The Real Effects of Asset Market Bubbles: Loan- and Firm-Level Evidence of a Lending Channel

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Abstract

This paper studies how a shock to the financial health of banks, caused by a decline in the asset markets, affects the real economy. The land-market collapse in Japan provides an ideal testing field in separating the impact of a loan supply shock from demand shocks. I find that banks with greater real estate exposure have to reduce lending. Firms' investment and market valuation are negatively associated with their top lender's real estate exposure. The lending channel is economically important: it accounts for one-third of lending contraction, one-fifth of the decline in investment, and a quarter of value loss.

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Key Words: Bubbles; Lending channel; Bank relationships; Bank distress; Japanese banking crisis

Introduction

In recent years, there have been increasing concerns among academics and policy makers about the real consequences of large swings in prices of assets, such as equities and property. Banks, the dominant financial institutions in most countries, are an important part of the interaction between the real and financial sectors of the economy. They typically have significant exposure to the asset markets, either through their lending to the real estate sector or, in many countries, through their direct holdings of stocks and land. Therefore, the booms and busts in asset markets are likely to affect the financial conditions of banks. Thus, how shocks to bank health, as a result of volatile equity and property prices, influence corporate investment and performance is critical to our understanding of the real effect of "bubbles" (or extreme movements in asset prices).

The objective of this paper is to provide evidence of the real consequences of bubbles by identifying and quantifying the economic impact of an adverse shock to banks induced by a large decline in the asset market. There are two necessary conditions for such a "lending channel" to work. First, as pointed out by Stein (1998), banks are credit constrained as the asymmetric information problem in the capital market prevents them from issuing uninsured debt and/or equity to offset a shortage of capital. Thus a shock to the financial health of banks results in reduced lending. Second, as emphasized in the recent banking literature (see James and Smith (2000) for a survey), bank loans are special and banking relationships are valuable. Consequently, when an exogenous shock forces banks to cut back on lending, firms cannot readily substitute other sources of financing for bank lending. Thus, they face less available credit, which results in reduced investment and worse performance. These two hypotheses collectively characterize the mechanism of a lending channel through which an adverse shock to banks may affect the real sector. So far, however, there have not been any studies that directly test both of these two hypotheses.[1]

The dramatic collapse in the land market in Japan in the early 1990s provides a natural laboratory to test these two hypotheses. Between 1990 and 1993, there was almost a 50% drop in land prices. Japanese banks historically had significant exposure to the land market, both through their lending to the real estate sector and through their direct holding of land. At the end of 1989, banks on average held 6.4% of their assets in real estate loans and, if marked to market, carried 7.9% of land on their book. This institutional background helps me to overcome an important empirical difficulty in separating the economic impact of a loan supply shock from contemporaneous demand shocks, namely, the endogeneity of bank financial health to firm performance. When land prices dropped by half, a shock that is unambiguously exogenous to any individual bank, banks were hurt differentially according to their exposure to the real estate sector prior to the shock. Thus the collapse of land prices induced an exogenous variation in the financial health of banks that is unlikely to be related to firm performance.

More importantly, this setting, along with a unique dataset of matched bank-firm loans, helps to deal with another source of endogeneity, namely, endogenous selection of bank-firm relationships. For example, the same shocks that trigger banking problems may also reduce firms' investment opportunities and thus their demand for credit. In addition, the adverse shock might hurt the balance sheets of borrowers and their credit worthiness, resulting in lower borrowing capacities. If firms more affected by the adverse shock somehow are selected into banks with more real estate exposure, one would observe a spurious relationship between a shock to bank health and firm performance. This paper deals with this problem by employing a rich dataset of matched loans between banks and firms. These data allow me to exploit the fact that there are firms that borrow from multiple banks with different levels of real estate exposure. I can examine whether the *same* firm borrowing from two different banks would receive less financing from the bank with more real estate exposure.

I present two sets of results characterizing how the burst of the bubble in the property market in Japan in the early 1990s is transmitted to firms in the *manufacturing* sector, whose demand for credit is not directly affected by the shock. I first use the *individual loan level* data to show that, after fully controlling for borrower characteristics, banks with greater exposure to the real estate sector prior to the shock had to cut back lending. This result supports the view that banks are credit constrained and that an exogenous shock to banks leads to reduced lending. The second set of results is at the *individual firm level*. Japanese industrial firms receive, on average, about one-third of their loans from their largest lenders. I find that the exposure of the top lender to the real estate sector negatively affected firms' fixed investment and stock market valuation, which supports the view that reduced bank financing forces firms to pass up profitable investment opportunities. The lending channel is economically important: the shock from the real estate market accounts for almost one-third of economy-wide contraction in bank lending to the manufacturing sector and accounts for about one-fifth of the decline in fixed investment and a quarter of the drop in stock market valuation. To my knowledge this is the first study that provides large-sample loan-level evidence on how a shock to banks influences firms' investment behavior and stock market performance.[2] Moreover, based on a large sample of publicly traded firms and banks, this paper quantifies the economy-wide impact of a collapse in the property market through the lending channel.

This paper extends a few strands of empirical literature at both the micro and the macro levels. The first is the literature on valuable banking relationships, which is related to the second hypotheses discussed above. Slovin, Sushka, and Polonchek (1993), Gibson (1995), and Kang and Stulz (2000) pioneered the approach of using the effect of bank distress announcements on client firms' performance as evidence of valuable banking relationships. As is discussed in more detail later, however, the results in the subsequent work are mixed (e.g. Bae, Kang, and Lim, 2002 and

Ongena, Smith, and Michalsen, 2003). Related to the first hypothesis in this paper, a strand of literature studies how changes in monetary policy affect bank lending activities, i.e., the "credit channel" (see Bernanke and Gertler (1995) for a survey). The main challenge is to separate a loan supply effect from a loan demand effect. Recent work by Kashyap and Stein (2000) and Campello (2002) addresses this concern by exploiting variations in banks' access to liquidity to identify the credit channel of monetary transmission. The third strand of literature has used aggregate data to examine whether a bank loan supply shock affects economic activity. The results are, again, mixed (e.g., Bernanke, 1983; Gilbert and Kochin, 1989; Peek and Rosengren, 2000; Ashcraft, 2005). Some of the inconsistencies in the previous studies are likely due to the empirical difficulties discussed above. More importantly, they point to the importance of using disaggregated data at the loan level and the firm level to pin down the mechanism through which shocks to banks affect client firms so that causality can be established.

The paper proceeds as follows. The next section describes the natural experiment. Section 3 presents the loan-level evidence on the effect of a shock to banks. Section 4 presents the firm-level evidence on the effect of a shock to banks. Finally, Section 5 presents a conclusion.

I. The Land-Price Collapse as a Natural Experiment

1.1. Previous studies on the effect of bank health

Researchers have studied the second hypothesis of a lending channel, i.e., the value of durable banking relationships (see James and Smith, 2000 for a survey of this literature). Slovin, Sushka, and Polonchek (1993), Gibson (1995), Kang and Stulz (2000) pioneered the approach of examining the effects of bank distress announcements on client firm performance. Slovin, Sushka, and Poloncheck (1993) report significantly negative wealth effect of Continental Illinois Bank's de facto failure on client firms. However, they focus on only one bank, which limits the applicability of their results. Gibson (1995) and Kang and Stulz (2000), both using a sample of Japanese firms, present evidence that bank health affects firm performance, as reflected in the firm's reduced investment and lower stock market valuation. As pointed out by Bae, Kang, and Lim (2002), however, the interpretation of their results, is complicated by the fact that the bank-firm relationship itself and bank health are not necessarily exogenous to firm performance.

Recent work by Bae, Kang, and Lim (2002) and Ongena, Smith, and Michalsen (2003) is an important step forward in addressing the endogeneity problem. Both use the event-study approach and carefully examine how exogenous shocks to banks affect the equity value of their client firms but find contrasting results. Bae, Kang, and Lim (2002) find that negative news announcements about the Korean banks, including the bankruptcy of a client firm, credit downgrading, deterioration of the Bank for International Settlements (BIS) ratio, etc., have negative effects on the value of their client firms. In contrast, Ongena, Smith, and Michalsen (2003) report that bank distress announcements had only small and temporary impacts on the equity value of Norwegian firms during the Norwegian banking crisis. In addition, Djankov and Klapper (2000) find announcements of bank closure has significantly negative effects on firms in Korea but not in Indonesia and Thailand. The advantage of the event-study approach is that, to the extent that the news announcements are unanticipated, it is possible to interpret the results from the event studies in a causal sense. The event-study approach, however, limits the scope of the analyses and does not provide evidence on the real impact of banking problems.

Related to the first hypothesis of a lending channel, a strand of literature studies how shocks induced by changes in monetary policy affect bank lending activities, i.e., the "credit channel" (see Bernanke (1995) for a survey). Bernanke and Blinder (1992), Kashyap, Stein, and Wilcox (1993), and Hoshi, Sharfstein, and Singleton (1993) present evidence that bank loan volumes decreases during monetary contractions and the latter two papers further document a rise in commercial paper issuance during such times. The main challenge is to identify the impact of a loan supply shock from contemporaneous loan demand-side shocks. Kashyap and Stein (2000) address this challenge by demonstrating that more liquid (large) banks are less likely to reduce lending during monetary contractions than are less liquid (small) banks. In a recent paper, Campello (2002) further exploits the differential responses of small banks with and without multi-bank holding company affiliations. The evidence suggests that internal capital markets in bank holding companies weakens the impact of monetary policies on bank lending.

