mnt} + \beta_{m\downarrow} I_{n\downarrow} R_{mnt} + \beta_d R_{dnt} + \beta_l R_{\ln t} + \beta_y R_{ynt} + \varepsilon_{nt}$$

	α_n	$\beta_{m\uparrow}$	$\beta_{m\downarrow}$	β_d	β_l	β_y	Adj. R^2
Panel A: Large Bank Portfolios							
Transaction Banks:							
Australia	−3.277	0.779[c]	0.864[c]	0.649	−0.644	0.841	0.565
	(−0.910)	(11.512)	(5.005)	(1.094)	(−0.916)	(1.086)	
Canada	−1.492[a]	0.883[c]	0.965[c]	1.571[c]	0.430	1.532[c]	0.524
	(−1.860)	(12.730)	(5.186)	(2.780)	(0.985)	(2.655)	
United Kingdom	−1.119	1.106[c]	1.124[c]	1.430	−0.485	1.432	0.660
	(−1.207)	(16.289)	(10.659)	(1.515)	(−1.138)	(1.462)	
United States	−5.624[a]	1.240[c]	1.594[c]	1.827[a]	−0.005	2.263[b]	0.610
	(−1.855)	(13.745)	(7.666)	(1.953)	(−0.005)	(2.153)	
Relationship Banks:							
Germany	0.726	1.095[c]	0.933[c]	−0.223	−0.928	−0.290	0.771
	(0.399)	(22.305)	(9.012)	(−0.760)	(−1.080)	(−0.728)	
Japan	−5.843	1.350[c]	0.945[c]	1.200	−2.016[a]	2.320	0.609
	(−1.153)	(13.379)	(7.224)	(0.695)	(−1.758)	(1.162)	
Netherlands	−1.006	0.844[c]	0.724[c]	0.112	−0.320	0.352	0.455
	(−0.307)	(11.654)	(3.495)	(0.131)	(−1.016)	(0.315)	
Switzerland	−0.946	0.977[c]	1.061[c]	0.761	−0.653	−0.206	0.728
	(−1.564)	(17.365)	(10.187)	(1.418)	(−0.986)	(−1.104)	
Wald Test	4.750	46.601[c]	12.365[a]	13.254[a]	6.267	17.936[b]	
Panel B: Retail Bank Indices							
Transaction Banks:							
Australia	−3.548	0.764[c]	0.854[c]	0.691	−0.701	0.898	0.571
	(−1.007)	(11.537)	(5.057)	(1.191)	(−1.019)	(1.189)	
Canada	−2.115[b]	0.921[c]	0.933[c]	1.816[c]	0.749	1.813[b]	0.454
	(−2.141)	(10.770)	(4.066)	(2.606)	(1.388)	(2.548)	
United Kingdom	−2.513[c]	1.118[c]	1.080[c]	2.826[c]	−1.067[c]	2.908[c]	0.729
	(−3.259)	(19.665)	(12.313)	(3.604)	(−3.012)	(3.580)	
United States	−5.578[b]	1.075[c]	1.407[c]	1.665[b]	−0.164	2.174[c]	0.707
	(−2.573)	(16.781)	(9.476)	(2.487)	(−0.225)	(2.896)	
Relationship Banks							
Germany	1.408	0.931[c]	0.905[c]	−0.274	−0.334	−0.416	0.810
	(1.003)	(24.585)	(11.323)	(−1.209)	−(0.504)	(−1.357)	
Japan	−3.718	1.302[c]	0.948[c]	0.724	−1.790[a]	1.329	0.690
	(−0.897)	(15.773)	(8.856)	(0.513)	(−1.910)	(0.814)	
Netherlands	−1.166	0.849[c]	0.629[c]	0.140	−0.303	0.429	0.520
	(−0.411)	(13.432)	(3.515)	(0.189)	(−1.107)	(0.442)	
Switzerland	−0.963[b]	0.947[c]	0.920[c]	0.828[a]	−0.203	−0.119	0.779
	(−1.987)	(20.973)	(11.044)	(1.934)	(−0.384)	(−0.794)	
Wald Test	11.712	43.145[c]	14.930[b]	26.587[c]	10.413	30.902[c]	

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

We next examine whether the market betas differ across countries during contractions. 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 find that the beta differences are larger but not as significant as in booms. The calculated Wald statistic is significant at 10 percent for large banks and at 5 percent for retail banks. For large banks, the average bust-beta for transactional

banks is 1.137, and for relationship banks it is 0.916. For retail banks, the average bust-betas are 1.0685 and 0.851, respectively. Banks' equity costs of capital differ across countries during contractions. During busts, the average exposure of transactional banks exceeds the average of relationship banks.

The point estimates for all countries indicate increases in market risk during busts for transactional banks (with the sole exception of the U.K. Retail Bank Indices estimates), and decreases in market risk during busts for relationship banks (with the sole exception of Large Bank Switzerland estimates). An increase in the cost of capital of transaction banks during economic downturns is inconsistent with the adverse selection hypothesis being the dominant effect during busts. This hypothesis predicts that high-quality borrowers switch to banks during economic contractions. This should reduce banks' risks. It may be that the bust exacerbates the credit problems of existing borrowers who, according to Diamond's model, are of lower quality and thus more likely to suffer during busts. This effect may be overwhelming the switch effect.

