Revisiting the Level Playing Field:

Domestic and International Implications of the Divergences in Japanese bank capital requirements from the Basel Accord

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Abstract

The 1998 passage of the Land Revaluation Law in Japan provided regulatory forbearance to Japanese banks in the form of a regulatory capital infusion. We test whether this divergence from international bank capital requirements had an impact on Japanese bank lending behavior. Because this natural experiment created an exogenous supply shock, we can utilize it to disentangle demand and supply effects in order to determine the impact on Japanese bank lending in both the U.S. and Japan. We find that the infusion of regulatory capital had no aggregate impact on Japanese bank lending in Japan, but it did change the allocation of loans. Well-capitalized Japanese banks shifted their lending from low margin, less capital intensive mortgage lending toward higher yielding, more capital intensive commercial loans. Moreover, we find evidence consistent with a shifting of Japanese bank lending activity away from U.S. lending (which is predominately real estate based) to domestic lending to fund manufacturing. Thus, we find that divergences from international capital standards have significant allocative effects on lending, as well as on bank profitability.

Keywords: Basel, Tier II capital, Land revaluation, bank lending, aggregate effect, allocative effect

JEL Classification Code: G15, G21, G28

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1 Introduction

The looming adoption of the Basel II capital requirements in 2008-2009 and the impending divergence in implementation across countries has again encouraged debate on the economic impact of bank capital regulations. One of the important motivations that launched the Basel capital accords in the first place was the recognition that, in a world of international bank competition, there should be a level regulatory playing field that harmonized bank capital requirements across countries. However, as of this writing, U.S. bank regulators appear determined to diverge from much of the regulatory community in Europe and parts of Asia in their decision to implement the Basel II Advanced Internal Ratings-based model for the largest 10-15 U.S. banks only, thereby leaving all other U.S. financial institutions under the old Basel I framework[1].

Of course, this is not the first instance in which national bank regulators have diverged from the international Basel standards. However, to our knowledge, there has been no academic work assessing the economic impact of these divergences in national bank capital requirements[2]. In this paper, we examine the lending reaction of Japanese banks both in Japan and the U.S. to an idiosyncratic change in bank capital requirements that caused a divergence between Japanese capital requirements and the Basel standards.

On March 31, 1998, at the end of the fiscal year, the Diet (the Japanese parliament) passed the *Law Concerning the Revaluation of Land.* This law allowed Japanese banks to count 45% of the unrealized capital gains on their real estate holdings, in addition to 45% of the revaluation of their securities, as Tier 2 capital, for the purposes of meeting their bank capital requirements. The real estate component of this Law was the more substantial part since it impacted all Japanese banks, whereas the securities component only applied to those Japanese banks that had international activities. Moreover, since Japanese banks held considerable land holdings that had been either initially acquired at much lower costs or obtained upon real estate loan foreclosures, the revaluation law provided a significant capital infusion for Japanese banks that was not available to non-Japanese banks[3]. Thus, Japanese bank regulators essentially granted regulatory capital to Japanese banks in a manner reminiscent

[1] On December 5, 2006, the Federal Reserve released a draft interagency notice of proposed rulemaking that would offer "the vast majority of banks, bank holding companies, and savings associations the option of either continuing to use the existing Basel I-based capital rule or adopting a more risk sensitive rule, known as Basel IA." Basel IA introduces some additional risk sensitivity into the Basel I requirements by allowing banks to use loan-to-value ratios in determining mortgage risk weights, or by increasing the number of risk weight categories, but did not adopt all of the risk measures proposed in the standardized approach of Basel II.

[2] The closest paper in this regard is Peek and Rosengren (1997) that examines the impact of equity price declines on Japanese bank lending in the U.S. Since Japanese banks had long held equity as a form of "hidden reserves," the Basel I provision that permitted 45% of the unrealized equity gains to be held as Tier 2 capital was relevant to Japanese, but not to U.S. banks. The dramatic drop in Japanese equity prices during the 1990s acted as a drain on Japanese bank capital that is qualitatively similar, but opposite in effect, to the regulatory policy shock that we examine in this paper.

[3] Subsequent losses in the value of land were not deducted from the banks' regulatory

of the supervisory goodwill that was at the heart of the thrift debacle in the U.S. (See White (1991).) The difference was that the Japanese regulatory capital infusion was granted to an important sector of the international banking community, thereby potentially impacting the structure and competitiveness of banks throughout the world, whereas the thrift crisis was largely contained in the U.S. Moreover, to the extent that land was often acquired through real estate and mortgage lending, the Land Revaluation Law significantly reduced Japanese bank capital requirements through both the numerator (by directly increasing Tier 2 capital levels) and the denominator (by encouraging the shift towards lower (50%) risk-weight mortgage lending for capital deficient banks), thereby magnifying the impact on bank capital requirements. Thus, in this paper, we examine the impact of this idiosyncratic regulatory policy change on bank lending behavior in both Japan and the U.S. In particular, we study both the *aggregate*, as well as the *allocative* effects on bank lending in the wake of the regulatory policy shift.