Using aggregate data, some studies have examined whether a bank loan supply shock affects economic activity. The results are, again, not conclusive. Using data from the Great Depression, Bernanke (1983) and Calomiris and Mason (2003) find a significant impact of bank loan supply shock on real economic activities. Peek and Rosengren (2000) document the negative effect of the Japanese bank crisis on construction activity in the United States in the 1990s. On the other hand, Driscoll (2003), Gilbert and Kochin (1989), Clair (1994), and Ashcraft (2003) do not find significant evidence that bank failure / monetary contractions are followed a decline in output.

Some of the inconsistencies in the previous research findings are probably related to the two endogeneity problems discussed in the introduction. This paper seeks to identify a source of exogenous shock to bank health and, exploiting disaggregate data at both the loan level and firm level, to examine the mechanism through which an adverse shock to bank health affects corporate investment and performance.

1.2. Institutional Background and the Natural Experiment

Land prices in Japan almost tripled in the second half of the 1980s. At its peak in 1990, the market value of all the land in Japan, according to several estimates, was four times the land value of the United States, which is 25 times Japan's size (Cargill, Hutchison, and Ito, 1997). The boom was followed by an equally sharp fall in the early 1990s. Between March 1990 and the end of 1993, the price of land dropped by almost one half. Meanwhile, stock prices in Japan experienced a similar pattern of boom and bust.

Japanese banks had significant exposure to the land market. They actively lent to the real estate sector: at the end of 1989, real estate loans on average constituted 6.4% of the total assets (the median was 5.0%). Banks also held land directly: at the end of 1989, the market value of land as a percentage of total bank assets averaged 7.9% (the median was 4.8%). When the land value dropped by half, many of these real estate loans went bad and banks suffered significant capital losses on the land they held.[3]

The shortage of capital was exacerbated by another development in the 1990s, that is, the tightening of capital requirements due to the introduction of Basel Accord in 1993. During the rest of the 1990s, Japanese banks came under increasing pressure to meet the capital requirements. Although the interest rates were low in Japan in the 1990s, the tightening of capital requirements means that, as long as capital market imperfections prevent banks from issuing equity, the capital losses in real estate will be translated into less loanable funds.

Such a setting, along with a rich dataset of matched lending between banks and firms, provides an excellent laboratory to examine the transmission mechanism of a shock to banks. It helps to deal with the endogeneity problems commonly encountered in separating the effect of a loan supply from demand-side shocks, namely, endogeneity of bank health and endogenous selection of banking relationships. Regarding the endogeneity of bank health to firm performance, when land prices dropped by one half, banks were hurt proportionally to their exposure to the real estate sector immediately prior the shock. Thus, the shock induced an exogenous variation in bank health that is plausibly exogenous to firm performance. Regarding the endogenous selection of bank-firm relationships, since the real estate exposure is not an indication of bank quality ex ante, this setting mitigates the concern of selection of banking relationship by firms. Moreover importantly, with a unique sample of matched lending between borrowers and lenders, I can examine whether the *same* firm borrowing from two different banks would obtain a smaller amount of loan from the bank with more real estate exposure, which controls for the endogenous selection of banking relationships.

One institutional factor that might affect my tests is the liberalization of the bond market in the 1990s. Before 1990, the public debt market was highly regulated and issuing firms had to meet strict accounting criteria. In November 1990, all the official restrictions were lifted. Therefore, it is possible that an observed relationship between banks' real estate exposure and lending may not be due to weakened financial conditions of banks but due to reduced demand for bank loans as firms rely more on bond financing. This concern, however, should not affect my loan-level lending tests because the matched bank-firm lending data allows me to fully control for (observable or unobservable) firm characteristics by examining how lending to the *same* firm changes when its banks' real estate exposure varies.

Access to the bond market may, however, affect the firm-level tests of investment behavior and stock returns. The public bond market may provide firms with an alternative source of financing to make up for the decline in bank loans, reducing the impact of the lending channel. On the other hand, if access to bond market means loosened banking relationships and if, during an economic downturn, the bond market is not as liquid and thus is not a viable alternative, access to the bond market may even lead to a more severe shortage of financing. Thus the impact of access to the bond market is not ex ante clear cut. As discussed later in the empirical analysis, probably reflecting the two offsetting effects, access to the bond market does not have significant impact on in firm-level investment and stock returns.[4] Moreover, controlling for bond-market access does not alter the main results about the lending channel.

Overall, the collapse in Japanese land market provides a unique setting to test both of the two hypotheses related to the transmission mechanism of a shock. In what follows, I first provide evidence on the credit constraints of banks based on the loan level data with matched borrowers and lenders. Then I provide evidence on the real impact of the shock using firm level data.

II. Loan Level Evidence on the Effect of a Shock to Banks

In this section I test the first hypothesis on the transmission mechanism of a shock to banks, that is, banks are credit constrained. When they are hit by an exogenous shock, they can not find enough financing to make up for a shock-induced shortfall in funds. In the current setting, the testable hypothesis is that banks with greater exposure to the real estate sector become less healthy and therefore are more likely to reduce lending after the shock.

2.1 Empirical methodology

To identify how banks' financial condition affects bank lending, I first need an exogenous measure of banks' financial health. As discussed earlier, when land prices dropped by half between 1990 and 1993, an exogenous shock to any individual bank, banks suffer varying degrees of capital losses according to their pre-shock exposure to the real estate sectors. Thus the banks' pre-shock real estate exposure serves as an exogenous measure of banks' financial health.

Then if firms are randomly assigned to banks, the analysis would be straightforward. I could simply focus on lending behavior of banks with and without much real estate exposure. Any difference between the two groups can be attributed to the effect of bank health induced by the land-price collapse. However, firms are not randomly assigned to banks. One can easily construct examples where endogenous selection of banking relationships might drive an observed relationship between bank financial condition and firm performance. One such example is that "bad" firms (e.g., with less investment opportunities) choose to borrow from weak banks to avoid monitoring and discipline. Both these "bad" firms and weak banks are more vulnerable to external economic shock, leading to a spurious relationship between bank financial health and firm performance.

In general, an important challenge in separating the effect of a bank loan supply shock is to control for unobserved firm characteristics that might affect loan demand. For example, the same shocks that trigger banking problems may also cause a decline in the investment opportunity of firms and thus the demand for credit by firms. In addition, the adverse shock might hurt balance sheets of borrowers and their credit worthiness, which leads to reduced lending. If firms more affected by the adverse shock somehow are selected into banks with more real estate exposure, one would observe a spurious relationship between shocks to bank health and firm performance.

My empirical strategy is to employ a rich data set of matched lending between lenders and borrowers, which allows me to exploit the fact that there are firms that borrow from multiple banks. Using these firms, I can examine whether the *same* firm received less financing from the unhealthy bank and more from the healthy bank. In a regression framework, the idea is to fully control for the firm characteristics (both observable and unobservable) through the firm fixed effects and therefore isolate the effect of a shock to bank health on lending. Specifically, I estimate the following model:

$$Lending_{ij} = a + b\ RE\ Exposure_i + c\ Bank\ controls_i + d\ Relationship\ characteristics_{ij} + u_j, \qquad (1)$$

where subscript i indexes the banks; j indexes the firms; and u_j is the firm fixed effects.

The dependent variable, $Lending_{ij}$, is a measure of lending from bank *i* to firm *j* between 1994 and 1998. I measure the availability of credit using the log of loan growth defined as the log of a firm's average long-term borrowing from a particular bank between 1994 and 1998 normalized by the average long-term borrowing from the same bank during the five years prior to the shock between 1984 and 1989. This focus on long-term lending is because, as pointed out by Hibara (2001), long-term loans are mainly associated with financing of Japanese corporate fixed investment. Since it is difficult to know how long it takes for the real estate losses to show up in lending, I examine the average lending five years after the shock. The bank control variables, which will be introduced shortly, are also averaged across years.

Using the amount of borrowing to measure credit availability implicitly assumes that the amount of debt used is the amount of credit available to the firm. This assumption is defensible for two reasons. First, after the collapse of stock and land prices, banks, facing mounting non-performing loans, had to tighten credit. On the borrower's side, as most bank loans were backed by land as collateral, the collapse in land prices significantly reduced the firms' ability to collateralize, resulting in tighter credit constraints. The contractual features of long-term loans necessarily mean that the loan balances adjust more slowly than desired by the lender. Therefore, after loan demand is controlled for, a large loan balance can arise both from the lender's willingness to lend and from lending decisions in the past. Normalizing loan balances by the amount borrowed in the earlier years helps separate out the effect of prior lending decisions.

RE Exposure is the bank's exposure to the real estate sector, which is used to measure banks' financial health. It includes two variables. The first is the bank's real estate loans as a percentage of its total assets, measured in 1989, the year prior to the shock *(% Real Estate Loans*). The other is the market value of land the bank held at the end of 1989 as a percentage of its total assets (*% Land Holding*). As only the book value of land is available, I follow Hayashi and Inoue

(1991) and use perpetual inventory method to construct the market value of land.[5] The coefficient *d* captures the effect of the shock to bank health on lending and is expected to be negative.

Bank control variables are fairly standard, including bank size, Tobin's q, and liquid assets over total assets. Bank size is measured as the natural log of total assets. Tobin's q, defined as market-to-book value of the asset, measures banks' market power or franchise value. The effect of Tobin's q on lending, however, is ex ante unclear. On one hand, to the extent that Tobin's q reflects future investment opportunity, it should be related to more lending. On the other hand, franchise value has been shown to be (negatively) related to banks' incentive to take risk. This is because, with deposit insurance (implicit or explicit), bank owners tend to take excessive risk as their payoff resembles a call option whose value increases with the risk (see e.g., Keeley, 1990 and Gan, 2004). Franchise value is something banks would lose in case of failure and thus constrains risk taking. To the extent that lending represents risks, higher franchise value would be associated to less lending, as is found in the U.S. data by Demsetz, Saidenberg, and Strahan (1996).