A decrease in the cost of capital of relationship banks during downturns is inconsistent with the moral hazard prediction that the riskiness of all banks should rise in tandem with the increased riskiness of their clients. A possible explanation for the fall in risk involves adverse selection and market timing. 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. The alleged better information of relationship banks may cause their market risk exposures to be greater in booms than they are in busts. This market timing effect may overwhelm the moral hazard effect.

This pattern of increasing risk of transaction banks and decreasing risk of relationship banks during economic downturns also appears in individual bank's returns. We conduct SUR regressions for each country on the individual banks included in the large bank portfolios.[12] With the individual bank returns as the dependent variable, we use the same specification as in Table 2. Out of the twenty-four large banks in the four transaction countries, twenty have point estimates that indicate higher market betas during economic downturns than during upturns.[13] Across these banks, the average beta rises from 1.044 to 1.387 as the home economy moves from growth to contraction. Of the thirteen large banks in the four relationship countries, eleven have lower betas in economic downturns.[14] For these banks, the average beta falls from 1.177 to 0.931 as the economy moves from growth to contraction.

Our primary interest is in the *relative* risk of transaction versus relationship banks. The adverse selection hypothesis says that transactional banks' betas fall relative to relationship banks' betas during busts. The moral hazard hypothesis predicts the opposite, transactional banks betas increase relative to relationship banks' betas during busts. The results in Table 2 indicate that during booms the ratio of the average beta of large transactional banks to that of large relationship banks is 0.939. During busts the

12. Because of the large number of coefficients in this approach we do not report them.
13. Five of these differences are significant at the 10 percent level or higher.
14. Four of these differences are significant at the 10 percent level or better.

ratio rises to 1.241. The comparable ratios for the retail banks indices are 0.962 in booms and 1.256 in busts. These support the moral hazard hypothesis over the adverse selection hypothesis.[15]

Table 3 presents our main results, statistical tests of the adverse selection hypothesis against the moral hazard hypothesis. Since we have four transaction and four relationship countries, we have sixteen matched pairs to test for each measure of returns (Large Banks and Bank Indices). This gives us a total of thirty-two ratio tests. The *Z*-statistic for a sign test of the thirty-two pairs in Table 3 is significant at the 1 percent level.[16] Betas of transactional banks change relative to relationship banks between booms and busts. Our main question is whether the changes are better explained by the adverse selection or the moral hazard hypothesis. Three of the ratios are positive as predicted by the adverse selection theory, and twenty-nine are negative as predicted by the moral hazard theory. It is highly unlikely that we would get only three positive differences out of thirty-two paired tests if the adverse selection hypothesis describes the data.

Three of the sixteen ratios for large banks are significantly negative. These are for Japan-United Kingdom, Japan-United States, and Germany-United States. Two other ratios, Japan-Australia and Japan-Canada, have *p*-values below 0.150. In panel B, using results with the retail bank indices, four ratios are significantly negative: Germany-United States, Japan-United Kingdom, Japan-United States, and Switzerland-United States. Two other ratios have *p*-values below 0.160, Japan-Australia and Netherlands-United States. The ratio test results support the moral hazard hypothesis over the adverse selection hypothesis.

The results are consistent with Sheard's contention that relationship banks are better managers of borrowers' in distress. 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 toward 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 a bank.

The results in Table 3 appear to be driven by changes in the U.S. and Japanese market betas over the business cycle. Instead of reflecting different monitoring abilities of U.S. and Japanese banks, changes in betas may be due to changes in the composition of banks' balance sheets.[17] 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 large portfolios for Japan and the United States for each year from 1984 through 1995

15. Results from the individual bank SUR regressions also support the moral hazard hypothesis. The ratio of the mean betas for transaction relative to relationship banks rise from 0.887 during economic expansions to 1.489 during contractions.

16. A Wilcoxon signed-rank sum test on these thirty-two pairs results in a *Z*-statistic of −4.56, significant at the 1 percent level.

17. We thank our colleague Walter Novaes, former international banker, for this suggestion.

TABLE 3

HYPOTHESIS TEST OF CHANGE IN RELATIVE MARKET BETAS OVER THE BUSINESS CYCLE

Model: $k_{nt} = \alpha_n + \beta_{m\uparrow} I_{n\uparrow} R_{mnt} + \beta_{m\downarrow} I_{n\downarrow} R_{mnt} + \beta_d R_{dnt} + \beta_l R_{\ln t} + \beta_y R_{ynt} + \varepsilon_{nt}$

Hypothesis test: $\frac{\beta_{m\uparrow Tr}}{\beta_{m\uparrow Rel}} - \frac{\beta_{m\downarrow Tr}}{\beta_{m\downarrow Rel}} = 0$

Where β_m = the market beta; $\uparrow\downarrow$ represent estimations during expansions and contractions, respectively; and Tr. designates Transaction Banks and Rel. designates Relationship Banks

Adverse Selection Prediction: $\frac{\beta_{m\uparrow Tr}}{\beta_{m\uparrow Rel}} - \frac{\beta_{m\downarrow Tr}}{\beta_{m\downarrow Rel}} \geq 0;$

Moral Hazard Prediction: $\frac{\beta_{m\uparrow Tr}}{\beta_{m\uparrow Rel}} - \frac{\beta_{m\downarrow Tr}}{\beta_{m\downarrow Rel}} \leq 0$