In addition to contributing to the policy debate regarding the relevance of a level bank regulatory playing field, this paper addresses a topic that has been the subject of a voluminous academic literature – the overall impact of capital regulations on bank liquidity provision and credit creation[4]. It is important to examine both the aggregate and allocative effects of bank capital requirements because the Basel II objectives are to leave the banking system's overall aggregate capital position unchanged. If this objective is achieved, then the implementation of Basel II may have no impact on either the aggregate supply of credit or on real investment opportunities[5].

Even if it were true that bank capital requirements have no impact on the level of bank lending, however it is not necessarily the case that changes in capital regulation have no impact on real economic activity if there are also allocative effects on bank lending behavior. That is, even if the aggregate level of credit creation is unchanged by capital regulations, an alteration in the distribution of credit may have real economic implications. The problem in detecting both these aggregate level and allocative effects has typically been the difficulty in disentangling loan supply from loan demand effects. We take advantage of the adoption of the Land Revaluation Law, an exogenous event that should have had no impact on loan demand, in order to focus on bank supply of credit. The impact of this natural experiment is to create a supply shock that can be used to investigate both the level and allocative effects of bank capital requirements in Japan and the U.S.

We find that passage of the Land Revaluation Law appears to have permitted well-capitalized banks to shift their lending back to higher return, more

capital positions. Since the banks chose whether to declare an allowance for land revaluation, the impact of the law was to provide Japanese banks with a one-time permanent, positive infusion of regulatory capital. There were no instances of negative land revaluations.

[4] See Jackson et al (1999) and Allen (2004) for summaries of the extensive literature studying whether the introduction of Basel I caused a credit crunch.

[5] Of course, recent Qualitative Impact Studies suggest that the adoption of Basel II will permit large decreases in bank capital requirements.

capital intensive commercial lending away from lower yield, real estate lending. Moreover, these banks reduce their overall lending in the U.S. This is consistent with Peek and Rosengren's (2000) findings that Japanese bank lending in the U.S. is predominately secured by real estate. Thus, Japanese banks respond to regulatory policy incentives and shift their lending to maximize returns subject to the capital constraints. Those Japanese banks that were relatively capital-constrained reallocated their lending toward lower yield, real estate lending that reduced their capital requirements. Well capitalized Japanese banks had a competitive advantage in that they could pursue the higher yield commercial loans, thereby reducing their lending to the real estate sector and in the U.S. These results suggest that divergences in capital requirements will have substantial impacts on bank lending activities across countries.

The paper is organized as follows. A brief literature review appears in Section 2. The data and model are described in Section 3. Empirical results regarding Japanese bank lending activity in the U.S. and Japan are presented in Section 4. Finally, Section 5 concludes.

2 Literature Review

There are several strands of the literature that are relevant to the proposed research. We survey the literature on the impact of the Basel Accord on credit creation and the possibility of a credit crunch. In particular, we consider the literature that describes the Japanese banking system and its particular incentive structure.

Most studies that evaluate the impact of Basel 1 Capital Accord have studied the US banking industry. Proponents of the view that Basel I capital requirements induced a credit crunch during the 1990-1991 recession in the US include Bernanke and Lown (1991), Shrieves and Dahl (1992), Hancock and Wilcox (1993, 1995), Berger and Udell (1994), Peek and Rosengren (1995a, 1995b), and Lown and Peristiani (1996). In contrast, opponents (such as Sharpe (1995)) argue that observed decreases in lending during capital-constrained downturns in economic activity may be the result of reduced loan demand rather than limitations in credit supply. Johnson (1991) finds that the contraction of bank credit in 1990 was not homogenous, but was instead determined by local economic conditions and bank financial condition. In particular, banks with the lowest lending growth in 1990 had greater exposure to bad real estate loans, lower $S\&P$ credit ratings and lower capital ratios. Thus, Johnson (1991) finds that compliance with Basel I capital requirements was only one factor limiting the supply of bank credit in the US during the 1990 recession. This view is supported when comparing the 1990-1991 recession to the 2000-2001 recession in the US. Stiroh and Metli (2003) find that the impact on the quality of bank loan portfolios, as well as the availability of credit, was much milder in the 2000-2001 recession as compared to the 1990-1991 recession. Moreover, the impact in 2000-2001 was

localized in certain troubled industries, particularly the telecommunications industry. Stiroh and Metli (2003) attribute the absence of a significant 2000-2001 credit crunch to the strong financial position of the banking system at the start of the economic downturn, rather than to any regulatory policy changes.