The liquidity of the bank's balance sheet is measured as liquid assets over total assets. Kashyap and Stein (2000) find that banks with more liquid assets are less likely to reduce lending during monetary contractions. Liquid assets, however, can also lead to less lending, for two reasons. The first is related to the risk-shifting incentive discussed above. To the extent cash reflects past profitability and may predict future profitability (i.e., franchise value), banks with more cash may be more conservative in lending. The second reason is related to precautionary saving. Dasgupta and Sengupta (2004) show that, in a multi-period setting, if firms anticipate being credit constrained in the future, an increase in liquid balances may make them more conservative in investment choices. Empirically, Almeida, Campello, and Weisbach (2004) find that firms tend to save more during recessions. Thus the effect of liquid assets on lending is ex ante ambiguous.

I include in the regressions a set of variables reflecting the strength of the lending relationship in the ten years (1984-1993) prior to my sample period. The first dimension of the relationship is its duration. This should be a proxy for the private information the lender has about the firm. Petersen and Rajan (1994) and Berger and Udell (1995) demonstrate explicitly that firms with long-term relationships with banks receive more credit from these banks and pay lower interest rates on loan commitments.

My second measure of the strength of the relationship is a dummy variable indicating whether the bank was the firm's biggest lender at least once from 1984 to 1993. Sharpe (1990), Rajan (1992) point out that relationship banking also increases the lender's information monopoly and creates “hold-up” costs and that firms can avoid these hold-up costs by establishing relationships with another bank. Japanese firms borrow from multiple banks. During the ten-year period between 1984 and 1993 prior to the sample period, Japanese firms borrowed from 16 banks on average with a median of 14 banks. Japanese firms, however, did not spread their borrowing evenly across all banks. They on average borrowed about one-third from a single institution. Even firms with over 10 lenders concentrated about 20% (the mean is 22% and the median is 20%) of their borrowing with their largest lenders. Therefore, whether or not the bank is the largest lender signifies how close the firm is to the bank.

Another way to mitigate the “hold-up” problem and to ensure bilateral commitment between the lender and the borrower is for the lender to take an equity stake that allows sharing of future surpluses with the borrower, which is a common practice of Japanese banks. Therefore, the third dimension of the relationship that I include in the regression is the percentage of equity stake that the bank has in the firm. Lastly, the institutional setting in Japan suggests that main banks obtain additional information on the group-affiliated firms. Therefore, I include a dummy variable indicating whether the bank is the firm's main bank.

In my sample, of all the firm-bank pairs in 1989, about 35% did not have a lending relationship during the after-shock period between 1994 and 1998. To correct for potential survivorship bias, I estimate a selection model using Heckman's (1979) two-stage regression. The first stage is a probit regression on whether the relationship survived; the second stage is an ordinary-least-squares regression on the log of loan growth. To the extent that the credit allocation is a two-step process in which the bank first makes a decision as to whether or not to lend and then makes a decision as to how much to lend, the selection model provides insight to both decisions. In addition, the bank characteristics prior to the shock is more likely to affect the first lending / no-lending decision whereas the contemporaneous bank characteristics tend to affect the second decision more. Therefore, in the first-stage regression, bank controls are measured in 1989, which naturally serve as instruments to help identify the second-stage regression. In all estimations, I report White heteroskedasticity-consistent standard errors. The results are robust to the GLS estimation with bank random effects accounting for dependence of the error terms due to the unobserved effect at the bank level.[6]

2.2 Data

The main data source is Development Bank of Japan (DBJ) database. I collect, from this database, data on long-term lending from individual banks to manufacturing firms (Development Bank of Japan Industry Code 1000-1700) and financial data of these manufacturing firms. The data include all publicly-traded manufacturing firms and their banks. Financial data on banks is from the NIKKEI NEEDs database. I identify each firm's main bank using *Industrial Groupings in Japan: the Anatomy of Keiretsu* by Dodwell Marketing Consultants.[7] Panels A and B of Table 1 present the summary statistics of the relationship-related variables and bank control variables used in the loan-level analysis.

It is worth noting that my sample does not include real estate firms, whose demand for loans is directly affected by the shock from the real estate market. Moreover, it has been reported that Japanese banks "ever-green" their loans by lending to weak firms, many of them real estate firms, to prevent their loans to go bad (e.g., Hoshi and Kashyap, 2004; and Peek and Rosengren, 2005). Indeed, lending to the real estate sector steadily increased from the early 1990s till 1998. Therefore, excluding real estate firms increase the power of the tests.

2.3 Empirical Results

Column (1a) of Table 2 reports the first-stage probit regression results. The dependent variable equals one if the relationship continues after the shock and zero otherwise. The independent variables are measured at the end of 1989. Relationship variables are important in determining the change in loan renewals. Duration, being the largest lender to the firm, and being the main bank of the firm all increase the chance of loan renewal significantly (at the 1% or 5% level). As expected, the banks' real estate exposure prior to the shock has a significantly negative effect on loan growth: the coefficients on both *% Real Estate Loans* and *% Land Holding* are significantly negative at the 1% level. Probably reflecting the two opposing effects of Tobin's q, its coefficient is insignificant.

Column (1b) reports results from the second-stage OLS regression, which is estimated based on the subgroup of firm-bank observations that have continued lending relationships. Among the relationship variables, being the biggest lender and being the main bank are related to more financing (at the 1% or 5% level). The coefficient of duration, however, is significantly negative. This could be reflecting that some of the loans granted earlier have been paid back. Compared to its effect on the loan renewal decision, banks' real estate exposure has a somewhat weaker impact on the actual credit allocation. While the coefficient on *% Real Estate Loans* is significant at the 1%

level, the coefficient on *% Land Holding* is insignificant. The difference between these two exposures to the real estate sector is probably due to the fact that when real estate loans go bad they have a direct impact on the available funds, whereas land holding, to the extent that they are not marketed to market, is more of a paper loss. The coefficient on liquid assets is significantly negative, which is consistent with the risk-shifting and the precautionary-saving incentives discussed earlier. Note that this result is in contrast to the findings in Kashyap and Stein (2000) that liquid assets weaken the effect of monetary contractions. Thus, while a more liquid balance sheet can buffer small loan supply shocks (e.g., due to changes in monetary policy), the role of liquidity is more complicated when the bank is hit by a large shock.[8]

In columns (2a) and (2b) of Table 2, I further explore how the banks' capital positions affect lending. In particular, if a bank is well capitalized, the impact of losses from its real estate exposure should have a smaller effect on loan growth. Therefore, I create a dummy variable (*BIND*) indicating if the bank's capital ratio in 1989 was below the *4%* capital requirement and let it interact with the two real-estate-exposure variables.[9] In the selection equation in column (2a), although the capital ratio itself is not significant in explaining loan renewal, the interaction between the *BIND* dummy and *% Real Estate Loans* is significantly negative at the 10% level. In column (2b), the coefficient on the capital ratio is significantly positive (at the 5% level); the coefficients on the interaction terms are not significant. Other coefficients on the bank's real estate exposure remain qualitatively unchanged.

2.4 Robustness: the effect of bank specialization

An alternative interpretation of the above results is related to bank specialization.[10] Suppose firms have different types of loans served by different banks. For example, a firm may use Bank 1 for its real estate related loans and Bank 2 for, say, capital expenditure. Then with a fall in the real estate market and thus real estate related activity, there is less demand for real estate loans, leading to reduced lending by Bank 1 with more observed "real estate exposure."

This argument is particularly relevant for real estate firms, since their demand for credit is closely tied to the real estate market. This concern, however, is greatly mitigated by the fact that my sample contains only manufacturing firms, not real estate firms. For manufacturing firms, real estate is an input into the production process (e.g., plants and structures) and should mostly be part of their fixed investments. Thus even if firms fund their real estate from one particular bank, as long as real estate borrowing is proportional to the total borrowing, the change in demand for loans from this "real estate bank" will not differ from other banks.

The concern about specialized real estate lending is further mitigated by the fact that the Japanese banks are large and therefore less likely to be specialized (which is typical of a "bank-centered" economy.) During my sample period, their average size is, if converted to U.S. dollars, approximately 80 billion. The smallest bank in the sample has assets of approximately 1 billion U.S. dollars. The Japanese banks are required to report their loans to different sectors, e.g., manufacturing loans, real estate loans, loans to individuals, etc. I thus calculate the concentration ratio of the largest loan category, defined as the loan amount in the largest category as a percent of total loans. I find that the maximum concentration ratio is slightly above two-thirds (36%), with the 90 percentile concentration ratio being slightly above a quarter (28%). Moreover, only 8% of banks have real estate loans as the largest category and among these banks, the real estate loans, on average, account for 25% of total lending. Therefore, it is unlikely that small and specialized real estate banks are driving my results.

To further confirm the robustness of my results, I perform the following test. If specialized real estate lending to the industrial firms - not bank financial health - is driving the results, then, if I could identify a subset of banking relationships that are not likely to be driven by specialized real estate lending, the earlier results would not hold for these relationships. One such relationship is that between a firm and its top lender. As discussed earlier, Japanese firms source one-third of their borrowing from the top lender. Since real estate activities unrelated to fixed capital expenditure must be a small proportion of their overall borrowing, borrowing from the top lender should not be specialized real estate loans. To implement this test, I create an interaction term between the dummy for top lenders and the lender's real estate exposure and include it in the estimation. If the specialized real estate lending hypothesis is true, one would expect the coefficient on the interaction term to be positive so that the sum of the coefficients of real estate exposure and the interaction term is not significantly negative. The results are displayed in columns (2c) of Table 2. The coefficient of the interaction term is not positive, indicating that specialized real estate lending does not explain my earlier results about the effect of bank health. Interestingly, the interaction term is significantly negative, implying that, although the top lenders generally lend more, the marginal benefit firms get from their top lenders decreases as the top lenders have more real estate exposure and therefore become financially less healthy. This result therefore strengthens the base finding that banks' financial health matters.