Panel A: Large Bank Portfolios

	Transaction Banks			
	Australia	Canada	United Kingdom	United States
Relationship Banks:				
Germany				
- Ratio Value	−0.214	−0.227	−0.194	−0.576
- Chi-Square Statistic	0.941	0.896	1.072	3.513
- *P*-value	(0.331)	(0.343)	(0.300)	(0.060)
Japan				
- Ratio Value	−0.337	−0.367	−0.370	−0.768
- Chi-Square Statistic	2.153	2.142	3.098	5.397
- *P*-value	(0.142)	(0.143)	(0.078)	(0.020)
Netherlands				
- Ratio Value	−0.270	−0.286	−0.242	−0.732
- Chi-Square Statistic	0.397	0.371	0.249	1.068
- *P*-value	(0.528)	(0.542)	(0.617)	(0.301)
Switzerland				
- Ratio Value	−0.016	−0.005	0.072	−0.233
- Chi-Square Statistic	0.007	0.007	0.182	0.757
- *P*-value	(0.931)	(0.978)	(0.669)	(0.385)

Panel B: Retail Bank Indices

	Transaction Banks			
	Australia	Canada	United Kingdom	United States
Relationship Banks:				
Germany				
- Ratio Value	−0.123	−0.041	0.007	−0.400
- Chi-Square Statistic	0.320	0.020	0.002	3.074
- *P*-value	(0.570)	(0.885)	(0.962)	(0.079)
Japan				
- Ratio Value	−0.314	−0.276	−0.280	−0.658
- Chi-Square Statistic	2.184	1.003	2.732	7.703
- *P*-value	(0.139)	(0.316)	(0.098)	(0.005)
Netherlands				
- Ratio Value	−0.457	−0.398	−0.400	−0.970
- Chi-Square Statistic	0.915	0.486	0.592	1.988
- *P*-value	(0.338)	(0.485)	(0.441)	(0.158)
Switzerland				
- Ratio Value	−0.121	−0.041	0.006	−0.394
- Chi-Square Statistic	0.319	0.021	0.001	2.973
- *P*-value	(0.572)	(0.884)	(0.965)	(0.084)

TABLE 4

MEAN VALUES OF ACCOUNTING RATIOS FOR BANKS IN OUR LARGE BANK PORTFOLIOS

	Expansion	Contraction	Difference
Loans/Total Assets			
- Japan	0.539	0.599	−0.059[c]
-United States	0.568	0.647	−0.079[b]
Total Assets/Equity			
- Japan	40.94	36.83	4.10
- United States	18.28	20.20	−1.92[b]

Numbers equal the mean value of accounting ratios across the banks included in our Large Bank Portfolios, identified in Table 1. Means calculated for years designated Expansion or Contraction according to the country's Leading Indicator. Accounting data are from Moody's International Manual. [a], [b], and [c] indicate significant difference based on a T-test for difference in means at the 10, 5, and 1 percent levels, respectively.

from Moody's International Manual. We classified each fiscal year as a contractionary year if seven+ months in that year are classified as contraction based on our method above or if the last six 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. 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 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 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 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 eight country default risk betas at the 10 percent level for large banks and at the 1 percent level for the retail banks indices. Only the transactional banks in Canada, the United Kingdom, and United States show significant sensitivity at the 5 or 1 percent levels to the default risk measure. None of the relationship banks show a sensitivity to the default risk measure at the 5 percent level. (Only the Retail Bank Index for Switzerland shows a significant sensitivity at the 10 percent level.)

We summarize our findings as follows. Banking theory predicts two different responses of banks' equity betas to fluctuations in economic activity. The adverse selection hypothesis says that transactional banks' betas move cyclically. They fall during economic contractions as higher-quality borrowers switch from market debt to bank debt. They rise during booms as the better borrowers return to the public debt markets. The moral hazard hypothesis relies on relationship banks being better monitors than transactional banks. As a result, relationship banks' betas fall relative to

those of transactional banks during downturns. Our results support the moral hazard hypothesis over the adverse selection hypothesis. Relationship banks are less risky than transactional banks during recessions and more risky during booms.

We view our results as supporting asymmetric-information-based theories of banks. None of the theories that we used explicitly stated their implications for banks' equity betas. Theorists built their models to address other questions. We subjected their theories to tests they did not envision. Their theories help us understand the risk exposures and returns of banks. This constitutes stronger evidence than we could obtain from an analysis that starts with observed differences in betas, builds a theory to explain these differences, and then finds that the theory explains the findings.

IMPLICATIONS OF LEGAL SYSTEMS FOR A BANK'S EQUITY COST OF CAPITAL

So far we have used banking theory to explain international differences in banks' equity betas. A separate line of research studies the effects of countries' legal systems on the breadth and depth of their capital markets. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), hereafter LLSV, posit that countries' legal systems differ in their protection of outside investors from insiders expropriating their investment returns. Countries with legal systems that offer high protection to outside investors have more-developed equity and debt markets. Every market has both a price and a quantity dimension. LLSV study the effects of legal systems on the quantity side of the market. Their findings prompt us to inquire whether banks' equity costs of capital, the price side of the market, depend on the legal system governing outside financing. Legal systems that protect outside investors may enable them to offer money to insiders at better terms. If so, equity costs of capital may be lower in countries with high protection of outside investors.