Brinkmann and Horvitz (1995) examine the availability of loan supply in the wake of the implementation of Basel I without distinguishing between required capital and discretionary capital. That is, banks may choose to hold a cushion to meet regulatory capital requirements. Thus, the imposition of Basel I may have an impact on loan supply even if all banks met the higher regulatory minimum capital levels, if banks restrict loan supply in order to build a desired capital cushion level. Brinkmann and Horvitz (1995) find that banks with larger capital surpluses under Basel I increased their lending at twice the rate of banks with smaller surpluses or deficient capital levels suggesting that the Basel I capital requirements may have been binding due to their impact on discretionary capital levels. Bugie, et al (2003) suggest that the greater volatility inherent in the more complex Basel II proposals will exacerbate this tendency toward capital surpluses.

Hancock and Wilcox (1994a) test bank convergence between regulatory capital requirements and long run equilibrium, bank-specific economic capital levels. They find US banks resold single-family home mortgages into the secondary mortgage backed securities market, but increased their holding of high-yielding commercial mortgages. Moreover, well-capitalized banks increased their mortgage lending more than poorly capitalized banks decreased their lending. Hancock and Wilcox's (1994b) results also do not find evidence of a shift of high risk-weighted loans to low risk-weighted securities, as would be the case if implementation of Basel I had induced regulatory capital arbitrage. Thus, their results are not consistent with a Basel-induced credit crunch. Instead, Hancock and Wilcox (1994a) explain the shifts in lending as responses to increases in real estate delinquency rates that led to higher economic capital requirements during the 1990-1991 period in the US. Thus, they conclude that Basel capital regulations do not constrain bank-lending behavior as much as the economic capital targets self-imposed by the banks. Hancock and Wilcox (1997) further examine the impact of Basel I on the real estate market in the US. However, in this paper, they find significant effects of the capital crunch on real estate market activity. There was a pronounced drop in commercial real estate loans in the US during the period following adoption of Basel I. Moreover, the volume of new single-family real estate loans leveled off during that period. Using national data, Hancock and Wilcox (1997) find a significant decrease in real estate lending by capital-constrained banks. However, non-bank financial intermediaries, such as government-sponsored enterprises, could have filled the gap left by the banks because they were unaffected by changes in capital regulations, but they did not. Hancock and Wilcox (1997) conclude that real economic activity in the real estate sector was affected by a combination of local economic and banking conditions. Thus, Hancock and Wilcox (1997) contend that banking sector re-

trenchment during the implementation of Basel I had a real impact on economic activity in the real estate sector and may have contributed to a credit crunch. This is particularly compelling because the Japanese experience in the wake of the introduction of Basel I was exactly the opposite of that in the U.S. Peek and Rosengren (1992) document the reverse effect of the Hancock and Wilcox (1997) impact of banking sector retrenchment on real estate market activity. They find that the upheaval in the real estate market, following the collapse of the New England real estate bubble and the economic slowdown in New England, seriously impacted the condition of the region's banks, rather than the reverse causality[6]. New England banks experienced a substantial decline in bank capital due to loan losses emanating from the real estate sector. This led poorly capitalized banks to reduce their lending more rapidly than well-capitalized banks. This suggests that Regional banks had excessive exposure to local economic and market conditions during 1990-1991. Thus, Peek and Rosengren (1992) contend that it was loan losses, rather than increased Basel I capital requirements that eroded bank capital levels, thereby inducing a credit crunch. Jackson et al (1999) state that during the 1980s and 1990s banks tended to raise their capital levels, although this may have been a response to increased supervisory or market discipline, higher required levels of economic capital or a response to more stringent Basel I regulatory capital requirements. Jackson et al (1999) find that the average ratio of capital to risk-weighted assets of major banks in the G-10 rose from 9.3% in 1988 to 11.2% in 1996. They conclude that, although the cause of this overall increase in bank capitalization is ambiguous, Basel I appears to have been the impetus that induced weakly capitalized banks to increase their capital positions either through mergers or capital issuance.

Studies using international data demonstrate a similar inconsistency in empirical results. Chiuri et al (2001, 2002) use data from 15 emerging countries (Argentina, Brazil, Chile, Hungary, India, Korea, Malaysia, Mexico, Morocco, Paraguay, Poland, Slovenia, Thailand, Turkey, and Venezuela) to test whether the introduction of Basel I caused credit to contract [7]. Kang and Stulz (2000)

[6] Duebel (2002) shows that credit loss realizations in the US commercial mortgages peaked at 250 basis points in 1993 after more than 15 years averaging only 50 basis points. However, Duebel (2002) argues that it was the "homogenous behavior" of financial institutions rather than the "intrinsic character of property markets" that led to this decline in real estate values. Some examples of this" homogenous behavior" are the firesale prices received by the Resolution Trust Corporation for the sale of thrift assets and the sale of low risk mortgage loans by banks eager to meet Basel I capital requirements.