While bank specialization per se does not seem to affect my tests, one may be concerned with some pre-sorting of lending relationships that cannot be completely controlled for by firm fixed effects. For example, some banks may have a comparative advantage in funding certain types of loans within industrial loans, e.g, operating funds as oppose to non-operating funds (equipment funds). If this type of loan is somehow "out of favor" after the shock and if this less favored loan type is somehow related to banks' real estate exposure, my earlier results could be driven by a systematic switch of loan types rather than by banks' financial condition. Although it is not obvious why for large and unspecialized banks, their engagement in certain *industrial* loan types are systematically related to their lending to the real estate sector or their land holding, it is worthwhile to check for robustness if relevant data is available. Japanese banks report their lending as operating funds v. non-operating (equipment) funds. As a robustness check, I include the percentage of operating funds prior to the shock (a bank level variable) in the estimation. The results are reported in column (2d) of Table 2.[11] It turns out that operating funds have a negative impact on overall lending. This suggests that, when faced with tighter credit, firms economize on their operating funds (e.g., by cutting down on general office expense or advertising spending) before curtailing investment in productive capacity. The coefficients on the real estate exposure remain unchanged, implying that, while the shock might affect the loan demand mix, this phenomenon in itself does not drive the observed effect of banks' financial health.

2.5 Discussions: the Impact of the Contemporaneous Stock Market Collapse

While it is prohibited in some countries, in Japan, banks typically hold equity in their client firms. It is possible that banks' losses in security holdings lead to worsened financial conditions in a similar way as their real estate exposure. Therefore, to gain a complete picture of the real effects of asset market bubbles, I explore the impact of the bank's stock market exposure.

There are, however, several factors that make it unclear how banks' equity holdings might matter empirically. First, as market value accounting is only a recent concept, the "paper losses" from equity holding may not affect bank liquidity and capital position. Second, banks' equity holdings are typically long - many equity stakes were purchased as early as the 1950s (Hoshi and Kashyap, 2001). With historical cost accounting, the holding period return is not negative even with the bursting of the bubble.[12] In such cases, banks may sell their stock holdings in an effort to strengthen their capital positions, since the capital gain can count as capital under "revaluation reserves" in the Basle Accord capital requirements. Third, while equity holding represents the bank's stock market exposure, it may also measure the strength of its client relationships, especially with its larger clients. In identifying the real impact at the firm level, I focus on the firm's most important lending relationship – the one with its top lenders. Thus my ability to identify a real impact depends critically on how banks cut back lending across firms. For example, if banks cut back lending in equal yen amounts across firms, I may not be able to detect a real impact since there is not enough cross-firm variation in reduction of loans and thus investments.[13] This is all the more likely to happen when loan cutbacks are due to losses in banks' equity holdings: banks with larger equity holdings may be more protective of their large and more dependent borrowers, resulting in an seemingly insignificant real impact on firms. Lastly, empirically quantifying this effect is made difficult by the fact that only book value of share holdings are reported, which is a noisy measure of banks' losses in the stock market.

In columns (3a) and (3c) of Table 2, I add as an independent variable the bank's stock market exposure, measured as its equity holding as a percent of total assets prior to the shock in 1989 (*% Stock Holdings*). I also control for whether the bank sold their equity holdings between 1989 and 1993 (*SOLD*). I find that while the bank's equity holdings do not significantly affect the decision to renew loans, they are associated with significantly less lending overall (at the 1% level). The coefficient on the *SOLD* dummy is statistically insignificant. This is probably because banks may have sold their equity holdings for different reasons. On the one hand, banks might sell because they are desperate to come up with capital to meet the regulatory requirements, in which case SOLD is likely to be related to more cutbacks in lending. On the other hand, banks might have accumulated a larger capital gain, which makes selling a cheaper alternative to other ways of raising capital, in which case SOLD should be related to a smaller reduction in lending. Interestingly, the coefficient on bank's land holding now becomes significantly negative. This appears to be related to the fact that banks with greater land holding are more likely to sell their equity holdings to make up for the capital loss, reducing the impact of the bank's land holding in the earlier estimation. Indeed, those banks that sold their equity holdings on average have land holding of 25%, as compared to the 6% land holding among those that did not sell.

In sum, the banks' real estate exposure prior to the shock negatively affects lending in two important ways: it not only lowers the chance of loans being renewed but also reduces the amount of credit actually being granted. A question naturally arises: does such reduction in loans affect the client firms' investment behavior? This issue, as well as the real impact of the bank's stock market exposure, is examined in the next section.

III. Firm Level Evidence on the Effect of a Shock to Banks

With firm-level data, this section examines the second hypothesis related to the transmission of the shock to banks, that is, reduced lending results in less fixed investment and worse firm performance. As discussed earlier, Japanese firms borrow close to one-third of their loans from their largest lenders. When the top lender is hit by the real estate shock, if the firm can not substitute other sources of financing for funds that are previously provided by the top lender, the firm would have to cut back its investment. To the extent that firms have to pass by positive-NPV projects, their market valuation will be lowered. Therefore, in what follows, I investigate whether the pre-shock real estate exposure of the firm's top lender is related to the firm's fixed investment and stock market returns in the period subsequent to the land-price collapse.

3.1. Top lender's real estate exposure and firm investment

3.1.1 Empirical specification

To examine whether the top lender's real estate exposure negatively affects the firm's ability to invest, I estimate the following baseline model:

$$I/K_j = a + bQ_j + cCash/K + d\%Real\ Estate\ Loans_j^{Top} + e\%Land\ Holding_j^{Top} + fControls_j + \varepsilon_j, \quad (2)$$

The dependent variable, *I/K*, is measured as the average investment rate for the period 1994-1998, reflecting, again, the fact that it is difficult to know how long it takes for the shock to take effect. Accordingly, the firm-level variables are also averaged across years unless otherwise specified. The main variables of concern are the top lender's real estate exposure, measured as the real estate loans of the firm's top lender ($\%\ Real\ Estate\ Loans^{Top}$) and the top lender's land holding ($\%\ Land\ Holding^{Top}$). Since my loan-level analysis suggests that the bank's capital position matters, I also control for the bank's capital ratio in 1989. The coefficients *d* and *e* are expected to be negative.

Firm controls include the usual set of variables in an investment equation: I have Tobin's q to measure investment opportunity, the cash flow and the cash reserve normalized by the capital stock to measure internal liquidity, and industry dummies to control for industry-wide shocks. In a recent study, Gan (2004) finds that fixed investments by Japanese firms were negatively related to their land holding prior to the shock, a measure of collateral losses they suffered. I therefore control for the firm's land holding in 1989, defined as market value of land normalized by the capital stock. I also control for the timing of the land purchase, measured by the proportion of land (in market value) purchased between 1988 and 1990, the period of rapid land price increase.

Lang, Ofek, and Stulz (1996) find that future growth and investment are negatively related to leverage, particularly for firms with high debt ratios. In the current setting, the effect of firms' collateral losses may also depends on firm leverage, with highly leveraged firms investing less due to more binding borrowing constraints. I therefore control for leverage and also create a dummy variable indicating leverage above the median and let it interact with firm land holding. Panel C of Table 1 presents a summary of the variables used in the firm-level analysis.

Regarding the estimation technique, note that the investment rate is right-skewed, with the median being about one-third of the mean. When I estimate the investment equation using an ordinary-least-squares (OLS) regression, I find that the distribution of the residual is still skewed, suggesting that the OLS estimators are not efficient. Therefore, I estimate the median or least absolute distance (LAD) regressions. LAD minimizes that sum of the absolute deviations rather the sum of the squared deviations. Therefore, it is less sensitive to the tail of the distribution or to outliers. Additionally, since for skewed data the median is generally a more efficient measure of the center of the data than does the mean, the precision of the estimates will also increase.[14] Koenker and Bassett (1978) show that the regression median is more efficient than the least squares estimator in a linear model for any distribution for which the median is more efficient than the mean in the location model. The standard errors are calculated based on the method suggested by Koenker and Bassett (1982).

3.1.2 Data

The firm-level data mainly come from the tapes compiled by the Development Bank of Japan (DBJ). The DBJ database contains detailed accounting data on all non-financial firms listed on various stock exchanges from 1956 onwards. For investment analyses, the DBJ database has several advantages over the NIKKEI NEEDS database, a popular database used in Japanese economic studies. It provides a detailed breakdown of five depreciable capital goods, as well as asset-specific gross and current period depreciation, which together enable a more accurate calculation of the replacement cost of capital and the investment rate net of asset sale. This is why

Japanese data have been used frequently in tests of investment models (e.g., Hayashi and Inoue 1991). The stock market data are from the NIKKEI NEEDS database.