We view an inadequate legal system that allows insiders to take advantage of outsiders as analogous to a tax on outside investors. The tax causes the rate paid by the insiders to exceed the rate received by the outsiders. The realized rate of return to outsiders is the project's gross rate of return times (1 − tax rate). A legal system with strong protections of outsiders' rights has a low tax rate. In a legal system that perfectly protects outside investors, the tax rate is zero. In this case, the rate paid by the insider equals the rate received by the outsider. This constitutes an economically efficient legal system.

If equity markets are internationally integrated, different legal systems can affect gross rates of returns on projects, but not necessarily realized rates of return to outside investors. Outsider investors allocate their money across investment alternatives in different countries to gain the highest expected rate of return commensurate with the risk they bear. As a result, projects with equal risk to outside investors, regardless of the country in which they are located, pay equal expected returns to investors. Equal returns to outsider investors require high gross project returns in countries with poor investor protections. From the law of diminishing marginal returns, high gross returns

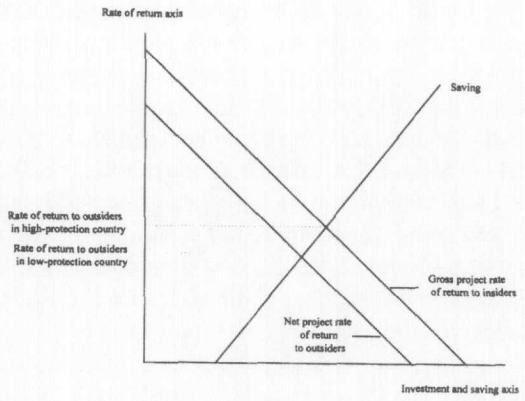

FIG. 1. Substitution Effect of Low Legal Protection on Returns to Outside Investors

are associated with low investment.[18] Even though aggregate investment is lower and gross returns are higher in low-protection countries, expected returns to investors are equal across countries with integrated capital markets. Thus, with internationally integrated capital markets, different legal systems should not affect expected returns to outside investors.

Do realized rates of return differ if debt and equity markets are internationally segmented? While a proper answer to this question requires a level of analysis that is beyond the scope of this research, we can use economic principles to make some reasonable conjectures. Figure 1 shows equity markets in two countries that differ only in their level of protections of outside investors. To abstract from other considerations that affect rates of return, we assume that the sets of investment projects, investors' risk aversions, and rates of time preference are the same in low-protection and high-protection countries. Equal sets of investment projects mean that projects with equal amounts of risk pay equal gross returns. Outside investors in the high-protection country face the same expected return schedule as do insiders. Outside investors in the low-protection country pay an expropriation tax to insiders and receive lower expected returns from any given project.[19] Their low returns induce them to invest less and consume more than their counterparts in the high-protection country. Judged just on the substitution effect, the rate of return to outsiders is lower in the low-protection country.

There is a possible offsetting wealth effect to consider. Low investment in the low-protection country reduces national wealth. As a result, outsiders consume and save

18. This is LLSV's point. They show low outside financial investment in countries with low investor protections.

19. In Figure 1 the net return to outside investors in the low protection country lies below the gross return from the project by the amount of the gross return that the insiders expropriate from the outsiders.

less. In Figure 1, the wealth effect shifts the saving schedule leftward in the low-protection country.[20] This drives upward the rate of return. Since the wealth effects and the substitution effects work in opposite directions, their net effect is ambiguous.

To test the effects of the legal system on banks' equity returns, our null hypothesis is that returns to banks' shareholders are equal between countries with low and high protection of outside investors. The alternative hypothesis is that returns differ systematically between low- and high-protection countries if they are segmented. Because of the ambiguity of the substitution and wealth effects we cannot say which countries' returns will be larger. If the legal system does not affect returns to outsiders, and if the market model describes realized returns, average returns for a period of time should be positively related to their risk.

LLSV define four measures of how legal systems protect outside investors' rights. Their rule-of-law variable is a survey-based estimate of investors' assessments of the quality of law enforcement in each country. Their antidirector-rights variable is a composite measure of whether (1) shareholders are allowed to mail their proxy vote as opposed to having to attend the shareholders' meeting in person; (2) shareholders have to deposit their shares before the shareholders' meeting; (3) cumulative voting is allowed; (4) an oppressed minorities mechanism is in place; and (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meetings is less than or equal to 10 percent. Their one-share-equals-one-vote variable indicates whether the law prohibits the existence of both multiple-voting and non-voting ordinary shares, and does not allow firms to set a maximum number of votes per shareholder regardless of the number of shares the shareholder owns. Their creditor-rights variable is a composite variable which depends on whether (1) the country imposes restrictions, such as creditor consent or minimum dividends, to file for reorganization; (2) secured creditors are able to gain possession of their security once the reorganization petition is approved; (3) the debtor does not retain the administration of its property pending the resolution of the reorganization; and (4) secured creditors are ranked first in the distribution of the proceeds from disposing the assets of a bankrupt firm.

Separately, LLSV describe four types of legal systems: English, French, German, and Scandinavian. English law is common law made by judges in specific cases and subsequently codified into law by legislatures. French, German, and Scandinavian legal systems are derivatives of Roman law which starts with legislature-written laws that are then applied to specific cases. They find that investor protections differ systematically across countries. The English law countries provide the greatest protection and the French law countries the least with the German and Scandinavian countries in between.