The sample contains all manufacturing firms in the DBJ database for which stock market data are available for the period 1986-98 and information on the top lender's real estate exposure is available for 1989. I drop from the analysis firms that do not have enough data to construct a capital-stock measure or have missing stock price data, firms that were involved in mergers and acquisitions between 1989 and 1998, and, if a firm changes its accounting period, the year in which such a change occurs. The Japanese fiscal year ends in March. However, many firms file late in the year. I follow the standard approach and define the fiscal year for a particular observation as the previous year if the firm filed before or in June, and as the current year if the firm files after June. The final sample contains 420 firms.[15]

3.1.3 Empirical results

Column (1) of Table 3 shows that the real estate exposure of the firm's top lender, as measured by real estate loans, has a significantly negative impact on fixed investment (at the 5% level). The coefficient on land holding of the top lender is statistically insignificant. As is discussed below, however, the coefficient is significant for the less capitalized lenders. The top lender's capital ratio prior to the shock is positively associated with the investment rate of the borrowing firm (at the 10% level), suggesting that all else equal, better capitalized banks are able to lend more.

Consistent with Gan (2004), the firm's land holding prior to the shock is related to a lower investment rate (significant at the 1% level). The coefficient on the interaction term between the high leverage dummy and firm's land holding is, as expected, significantly negative (at the 1% level). To the extent that land serves as collateral for corporate borrowing, the shock also worsens the borrower's balance sheet position and thus their ability to borrow, especially when they are already high leverage. These results suggest a collateral channel a la Bernanke and Gertler (1989 and 1990) and Kiyotaki and Moore (1997) and strengthen the argument that, in a test of the impact of the financial health of banks, it is important to control for the borrower's "balance-sheet effect". Lastly, the coefficient on leverage is significantly positive at the 10% level, probably because in a bank-dominated economy and at a time of severe credit rationing, how much firms can borrow also proxy for firm quality and/or lending relationships. However, leverage does hurt growth in the sense that it worsens the impact of collateral losses.

In column (2) of Table 3, I control for firm's access to alternative sources of debt financing, i.e., its access to the public bond markets. As pointed out by Hoshi and Kashyap (2001), after the liberalization of the bond market, Japanese firms need at least an investment grade (i.e., a rating equivalent to S&P's BBB rating or higher) to issue public debt. I code a dummy variable indicating whether or not a firm meets these criteria at least four years out of the five-year period during 1994-1998 and include it in the estimation.[16] Consistent with the earlier discussion that the effect of access to the bond markets is not ex ante clear-cut, the coefficient on access to the bond markets is not statistically significant.

The impact of the top lender's pre-shock exposure to the real estate sector may depend on how concentrated the firm's borrowing is on this lender. The more the firm relies on its top lender, the more it will be hurt when this lender has to cut back lending. Therefore, in column (3) of Table 3, I control for the concentration of borrowing from the top lender, defined as the top lender's share in the firm's total long-term loans outstanding. I also create a dummy variable indicating if the concentration is above the median and let it interact with the two measures of real estate exposure. Note that this specification also addresses a potential alternative explanation of the earlier results: if firms happen to concentrate their borrowings more on top lenders with greater real estate exposure, perhaps because these banks had more funds to spare in the late 1980s, the earlier findings may merely reflect such concentration in borrowing rather than the effect of the top lender's real estate exposure. As shown in column (3) of Table 3, the concentration of loans from the top lender does have a negative impact on firm investments (at the 1% level). However, neither of the two interaction terms is significant and, by an F-test, I cannot reject the hypothesis that they are jointly insignificant in explaining firm investment (p-value = 0.3115). On the other hand, the results on the real estate exposure remain unchanged.

Next I examine how the effect of the top lenders' real exposure depends on the bank's capital position prior to the shock. In column (4) of Table 3, I create a dummy variable, *BIND*, indicating whether or not the bank had a capital ratio lower than the *4%* requirement and let it interact with the two measures of real estate exposure. The interaction term between the *BIND* dummy and the top lender's land holding is significantly negative (at the 10% level), suggesting that the insignificant coefficient on *% Land Holding* in the earlier specifications is driven by those better capitalized lenders. When the top lender is not well capitalized, its exposure due to direct land holding hurts a client firm's ability to invest. On the other hand, the interaction term between the *BIND* dummy and *% Real Estate Loans* is not statistically significant, suggesting that the negative impact of exposure due to real estate lending does not vary significantly across lenders with different capital positions.[17] The difference between the two coefficients on real estate exposures is similar to that in the loan-level tests, consistent with the earlier conjecture that losses from real estate loans dry up funds more directly and therefore are more related to the bank's ability to grant loans.

Lastly, I explore the real effect of the top lender's stock market exposure. In column (5) of Table 3, I control, similar to Table 2, the top lender's equity holdings *(% Stock Holdings)* and a dummy variable indicating whether the bank sold its equity holdings *(SOLD)*. Neither of the two variables is statistically significant. Consistent with my earlier conjecture that equity holdings reflect the bank's relationships with their clients, the bank seems to be reluctant to cut back loans to those who are dependent on them. To further explore this possibility, I include in the lending equation an interaction term between the top-lender dummy and the bank's equity holdings, the coefficient is positive but not statistically significant (unreported). Thus, unlike the bank's real estate exposure, a significant number of banks, when faced with stock market losses, tend to cut proportionally less loans to more dependent borrowers and thus squeeze smaller borrowers more. Therefore, even if there is a real impact of the lending shock, such an impact is hard to be detected *across* firms. Another reason for the insignificant stock market effect may simply be that the book value of equity holding is a noisy indicator of the bank's true stock market exposure and thus reduces the statistically power of my tests.

Hayashi and Prescott (2002) argue that Japanese firms do not seem to be financially constrained as they hold much more cash than the U.S. firms and small firms have steadily increased their cash holding since 1996. They point out a slowdown in total factor productivity growth as the main reason for Japan's "lost decade of growth." Cash holding, however, is endogenous. Recent empirical evidence that financially constrained firms save a bigger fraction of their cash balances in recessions is supportive of this view (Almeida, Campello, and Weisbach, 2004). The results in this paper, however, are not inconsistent with Hayashi and Prescott's view. As the shock worsens the financial health of the banking sector and therefore reduces their ability to lend, to the extent that firms have to cut back on investment in technologies that improves productivity, the total factor productivity in the economy would be reduced.

The literature on the role of banks suggests that a decline in the financial health of the banking sector causes firms to underinvestment. However, in the current setting, it is possible that firms took advantage of the increased collateral value due to the land price run-up in the 1980s to borrow excessively and wasted the funds on unprofitable projects. The reduced investments after the collapse simply represent a correction to the overinvestment problem. Although this hypothesis may change the interpretation of the results, it does not refute the effect of declined financial health of banks on firm investments. Nevertheless, this issue is important because it relates to our understanding of macroeconomic impact of bank health. I distinguish between these two hypotheses by examining the firms' stock market valuation. To the extent that firms under-invest and pass up profitable investment projects, their stock market valuation should be lowered.

3.2. Top lender's real estate exposure and firm value

3.2.1. Empirical specification

To examine whether the stock market valuation of firms is negatively related to their top lenders' real estate prior to the shock, I estimate the following model:

$$RET_j = a + b \ \%\ Real\ Estate\ Loans_j^{Top} + c\ \%\ Land\ Holding_j^{Top} + d\ Firm\ Controls_j + \varepsilon_j, \qquad (3)$$

I calculate the buy-and-hold return for the period 1994-98 (RET) and use it as the dependent variable. The main variables of concern are the top lender's real estate exposure: the top lender's real estate loans ($\%\ Real\ Estate\ Loans_j^{Top}$) and the land holding of the firm's top lender ($\%\ Land\ Holding_j^{Top}$). The coefficients *b* and *c* are expected to be negative. Similar to Table 3, I control for the bank's capital ratio in 1989.

In estimating Equation (3), I consider, in addition to the effect of bank health, several non-mutually exclusive hypotheses similar to those in Kang and Stulz (2000) that may explain the cross-sectional returns for the period subsequent to the land-price collapse. The first is a "bubble-size" explanation, which implies that firms that enjoyed the boom during 1986-89 had a larger bubble in its valuation and would perform worse later.[18] Therefore, I include the return during 1986-89 as a control variable (RET8689). To further distinguish this hypothesis from the Capital Asset Pricing Model (CAPM), I also control for the beta (BETA8689), which is calculated from the monthly return during 1986-89.[19] Another explanation is that, concurrent with the shock to land price, there is a shock to the profitability of projects undertaken in the second half of the 1980s so that these projects ceased to be profitable. Therefore, I control for a forecast of cash flow, using the cumulative cash flow during 1986-89 divided by the firm's total assets. According to this hypothesis, the coefficient on this variable should be negative.

Similar to the investment equation, I control for the land holding of the firm prior to the shock ($Land/K^{1989}$) and the timing of land purchases (*% Recent Purchase*). As land is an important form of collateral for corporate borrowing, loss of collateral value is expected to have a negative impact on firm value. I also control for two valuation variables observed in 1989, namely, the price-earnings ratio and the book-to-market ratio. Lastly, as the dependent variable is the equity return, which is a function of leverage for any given return on assets, I control for leverage at the beginning of the sample period in 1993.

The sample used estimating equation (3) is the same as that in the investment equation. Panel C of Table 1 presents a summary of the variables used in the analysis.

3.2.2. Empirical Results

As shown in Table 1 (Panel C), between 1994 and 1998, the sample of firms experienced an average loss in equity value of 26% and a median loss in value of 34%. Column (1) of Table 4 shows that the firm value is negatively related to the top lender's land holding (significant at the 5% level). The coefficient on real estate loans is not statistically significant. However, as is discussed later, this is related to the capital position of the bank. Supportive of the bubble-size hypothesis, column (1) of Table 4 shows that the greater the gain prior to the shock between 1986 and 1989, the greater the fall in the post-shock period. Leverage is significantly positive, probably suggesting that firms that can secure borrowing are better firms and/or those with better relationships. Consistent with the earlier finding that firms with land holdings prior to the shock suffered greater losses of collateral and therefore faced greater credit constraints, the coefficient on the firm's land holding in 1989 is significantly negative (at the 10% level).

Column (2) of Table 4 includes some additional controls. As share prices fell more than the fundamentals, firms with more security holdings are expected to lose more value to the extent that the security holdings are shares. I control for export sales because given the recession at home, firms that export more may have been less affected. I also control for firms' access to the bond market. None of these additional controls is significant; the earlier results regarding the impact of the top lender's real estate exposure remain unchanged.

In column (3) of Table 4, I control for the firm's concentration of borrowing from its top lender. Similar to the investment equation, the top lender's loan share is negatively related to firm value. However, none of the two interaction terms is significant and they are jointly insignificant based on the F-test (p-value = 0.4952). In column (4) of Table 4, I further examine how the effect of real estate exposure may vary with the top lender's capital position prior to the shock. The interaction term between the *BIND* dummy and the top lender's real estate loans becomes negative and marginally significant at 10% by a one-sided test. Given that the predictions about the real estate exposure are one-sided, this finding indicates (albeit weakly) that although the market does not "penalize" a firm when its better capitalized top lender lends to the real estate sector, if its top lender is not well capitalized, the lender's real estate lending hurts the firm's valuation. On the other hand, results regarding the top lender's land holding remain unchanged. The difference in the two measures of real estate exposure could be reflecting that land holding is more visible than lending to the real estate sector and the market valuation is thus more based on land holding.

The impact of the stock market exposure is presented in column (5) of Table 4. Consistent with the results in Table 3, the stock market related variables are not statistically significant. This result supports the earlier argument that, given the data limitations, it is hard to empirically quantify the real impact of the bank's stock market exposure.

As a summary, the results in this section demonstrate that the real estate exposure of a firm's top lender affects the firm's ability to make fixed investments. And consistent with the notion that firms pass by positive-NPV investment project, I find that top lenders' real estate exposure is negatively associated with firms' stock market value. These findings, combined with the earlier evidence at the loan level, suggest that a shock to the financial health of the banking sector transmits to the real sector by reducing the bank's ability to grant loans and the firm's ability to invest profitable projects. Are these results economically significant? This question is examined in the next section.

IV. Economic Significance

I compare the lending behavior of two hypothetical banks that are otherwise identical except that one has real estate exposure at the *25th* percentile in both measures *(% Real Estate Loans = 3.6% and % Land Holding = 2.1%)* and the other at the *75th* percentile *(% Real Estate Loans = 7.9% and % Land Holding = 7.8%)*. Note that the coefficient estimates in column (1a) of Table 1 reflect the marginal impact of change in real estate exposure on the probit index, not probability. Therefore I first calculate the marginal impact of real estate exposure on the probability of relationship continuation evaluated at the mean. They are -*0.944* for *% Real Estate Loans* and -*0.879* for *% Land Holding*. Thus the probability of continued relationship is 4.1 percentage points (=*-0.944*(7.9%-3.6%)* lower for the 75th percentile bank due to its excess real estate loans and *5.0%*

percentage points *(=-0.879*(7.8%-2.1%))* lower due to its excess land holding. These effects are moderate compared to the unconditional probability of relationship survival *(65%)*. As to the overall impact of real estate exposure on the loan growth, from column (1b) of Table 2, the *75th* percentile bank is expected to be have a growth rate over pre-shock level that is 9*.2* percentage points *(=-2.318*(7.9%-3.6%)* lower than that is for the *25th* bank. These magnitudes are clearly economically important.

The estimates in Table 3 and 4 are also consistent with a significant effect of the lending shock on fixed investment and firm value. Let's base the calculation on the differential behavior of two otherwise identical firms with top lenders' real estate exposure at the *25th* percentile and the *75th* percentile. According to column (1) of Table 3, the firm with a top lender who held real estate loans at the 75th percentile would have an investment rate *2.6* percentage points lower than the other firm. If the top lenders face binding capital requirement, firm investment will be further reduced by *6.8* percentage points due to the lender's land holding. The stock market appears to have taken this into account: the firm with the top lender with *75th* percentile exposure has a market valuation that is *8.6* percentage points lower due to its lenders' excessive land holding and in the case where the top lender is facing binding capital requirement, the market valuation is *5.2* percentage lower due to the lender's excessive lending to the real estate sector. These effects are economically significant.

The above calculations only compare banks at extremes of the spectrum of real estate exposure. To gauge the total impact of the shock, I integrate over the distribution of the real estate exposure. In particular, I take the actual real estate exposure measures and assume that for banks with these measures above the *25th* percentile the credit constraints are binding. For example, to obtain the aggregate impact of the shock on the loan growth, I take the estimate of *-2.138* in column (1) of Table 2 (the most conservative estimate) and calculate an aggregate of the incremental impact of *% Real Estate Loans* above the *25th* percentile across bank-firm pairs.[20] It turns out the total loan growth is *3.5* percentage points lower than it would be if all banks were unconstrained. The total fixed investment is lowered by *1.1* percentage point due to banks' real estate lending and *0.16* percentile due to their land holding. Aggregate firm value is lowered by *2.8* percentage points due to banks' land holding and by *0.7* percentage point due to banks' real estate lending. During the sample period, firms in the sample lost *13.8%* in total value. Thus the shock to banks accounts for about a quarter (*25.2%*) of such a loss.

It is worth noting that the results above are based on publicly traded banks and firms, which represent perhaps the most important component of the economy. For smaller and younger firms, the effect can be arguably even more pronounced as they are more affected by the information asymmetry in the credit market due to higher "information costs." Therefore, the above economic magnitude can be considered as a lower bound of the real impact of the shock.

V. Conclusion

Exploiting a unique economic setting and a unique data set, this paper identifies and quantifies the full economic impact of a powerful lending channel that transmits downward movements in asset markets to the real economy. It provides two levels of evidence characterizing such a transmission mechanism. At the individual loan level, I find that banks are credit constrained: when they are hit by the shock in the land market, banks with greater real estate exposure prior to the shock have to cut back lending in the five years subsequent to the shock. At the individual firm level, I find that, consistent with the view that firms cannot easily substitute other sources of financing for bank credit, the borrowing firms' behavior is significantly affected by their top lender's real estate exposure: they invest less and lose market value. To my knowledge, this is the first paper providing large-sample loan-level evidence on the transmission of a banking shock to firms' real (investment) decisions and market valuation. Moreover, it is also the first paper that is based on all publicly traded firms in an economy and thus quantifies the full economic impact of a loan supply shock.

While this paper emphasizes a strong lending channel that contributes to the economic decline in Japan in the 1990s, it does not rule out other explanations. For example, Hoshi and Kashyap (2004) and Peek and Rosengren (2005) point out that Japanese banks "ever-green" their loans and misallocate funds by providing additional credit to many weak firms. Indeed, despite the banking problems, domestic bank lending in Japan did not decline till mid-1990s. However, this pattern is largely driven by firms in the non-manufacturing sectors. For example, lending to the real estate sector steadily increased from the early 1990s till 1998. Lending to the manufacturing firms, which is the focus of this paper, started to decline as soon as the bubble burst. Therefore, it is very likely that the "ever-greening" incentive at the banks exacerbates the real effects of the adverse shock to banks' financial health.[21]

Japan's experience has important implications for the U.S. and other countries. Around the world, the property markets have enjoyed unprecedented price increases in recent years. As a result, banks have enjoyed large increases in real estate related lending business. There has been hot debate on what would happen to the economy if there were a "correction" in the property markets. The Japanese experience in the 1990s suggests that a decline in the property market may have a large adverse impact on the real economy through the interaction between the asset markets and the credit markets.

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[1] Researchers have used aggregate data to study the relationship between bank loan supply and economic activity. However, as will be reviewed later, the results are mixed.

[2] Hubbard, Kuttner, Palia (2002) study how banks' health affect borrowers' cost of fund, also using a matched sample of loans. My study differs from theirs in two aspects. First, their sample is restricted to syndicated loans. Second, they do not study the bank effects on firms' investment behavior and stock market valuation.

[3] An indirect effect is that, as most of long-term bank loans in Japan are collateralized by land, the credit quality of bank loans thus deteriorated.

[4] It is also possible that this result simply reflects the fact that I control for other firm characteristics which may determine firms' access to bond market.

[5] In the NIKKEI NEEDS database, which provides financial data on banks, the land areas owned are also available. Under the assumption that there is a homogenous unit price, it can be converted into the market value. However, the homogenous unit price assumption does not generally hold. For example, a piece of land in the central business district of Tokyo would be much more expensive than a parcel of equal size in the suburbs. The book value of land may better reflect its price and therefore its market value at the time of purchase. Moreover, NIKKEI NEEDS data results in less number of observations. Nevertheless, when I use the land area as an alternative measure of land holding, I obtain similar results.

[6] The results are actually stronger, which is not surprising as the GLS is more efficient than the OLS if the model is correctly specified (Hausman tests do not reject the exogeneity of the bank effects). For the sake of brevity, I do not report these results but they are available upon request.

[7] Some studies also use the classification of Keiretsu no Kenkyu published by the Keizai Chosa Kyokai (Economic Survey Association). Both Keiretsu no Kenkyu and Dodwell publications

classify Keiretsu firms based loan structure, bank shareholding, and historical factors. Dodwell's definition of group firms is narrower than Keiretsu no Kenkyu and are more stable over time. Using the Dodwell classification, less than 4% of the firms in the sample switch into or out of their groups over a 13-year period. As I already control for whether the bank is the largest lender and other time-varying relationship variables, I prefer a classification that is more stable. In my sample, of all the largest lenders, 23% are main banks.