Among our eight countries, four have English legal systems (Australia, Canada, United Kingdom, and United States) and three have German-based legal systems (Germany, Japan, and Switzerland). The last country, the Netherlands, has a French-

20. We do not show the wealth effect shift of the savings schedule in Figure 1 because theory does not tell us the size of the shift.

based legal system. If legal systems have a systematic effect on returns, we expect to find similarities in returns within the various legal traditions.

We conduct our empirical analysis of the effects of different legal systems on banks' returns in two steps. First, for each of the eight countries in our sample we estimate a monthly time series regression of average returns for all banks in that country against the market return.

$$k_{nt} = \alpha_n + \beta_n R_{mnt} + \varepsilon_{nt}. \tag{3}$$

Here, k_{nt} is the monthly rate of return on a portfolio of bank stocks in country n (we do this separately for our large banks and retail bank indexes), and R_{mnt} is the market return in country n for month t. Regression (3) gives us an estimate of the aggregate beta for all banks' in each country. We also calculate the average return, $\bar{r}_n$, for all banks in each country over the entire sample period.

In our second step, we estimate a cross-country regression of the average return, $\bar{r}_n$, against the average beta, β_n, and one of LLSV's measures of the legal system. Because we have only eight countries, we enter LLSV's measures one at a time to preserve degrees of freedom. Our second step regression is

$$\bar{r}_n = \gamma_0 + \gamma_\beta \beta_n + \gamma_L L_i + \varepsilon_n. \tag{5}$$

Here, L_i is one of LLSV's measures of the legal system. The null hypothesis is that $\gamma_L = 0$.

Table 5 reports our results for a portfolio of large banks' stocks in panel A and for an index of all banks' stock returns in panel B. None of the intercepts or beta coefficients are significant in any of the sixteen regressions. The only significant regressor is LLSV's measure of antidirector rights. It has a significant effect on large banks' stock returns at the 1 percent confidence level, and it explains 69 percent of the variation in average returns. An increase of one unit in the antidirector rights variable increases returns at large banks by twenty basis points. It is significant for retail banks at the 10 percent level and explains 24 percent of the variation in average returns across the eight countries. A one unit increase in antidirector rights increase average returns by thirteen basis points. Banks' stock returns are higher in countries that have greater shareholder rights. Figure 2 plots large banks' average stock returns against the antidirector rights measure. There is a steady upward progression from low protection and low returns in Germany and Switzerland through the Netherlands, Japan, and the United Kingdom to the high protection and high returns in the United States. Australia and Canada are outliers as they have relatively low returns for their relatively high level of shareholder protection.[21]

If these results represent a systematic relationship between returns and shareholder protection, they suggest that markets for banks' equities were internationally seg-

21. Adjusting for risk by including beta in the regression reduces the errors associated with Australia and Canada.

TABLE 5

EFFECTS OF LEGAL SYSTEMS ON BANK'S EQUITY RETURNS

Constant	Beta	Rule of Law	Antidirector Rights	One Share = One Vote	Creditor Rights	Origin	Adjusted R-squared
Panel A: Large banks' stocks							
0.17	1.06	−0.005	—	—	—	—	−0.07
(0.05)	(1.09)	(−0.02)					
−0.08	0.67	—	0.200	—	—		0.69
(−0.16)	(1.39)		(3.49)[c]				
−0.08	1.29	—	—	−0.29	—	—	0.00
(0.08)	(1.42)			(−0.62)			
0.11	1.03	—	—	—	0.03	—	−0.07
(0.12)	(1.16)				(0.20)		
0.70	0.87	—	—	—	—	−0.23	0.17
(0.75)	(1.11)					(−1.20)	
Panel B: Portfolio of all banks' stocks							
2.39	0.93	−0.23	—	—	—	—	0.05
(0.77)	(0.76)	(−0.90)					
−0.01	0.73	—	0.13	—	—	—	0.24
(−0.01)	(0.67)		(1.50)[a]				
−0.26	1.38	—	—	0.09	—	—	−0.10
(−0.22)	(1.16)			(0.21)			
−0.12	1.03	—	—	—	0.11	—	0.04
(−0.11)	(0.87)				(0.89)		
0.23	1.08	—	—	—	—	−0.11	−0.05
(0.16)	(0.82)					(−0.51)	

Table reports coefficient estimates for an OLS regression with eight observations, one for each country (Australia, Canada, Germany, Japan, the Netherlands, Switzerland, the United Kingdom, and United States). The specification is

$$\bar{r}_n = \gamma_0 + \gamma_\beta \beta_n + \gamma_L L_i + \varepsilon_i$$

where $\bar{r}_n$ equals the average monthly stock market return for all banks in country n over the entire period. β_n equals the average Beta, and L_i equals one of LLSV's measures of the legal system. Origin equals 1 for the English law countries, 2 for the German law countries, and 3 for the French law country. In panel A, the dependent variable equals the average rate of return on a portfolio of large banks' stocks. In panel B, the dependent variable equals the average rate of return on an index of retail banks. t-statistics in parentheses. [a], [b], [c] denote significance at the 10, 5, and 1 percent levels respectively.

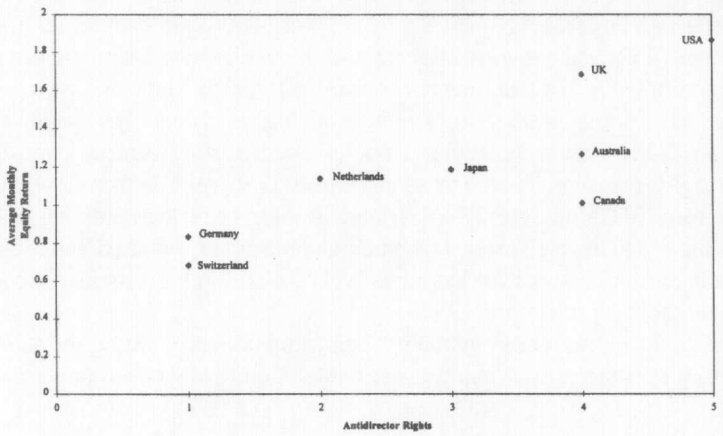

FIG. 2. Large Banks' Equity Returns versus LLSV's Antidirector Rights

mented over the sample period, and that the substitution effect of low investor protection dominated any offsetting wealth effect.

CONCLUSIONS

We have used two different theoretical frameworks to study international differences in banks' equity costs of capital. Banking theory, based on asymmetric information between a bank and its customers, implies that banks' betas should differ between economic booms and busts, and between transactional and relationship banks. Using data for banks in eight countries, we find consistent evidence that the equity market risk of transactional banks relative to relationship banks rises during economic contractions. These results support the notion that relationship banks monitor moral hazard more effectively than transactional banks. Additionally, the finding of significant default risk for only the Canadian, U.S., and U.K. banks supports the notion that relationship banks manage credit risk more effectively than transactional banks.

Legal systems theory sees international differences in the levels of protection of outside investors. La Porta, Lopez-de-Silanes, Shleifer, and Vishny argue that English legal systems offer greater protection than do German, French, and Scandinavian systems. We study the effects of each of five measures of legal protection and origin of legal system on both large and all banks' equity returns. LLSV's measure of antidirector rights has an economically and statistically significant effect on large banks' equity returns. It has a weaker and marginally significant effect on the returns of all banks. The positive relationship between antidirector rights and banks' stock returns may be worth further study.

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Comment on An International Comparison of Banks' Equity Returns, *by Philip E. Strahan*

In "An International Comparison of Banks' Equity Returns" Kathryn Dewenter and Alan Hess (DH) ask how the regulation of banks and the legal protection of creditors and shareholders affect bank stock returns. The first half of the paper contrasts the cyclical behavior of bank stock returns in countries that allow "relationship" banking with those that restrict bank powers and thus allow only "transactional" banking. The second half of the paper reports the correlation between measures of legal protections of investors and bank stock returns. I have a few comments on each portion of the paper.

The Cyclical Properties of Bank Stock Returns

Banks in countries like Germany and Japan face relatively few regulations constraining their ability to forge close ties to their borrowers. German and Japanese universal banks, for example, own equity in nonfinancial companies and actively monitor and control managers of these companies by holding one or more seats on the board of directors. Edwards and Fischer (1994, p. 206) report that eighty of the largest one hundred firms in Germany have at least one banker on the board of directors, and Prowse (1990, 1992) reports that about half of the firms listed on the first section of the Tokyo Stock Exchange have at least one representative of their main bank sitting on the board. Moreover, countries with universal banks tend to have less well developed capital markets than countries like Britain and the United States (Prowse 1996).

Regulations such as the 1933 Glass-Steagall Act in the United States, which prohibits banks from taking equity stakes in nonfinancial firms, have often been cited as the reason for the more limited role of banks here in corporate finance and corporate governance (for example, Roe 1994; Kroszner and Rajan 1994, 1997).[1] While the Glass-Steagall Act has been much analyzed as the key source of the difference between the U.S. "market-based" financial system and "bank-based" financial systems, the role of bankruptcy codes has recently begun to receive attention (Roe 1994;

1. Banks may take equity as part of a debt restructuring or bankruptcy workout but they are required to sell their holdings after a specified number of years (see Gilson 1990 and James 1995). The Bank Holding Company Act of 1956 also regulates a bank's equity ownership (Roe 1994, p. 98).

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Kroszner and Strahan 1998). Unlike banks in Germany and Japan, U.S. banks that take an active role in the management of a firm prior to bankruptcy can be subject to equitable subordination and lender liability. Under these doctrines, a bank may not only lose the seniority of claims against a bankrupt firm but may also be subject to lawsuits to pay damages to other creditors of the bankrupt firm. Kroszner and Strahan (1998) report evidence that the likelihood that a banker will sit on the board of a nonfinancial company in the United States is influenced by the potential costs associated with lender liability.

Given these differences in both the regulation of banks in particular and the treatment of creditors in bankruptcy more generally, it seems quite reasonable to suppose that banks (and other intermediaries) operating in different financial systems exhibit different propensities to take risks and monitor their borrowers through time. DH argue that credit cycles—which I will define as changes in the risk profile of banks over the business cycle—may therefore differ systematically across these groups of countries. Adverse selection effects are likely to be relatively more important in countries that prohibit universal banking (that is, countries with transactional banks) because these countries tend to have deeper capital markets, giving borrowers greater freedom to choose between bank debt and market debt. Moral hazard effects may also be more important in these countries, since direct monitoring by lenders tends to be more intense in countries that allow relationship banking.