[8] One way to distinguish between the risk-shifting and the precautionary-saving incentives is to account for the effect of liquidity on banks with different capital positions. As pointed out by Keeley (1990), when banks have less capital at stake, they have little to lose and tend to be more aggressive in extending loans. On the other hand, a weak capital position increases the need for precautionary saving. Therefore, in a later estimation, I include as independent variable an interaction term between liquid assets and a dummy variable indicating whether the firm's capital ratio in 1989 is below the *4%* capital requirement. The results are supportive of the precautionary-saving incentive: the interaction term is significantly negative (columns (3a) and (3b) in Table 2). The coefficient on the liquid assets itself is positive but insignificant.

[9] Basel Accord, an international agreement on bank capital standards, was introduced in 1988. Although the main focus of the Accord is on risk-based capital requirements, it sets a core (basic) capital requirement of 4%. Given that the data on risk-based capital ratio is not available, I use the core requirement to measure whether the bank faces binding capital requirements.

[10] I thank Murillo Campello for pointing out this possibility to me.

[11] The additional control variables in columns (2c) and (2d), namely the interaction between the top-lender dummy and real estate loans and the percent of operating funds are not statistically significant in the first-stage regression. Including them in the first-stage estimation does not change the results.

[12] One may think that a similar argument can be applied to banks' land holdings. However, banks may have purchased land for speculative purposes or have obtained land through foreclosure. These land holdings are much more recent and use up cash, half of their value evaporated during the collapse.

[13] Under reasonable assumptions, a detectable real impact generally requires that the bank at least cut back lending proportionally (based on outstanding loans) across lenders.

[14] For an overview of LAD and quantile regressions in economics research, see Koenker and Hallock (2001).

[15] Note this sample shrinks from that in the lending equation mainly due to the requirements that (1) the lending relationships existed in 1989; (2) valid firm-level financial information in the DBJ financial database. I am not aware of any systematic pattern in the firms dropped. Indeed, the earlier results in Table 2 can be reproduced in this smaller set of firms (unreported but available upon request), further suggesting that the firm-level results are not driven by sample selection.

[16] Note that this is a relatively restrictive cutoff. As it takes time for firms to prepare for bond issuance, they may not be able to issue whenever they get an investment grade. However, alternative cutoffs of meeting the criteria once to five times do not change the results.

[17] The significance level of the interaction between land holding and the BIND dummy increases to 5% when I drop this variable, suggesting that this term is adding noise to the estimation. Therefore I drop this variable in the later estimation.

[18] I thank the referee for suggesting this term to me.

[19] During 1986-89 when the market performed well, high beta stocks had better performance on average than did low beta stocks. When I regress RET9498 on RET8689, I am effectively regressing the return on the beta. If the beta is constant over time, one would expect high beta stocks to perform poorly, since the market performed poorly during 1994-98.

[20] This involves calculating the reduction in loan growth due to real estate loans for each bank-firm pair above the 25th percentile ($d_{ij} = 2.138*(\% \text{ Real Estate Loans}_i - 3.6\%)$, where i indexes banks and j indexes firms) and then aggregating across bank-firm pairs ($=log(\sum L_{ij}e^{-di}/\sum L_{ij})$, where L_{ij} is the loan balances prior to the shock between bank i and firm j).

[21] Indeed, in a Bank of Japan (BOJ) Financial Institution Research Institute Report issued in 2000, the BOJ expressed the concern that, due to increased lending to the real estate sector after the burst of bubbles, banks imposed very tight credit to small and medium enterprises.

Table 1. Summary Statistics

This table presents descriptive statistics on variables used in the paper. Panel A presents summary statistics for relationship variables. Log(loan growth) is the log of the average borrowing from a particular bank during 1994-1998 normalized by the average borrowing from the same bank during 1984-1989. Duration is the number of years that the firm-bank pair had positive loan balances in the past 10 years during 1984-1993. Top lender is whether the bank served as the firm's largest lender at least once during 1984-1993. Equity ownership is the number of shares owned by the bank as a percentage of the firm's total shares outstanding in 1989. Main bank is a dummy variable equals to 1 if the bank is also the firm's main bank and zero otherwise. Panel B presents the statistics for banks. % Real Estate Loans is the loans to the real estate sector normalized by the total assets in 1989. % Land Holding is the market value of land normalized by the total assets in 1989. q is Tobin's average q. Liquid Assets / Assets is the sum of cash and government security holdings over total assets. Capital ratio is the book equity over total assets. % Operating Funds is the operating funds as a percent of total loans in 1989. % Stock Holdings is the equity holdings as percent of total assets in 1989. SOLD is a dummy variable indicating whether the bank sold its equity holdings druing 1989-93. Panel C presents the statistics for firms. I/K is the average investment rate defined as fixed investments normalized by the beginning-of-period capital stock between 1994 and 1998. q is Tobin's average q. Cash Flow / K is cash flow normalized by normalized by the beginning-of-period capital stock. Cash Stock / K is the cash stock normalized by the beginning-of-period capital stock at the end of 1993. Land/K (firm) is the firm's market value of land normalized by the replacement cost of capital in 1989. % Recent purchase is the proportion of land (in market value) purchased during 1988-1990. Top Lender's Loan Share is the firm's top lender's share of total long-term loans in 1989. Return (1994-1998) and Return (1986-1989) are the buy-and-hold stock return during 1994-1998 and during 1986-1989, respectively. Beta is calculated using monthly return during 1989-1989.

Statistics	Variable Names								
Panel A: Banking Relationship Variables									
	Log (loan growth)	Duration	Top Lender	Equity Stake (%)	Main bank				
Mean	0.432	6.85	0.174	3.123	0.077				
Median	0.371	7		3.11					
Panel B: Bank Level Variables									
	% Real Estate Loans	% Land Holding	Log(assets)	Tobin's q	Liquid Assets / Assets	Capital Ratio (1989)	% Operating Funds (1989)	% Stock Holdings	SOLD
Mean	0.064	0.079	14.629	1.022	0.278	0.034	0.671	0.022	0.242
Median	0.05	0.048	14.481	1.017	0.258	0.033	0.67	0.019	0.000
Panel C: Firm Level Variables									
Variables used in the investment regressions:									
	I / K	Tobin's q	Cash Flow / K	Cash Stock / K	Land / K (firm)	% Recent Purchase	Debt / Asssets	Top Lender's Loan Share (1989)	
Mean	0.306	0.87	0.084	0.187	0.677	0.018	0.171	0.364	
Median	0.086	0.716	0.019	0.165	0.691	0.004	0.164	0.303	
Additional variables used in the return regressions:									
	Return (1994-98)	Return (1986-89)	Price Earning Ratio (1989)	Book to Market (1989)	Beta	Bank Debt / Debt	flow 1986-89 / Assets	Security Holdings / Assets	
Mean	-0.262	1.066	49.376	0.236	0.341	0.623	0.021	0.054	
Median	-0.343	0.615	31.29	0.233	0.329	0.702	0.019	0.038	

Table 2. Bank Real Estate Exposure and Lending

This table presents the effect of the bank's real estate exposure prior to the land-price collapse on its lending to its client firms based on Heckman two-stage regressions. The first stage is a probit regression. The dependent variable is a dummy variable indicating the survival of the lending relationship. The second stage is an OLS regression. The dependent variable is the log of the average borrowing from a particular bank during 1994-1998 normalized by the average borrowing from the same bank during 1984-1989. Duration is the number of years that the firm-bank pair had positive loan balances in the past 10 years during 1984-1993. Top-Lender Dummy is a dummy indicating whether the bank served as the firms largest lender at least once during 1984-1993. Main-Bank Dummy is a dummy variable indicating whether the bank is the firm's main bank. Equity ownership is the the number of shares owned by the bank as a percent of the firm's total shares outstanding. q is Tobin's average q. Liquid Assets / Assets is the sum of cash and government security holdings over total assets. Capital ratio is the book equity over total assets in 1989. % Operating Funds is the operating funds as a percent of total loans in 1989. % Real Estate Loans is the loans to the real estate sector normalized by the total assets in 1989. % Land Holding is the market value of land normalized by total assets in 1989. BIND is a dummy variable indicating whether the top lender's capital ratio in 1989 is below the capital requirement 4%. % Stock Holdings is the equity holdings as percent of total assets in 1989. SOLD is a dummy variable indicating whether the bank sold its equity holdings druing 1989-93. Heteroskedasticity-consistent standard errors are presented in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	(1a) Probit	(1b) OLS	(2a) Probit	(2b) OLS	(2c) OLS	(3a) OLS	(3b) OLS
Relationship Characteristics:							
Duration	0.300***	-0.137***	0.301***	-0.147***	-0.162***	0.301***	-0.151***
	(0.010)	(0.043)	(0.010)	(0.042)	(0.043)	(0.010)	(0.043)
Top-Lender Dummy	0.306***	0.090**	0.310***	0.292***	0.255***	0.309***	0.285***
	(0.043)	(0.039)	(0.043)	(0.077)	(0.078)	(0.043)	(0.078)
Main-Bank Dummy	0.156**	0.355***	0.146**	0.335***	0.346***	0.148**	0.335***
	(0.068)	(0.048)	(0.069)	(0.048)	(0.049)	(0.069)	(0.049)
Equity Holding	-0.017	-0.015	-0.016	-0.016	-0.015	-0.017	-0.006
	(0.013)	(0.012)	(0.013)	(0.012)	(0.012)	(0.013)	(0.013)
Bank Characteristics:							
Log (assets)	0.024	0.086***	0.026	0.120***	0.095***	0.025	0.094***
	(0.027)	(0.028)	(0.030)	(0.030)	(0.033)	-0.03	-0.033
Tobin's q	0.611	0.207	0.352	-0.455	0.204	0.284	0.169
	(0.517)	(0.638)	(0.560)	(0.731)	(0.818)	-0.558	-0.873
Liquid Assets / Assets	0.3	-0.531***	0.29	-0.534**	-0.983***	0.214	0.940
	(0.226)	(0.189)	(0.240)	(0.214)	(0.310)	-0.254	-0.792
Capital Ratio			0.896	10.311**	11.986**	1.325	5.144
			(4.002)	(4.004)	(5.213)	-4.122	-5.411
% Operating Funds					-0.515**		-0.480*
					(0.246)		-0.247
Liquid Assets / Assets * BIND							-1.451**
							-0.714
Bank Real Estate Exposure in 1989:							
% Real Estate Loans	-2.845***	-2.138***	-2.449***	-2.003**	-1.845**	-2.682***	-3.176**
	(0.633)	(0.741)	(0.687)	(0.784)	(0.799)	(0.816)	(1.618)
% Land Holding	-2.649***	0.91	-4.641**	-0.006	-0.91	-4.515**	-4.189*
	(0.829)	(0.988)	(2.081)	(2.428)	(2.423)	(2.085)	(2.511)
% Real Estate Loans * BIND			-0.939*	-0.318	0.243	-0.897	3.187
			(0.584)	(0.651)	(0.744)	(0.601)	(2.034)
% Land Holding * BIND			2.017	0.994	1.332	1.952	3.918
			(1.753)	(2.248)	(2.299)	(1.750)	(2.411)
Top-Lender Dummy * % Real Estate Loans				-3.503***	-3.172***		-3.406***
				(1.146)	(1.145)		(1.149)
% Stock Holdings						0.931	-6.802***
						(1.936)	(1.824)
SOLD - Stock Holdings							-0.085
							(0.172)
IMR		1.064***		1.003***	0.897***		0.941***
		(0.284)		(0.282)	(0.284)		(0.284)
Observations	11393	7452	11393	7452	7452	11393	7452
Psuedo R^2 / R^2		0.65		0.65	0.65		0.65