DH test these ideas by comparing the cyclical properties of the market model β (hereafter, simply β) for a portfolio of bank stocks in eight countries, half with relationship banks (Germany, Japan, the Netherlands, and Switzerland) and the other half with transactional banks (Australia, Canada, the United States, and the United Kingdom). They find that β during upturns is typically higher than β during downturns in countries with relationship banks; they find just the opposite pattern in countries with only transactional banks.

Why should bank risk (β) vary over the business cycle? Diamond (1991) provides a demand-side reason: Borrowers from public bond markets always have the temptation to exploit their uninformed bondholders. Reputation offsets this temptation for very high-quality firms at all times. Somewhat less high-quality firms, however, may be tempted to exploit their bondholders during economic downturns by, for example, substituting high-risk assets for low-risk ones. Knowing these incentives, bondholders price this risk, so bank loans become cheaper than bonds for these relatively high-quality firms during downturns. Diamond's model predicts that the average quality of bank borrowers will improve during the downturn, thereby reducing bank risk. Consequently, the relative riskiness of banks, which DH measure by β, should decrease during economic downturns. As noted above, the selection effects are likely to matter more where financial markets are larger—typically in countries with transactional banks.

DH also argue that borrower moral hazard provides an opposing force that could cause bank βs to increase during downturns because more of a bank's borrowers will be in financial distress then. They argue that these moral hazard effects will be more important at transactional banks than at relationship banks because the relationship

banks monitor their borrowers more effectively. It is certainly true that moral hazard problems are worsened by financial distress. In fact, this is at the heart of Diamond's result: it is because moral hazard problems are exacerbated by economic downturns that relatively high-quality firms voluntarily subject themselves to bank monitoring. But for βs to increase, banks would have to become riskier relative to the market during downturns. Since financial distress exacerbates moral hazard problems for everyone, it is not at all clear why banks would become *relatively* more risky during downturns, particularly given the selection effects implied by the Diamond model.

Turning to the results, DH find, consistent with Diamond's model, that bank equity βs decline during downturns at the relationship banks, but they *increase* at the transactional banks. The increase is quite large in the United States, where β is about 30 percent higher during downturns than during upturns. In the other three countries with transactional banks, the increase in β does not appear to be statistically significant at conventional levels. I have two concerns with these results. First, DH look at changes in a bank's equity β, rather than the β for the whole firm. Since bank leverage tends to increase relative to the leverage of other firms during downturns, a bank's equity β would tend to rise during downturns *even if the riskiness of its assets remained constant.*[2] Second, since DH look at data for the period from 1984 to 1996, their results are driven by a single downturn in the business cycle. This second concern is motivated by the atypical response of the banking sector to the last recession, exemplified by the marked slowdown in bank lending. A variety of factors probably played a role in this so-called "credit crunch," including the effects of credit problems following the LDC debt crisis, large losses on banks' commercial real estate portfolios, and tightened capital adequacy standards stemming from the 1988 Basle Accord.

How important are these concerns? Table I reports a set of results based on a slightly simplified version of DH's market model regressions, augmented with a recession indicator and its interaction with the market return. The model is based on the portfolio of large U.S. banks used in DH. I have estimated the model during the DH sample period (1984–96) and during an earlier period (1976–83). The results, reported in the top half of Table 1, show that in the earlier period β is *lower* during the downturn of the business cycle than during the upturn, although not statistically significantly so. This result is qualitatively consistent with Diamond's model. During the later period, consistent with DH, I find that the equity β is considerably higher during the downturn.[3]

To see how changes in leverage over the business cycle could affect the results, consider the following simple model.

We know that

$$\beta_a = E/(E + L) * \beta_e + L/(E + L) * \beta_L$$

where β_a equals the β for the whole firm, β_e equals the equity β, β_L equals the β for the firm's liabilities, E equals the market value of equity, and L equals the market value of

2. This follows because banks operate with much higher leverage than other firms. Thus, a given change in asset values has a much greater effect on leverage at banks than at other firms.

3. Reported statistical significance is much higher in Table 1 than in the tables reported in DH because I use daily stock returns rather than weekly.

TABLE 1

ESTIMATES OF (LARGE) BANK βs IN DIFFERENT ECONOMIC ENVIRONMENTS AND CONTROLLING FOR LEVERAGE

Market Model	January 1976 through December 1983	January 1984 through April 1996
Intercept	−0.0002	0.0002
	(−0.85)	(0.96)
R^m	1.055	1.249
	(36.43)*	(55.32)*
R^m* recession indicator	−0.075	0.429
	(−1.58)	(5.64)*
Recession indicator	0.0005	0.0001
	(1.24)	(0.14)
Leverage Adjusted Market Model		
Intercept	−0.0001	0.0004
	(−0.51)	(2.12)*
R^m*$(E+L)/E$	0.034	0.047
	(34.28)*	(51.19)*
R^m*$(E+L)/E$* recession indicator	−0.008	0.014
	(5.24)*	(4.90)*
Recession indicator	0.0006	0.0002
	(1.29)	(0.26)

SOURCES AND NOTES: Daily stock return data including dividends are from the Center for Research in Securities Prices. The dependent variable equals the value-weighted return on the stocks of the following banking companies: Bank of America, Bankers Trust, Citicorp, Chemical Bank, First Chicago, J. P. Morgan, Manufacturer's Hanover, Security Pacific, and Wells Fargo. The return on the market equals the value-weighted return on all NYSE, AMEX, and NASDAQ stocks. The recession indicator equals 1 between the peak and trough of the business cycle as defined by the National Bureau of Economic Research. *T*-statistics appear below coefficients in parentheses; an asterisk denotes statistical significance at the 5 percent level.

liabilities. If we assume, somewhat heroically, that banks issue only risk-free debt, then[4]

$$\beta_e = \beta_a * (E + L)/E.$$

Substituting this into the standard market model equation, we get the following:

$$R_t^b = \alpha + \beta_a[(E + L)/E]_t R_t^m + \varepsilon_t$$

where R_t^b equals the value-weighted return on a portfolio of large banks' stock returns and R_t^m equals the return on the market. In estimating this equation, I approximate E as the product of the price of common equity and shares outstanding, summed across all of the banks in the portfolio; I approximate L by the book value of liabilities as of the preceding quarter, again summed across all banks in the portfolio. As before, I estimate the model with a recession indicator and interaction term.

The lower half of Table 1 reports the estimate of β_a after making this (very simple) leverage adjustment. During the earlier sample period, β_a is now more than 20 percent lower during the downturn than during the expansion phase of the cycle, and this de-

4. Note that one could estimate a model that allows banks to issue risky debt by modeling equity as a call option on the assets of the firm, as has become standard in the banking literature since Merton (1977) modeled deposit insurance as a put option. I present this very simple model only to illustrate the potential impact of changes in leverage on the basic findings.

crease is statistically significant at the 1 percent level. During this period, banks in the United States became markedly safer during recessions, supporting the basic notion of a credit cycle. In this 1984–96 period, however, the leverage adjustment does not change the original qualitative finding that bank risk increases during the downturn. Evidently, the cyclical behavior of β is quite different in the later period. This is not entirely surprising given the well-known problems experienced by the banking sector during the last recession.

Legal Protections of Investors and Bank Stock Returns

In the second half of the paper, Dewenter and Hess extend the literature on the impact of law on the efficiency and depth of financial markets. We now know that this is an important policy issue because differences in financial market depth are strongly related to cross-country differences in long-run growth performance (King and Levine 1993; Rajan and Zingales 1998). Moreover, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) show that legal protection of creditors' and shareholders' rights are correlated with the size of the financial sector, and Levine (1998) shows that the component of financial market depth that can be explained by legal institutions itself predicts long-run growth. In the United States, state-level growth accelerated after states deregulated restrictions on bank branching (Jayaratne and Strahan 1996).

DH explore how measures of the legal system's protection of the rights of shareholders and creditors affects bank stock returns and, by extension, banks' willingness to take risks. These measures, taken from La Porta et al., include the strength of law enforcement in the country, two variables capturing shareholders' rights (antidirector rights and one share-one vote), an index of creditors' rights, and a set of indicator variables for the country from which the legal system evolved. The authors make an important first step toward extending this literature, since we do not yet know much about the relationship between legal institutions and the kinds of investments that receive financing. La Porta et al., for instance, show that there is more financial activity when creditors' and shareholders' rights are better protected. Less is known about whether banks and other investors are more willing to take risks when their rights are better protected by the legal system.

DH find that expected returns on bank stocks are higher in countries where the legal system does a better job protecting the rights of shareholders. Of course, these results are based on only eight observations (one per country), so one wonders about their generality and statistical robustness. Moreover, while legal protection of shareholders' rights is correlated with bank stock returns in this small sample, the protection of creditors' rights is not. Given that banks are primarily creditors, this results is somewhat puzzling, but it may reflect the use of stock returns as a measure of bank risk rather than a more direct measure of the riskiness of lending. Looking at the result a little more closely, it becomes less clear whether shareholder protection matters or whether the key distinction lies in the regulation of banks. Figure 2 in DH shows that expected returns are highest at banks in the United States, the United Kingdom, and Australia (all countries with transactional banks) and lowest in Switzerland and Germany (countries with relationship banks).

Overall, the second part of the paper suggests the following extensions to this literature for future research:

(1) *What aspect of the legal or regulatory regime determines banks' willingness to take risk?* With a large set of countries, one could explore whether protection of shareholders is really the most important aspect of the legal environment. It would be useful to see a multivariate analysis that controls for the regulation of banks (are universal banks permitted?), the treatment of creditors in distressed firms (is there lender liability?), the protection of creditors (how hard is it to take possession of collateral?), and the protection of shareholders (do outside investors have strong voting rights?).

(2) *How are bank risks affected by the legal (or regulatory) environment?* Do banks simply hold less capital in some environments, or do these banks actually extend credit to riskier investment projects? This issue could be resolved by comparing the balance sheets of the banks in various countries in greater detail.

(3) *Does banks' willingness to take risk affect economic growth?* This question follows naturally from the finding of La Porta et al. (1997) and Levine (1998) that the legal environment affects the size and depth of the financial sector and that the component of financial sector depth correlated with measures of the legal environment is associated with higher long-run growth.

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