Table 3. Effect of the Top Lender's Real Estate Exposure on the Firm's Fixed Investment

This table presents the effect of the top lender's real estate exposure on firm investment based on Least Absolute Distance (LAD) Regressions. The dependent variable I / K is the average investment rate (defined as fixed investments normalized by the beginning-of-period capital stock) between 1994 and 1998. Cash flow / K is the cash flow normalized by normalized by the beginning-of-period capital stock. Cash Stock / K is the cash stock normalized by the beginning-of-period capital stock at the end of 1993. q is Tobin's average q, Land / K (firm) is the firm's market value of land normalized by the replacement cost of capital in 1989. % Recent Purchase is the proportion of land (in market value) purchased during 1988-1990. Leverage is the debt to assets ratio. High Leverage is a dummy variable indicating a firm's leverage above the median. % Real Estate Loans is the loans to the real estate sector normalized by the total assets in 1989. % Land Holding is market value of land normalized by the total assets in 1989 for the top lender. CON is a dummy variable indicating whether the top lender's loan share is above the median. BIND is a dummy variable indicating whether the top lender's capital ratio in 1989 is below the capital requirement 4%. Standard errors are calculated based on the asymptotic variance. They are presented in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)	(5)
q	0.025***	0.025***	0.025***	0.025***	0.026***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash Flow / K	1.111***	1.116***	1.107***	1.103***	1.083***
	(0.018)	(0.022)	(0.021)	(0.022)	-0.016
Cash Stock / K	0.205***	0.204***	0.205***	0.206***	0.209***
	(0.003)	(0.003)	(0.003)	(0.003)	-0.002
Land / K ^{1989} (firm)	-0.132***	-0.138***	-0.173***	-0.173***	-0.168***
	(0.036)	(0.044)	(0.043)	(0.044)	-0.031
% Recent Purchase	-0.064	-0.07	-0.042	-0.027	-0.024
	(0.118)	(0.145)	(0.111)	(0.109)	-0.08
Leverage	0.090*	0.116*	0.140**	0.157**	0.154***
	(0.054)	(0.067)	(0.069)	(0.068)	(0.049)
Land / K ^{1989} (firm) * High Leverage	-0.092***	-0.097***	-0.118***	-0.107***	-0.117***
	(0.018)	(0.022)	(0.022)	(0.023)	(0.016)
Access to the Public Bond Market		-0.014	(0.004)		
		(0.014)	(0.013)		
Top Lender's Real Estate Exposure and Other Characteristics in 1989:					
% Real Estate Loans	-0.615**	-0.509*	-0.664**	-0.640*	-0.712***
	(0.249)	(0.305)	(0.309)	(0.369)	(0.265)
% Land Holding	-0.07	-0.134	-0.484	0.001	-0.009
	(0.292)	(0.352)	(0.482)	-0.514	(0.372)
Top Lender's Capital Ratio	2.520*	2.218	2.811	5.654**	5.320***
	(1.419)	(1.694)	(1.738)	(2.343)	(1.379)
Top Lender's Loan Share			-0.123***	-0.100***	-0.114***
			(0.037)	-0.029	(0.021)
% Real Estate Loans * CON			0.075		
			(0.132)		
% Land Holding * CON			0.487		
			(0.705)		
% Real Estate Loans * BIND				-0.044	
				(0.145)	
% Land Holding * BIND				-1.189*	-1.113**
				(0.693)	(0.557)
% Stock Holdings					0.075
					(0.702)
SOLD - Stock Holdings					0.07
					(0.062)
Observations	420	420	420	420	420
Psuedo R^2	0.44	0.44	0.45	0.45	0.45

Table 4. The Top Lender's Real Estate Exposure and Firm Valuation

This table presents the effect of the top lender's real estate exposure on firm valuation based on OLS regressions. The dependent variable is the buy-and-hold stock return between 1994 and 1998. Return (1986-1989) is the buy-and-hold stock return between 1986 and 1989. Beta is calculated using monthly return during 1986-1989. Cash Flow (1986-89) / Assets is the cumulative cash flow between 1986 and 1989 normalized by the total assets in 1989. Land/K (firm) is the firm's market value of land normalized by the replacement cost of capital in 1989. % Real Estate Loans is the loans to the real estate sector normalized by the total assets in 1989. % Land Holding is market value of land normalized by the total assets in 1989 for the top lender. CON is a dummy variable indicating whether the top lender's loan share is above the median. BIND is a dummy variable indicating whether the top lender's capital ratio in 1989 is below the capital requirement 4%. Heteroskedasticity-consistent standard errors are presented in parentheses. Significance at the 1%, 5%, 10% levels by a two-sided test is indicated by ***, **, and *, respectively. Significance at the 10% and 15% level by a one-sided test is indicated by a and b respectively.

	(1)	(2)	(3)	(4)	(5)
Return (1986-89)	-0.039***	-0.039***	-0.039***	-0.041***	-0.041***
	(0.011)	(0.012)	(0.012)	(0.011)	-0.011
Beta	0.046	0.048	0.041	0.042	0.042
	(0.036)	(0.037)	(0.037)	(0.037)	-0.037
Cash Flow (1986-89) / Assets	0.364	1.495*	1.606**	1.553*	1.554*
	(0.497)	(0.789)	(0.816)	(0.831)	-0.832
Leverage (1993)	0.441***	0.404**	0.361*	0.399**	0.400**
	(0.170)	(0.185)	(0.185)	(0.178)	-0.178
Bank Debt / Total Debt (1993)	0.085*	0.065	0.058	0.076	0.076
	(0.050)	(0.053)	(0.054)	(0.053)	-0.053
Price Earnings Ratio (1989)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Book to Market (1989)	0.007***	0.005*	0.006*	0.006**	0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	-0.003
Land / K^{1989} (firm)	-0.266**	-0.315***	-0.298**	-0.290**	-0.289**
	(0.114)	(0.121)	(0.124)	(0.124)	-0.126
% Recent Purchase	0.124	0.106	0.127	0.143	0.142
	(0.182)	(0.184)	(0.186)	(0.185)	-0.185
Security Holdings / Assets (1993)		-0.002	0.027	0.051	0.052
		-0.268	(0.271)	(0.274)	-0.278
Export Sales / Sales (1993)		0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Access to the Public Bond Market		-0.035	-0.031		
		(0.037)	(0.037)		
<u>Top lender's Real Estate Exposure and Other Characteristics in 1989:</u>					
% Real Estate Loans	0.307	0.377	0.079	0.809	0.846
	(0.750)	-0.764	(0.856)	-0.964	-1.105
% Land Holding	-1.516**	-1.502**	-1.917***	-1.426*	-1.679**
	(0.697)	(0.710)	(0.721)	(0.786)	(0.853)
Top Lender's Capital Ratio	-3.8	-2.706	-3.711	3.64	3.439
	(4.134)	(4.163)	(4.276)	(5.432)	(5.527)
Top Lender's Loan Share			-0.186*	-0.130*	-0.131*
			(0.098)	(0.077)	(0.077)
% Real Estate Loans * CON			0.608		
			(0.770)		
% Land Holding * CON			0.797		
			(1.702)		
% Real Estate Loans * BIND				-1.190[a]	-1.246[a]
				(0.909)	(0.875)
% Land Holding * BIND				-0.43	
				(1.289)	
Top Lender's Stock Market Exposure					0.030
					(2.460)
SOLD Equity Holdings					0.008
					(0.243)
Observations	476	448	448	448	448
R^2	0.12	0.13	0.13	0.13	0.13