[7] Using a simultaneous equation model, Chiuri et al (2001, 2002) follow Peek and Rosengren (1995a, 1995b) in attempting to disentangle the supply and demand effects of the reduction in credit following the introduction of Basel I. That is, higher capital requirements may have reduced bank supply of credit, but recession and financial crisis may have reduced the demand for credit.

Their answer is affirmative, with the aggregate credit contraction exacerbated in countries that either strictly enforced the Basel I capital requirements or concurrently experienced currency or financial crises. Retrenchment in the supply of bank loans may have had detrimental impacts on the aggregate level of real economic activity in emerging markets. This credit crunch effect was exacerbated in emerging countries by underdeveloped alternative sources of financing. This restriction in the supply of credit is larger for undercapitalized than for

find that strong reliance on bank financing and the lack of alternative sources of funds in Japan contributed to the decline in firm value displayed by the loss of more than half of equity value for the typical firm on the Tokyo Stock Exchange during 1990 to 1993. Chiuri et al (2002) find, however, that some of the reduced lending may have been "ill-advised" and thus the credit contraction was not necessarily detrimental to the economy. Moreover, the severity of the credit crunch was reduced somewhat for foreign banks, suggesting that globalization of the banking industry may mitigate the contractionary impact of Basel capital requirements. However, Chiuri et al (2001, 2002) conclude that the credit contraction implications of Basel I are the result of increases in aggregate capital levels. To the extent that Basel II does not raise overall capital requirements, there may not be the same retrenchment in capital supply. In contrast, Bikker and Hu (2002) find no support for the credit crunch hypothesis using an international sample of banks from 26 developed and developing countries. Since banks typically hold capital in excess of regulatory minimums, they conclude that capital requirements do not appear to be binding constraints on loan supply.

There are several studies examining the relationship between capital regulation and bank credit creation in Japan. Japan implemented new guidelines on bank capital in May 1986 in preparation for increased competition from foreign banks association with the liberalization of the Japanese financial sector. At that time, banks without foreign branches were required to increase their capital ratios to 4% by March 1991. Those banks with overseas branches had to increase their capital to 6% by March 1998[8].

Evans, et al (1999) find that Japanese banks focused almost exclusively on market share maximization during the pre-Basel I period, thereby neglecting possible risk management and profit maximization policies. The pursuit of growth at all costs set the stage for the chronic bad loans and undercapitalized state of the Japanese banking system during the 1990s. In contrast, Evans, et al (2003) examine European banks and find that while they also experienced asset growth at the same time as did the Japanese banks, their risk levels were lower and their capital levels were higher than those of Japanese banks. Moreover, Ito and Sasaki (2002) examine 87 major Japanese banks and find that they reduced lending in the post Basel I period, as well as issued additional subordinated debt. Japanese banks issued subordinated debt in order to raise Tier 2 capital because Tier 1 capital (equity) was too expensive given the dramatic fall in Japanese equity prices after 1989. Kim and Moreno (1994) trace the reduction in bank lending during the mid-1980s to mid-1990s to the impact of falling

well-capitalized banks.

[8] International banks were permitted to include up to 70% of unrealized gains on equity security holdings (hidden reserves) into their capital in order to meet the new capital requirements instituted in May 1986 in Japan. After the adoption of Basel I, this was decreased to allow only 45% of hidden reserves to be included into Tier 2 bank capital; see Honda (2002).

Honda (2002) examines Japanese bank credit creation during the period of 1967-1994 and finds that the introduction of Basel I reduced aggregate bank credit significantly.

stock prices on Japanese bank capital levels. Since capital requirements were becoming more stringent during this period, the reduction in bank capital levels became a binding constraint on lending activities for Japanese banks.

Japanese banks typically hold significant equity positions and therefore reductions in stock prices erode bank capital levels, thereby constraining the supply of bank loans. However, Kim and Moreno (1994) also note that falling equity prices in Japan may reflect deteriorating economic conditions that would reduce the demand for bank loans. Hoshi and Kashyap (1999) find that the deregulation leading up to the Big Bang has played a major role in the current banking problems. This deregulation allowed large corporations to quickly switch from depending on banks to relying on capital market financing. The deregulation was much less favorable for savers and consequently they mostly continued depositing their savings in banks. However, banks were also constrained. They were not given authorization to move out of traditional activities into new lines of business. These developments together meant that the banks retained assets and had to search for new investment activities. Their new lending primarily flowed to small businesses and became much more tied to property than in the past. These loans have not fared well during the 1990s. Kazuo Ueda (1998) agrees with Hoshi and Kashyap and finds financial liberalization had resulted in increased lending to small firms and real estate sector during the latter part of eighties, which turned to "non performing loans" in the 1990s when the real estate prices collapsed. Ricardo Caballero, Takeo Hoshi and Anil Kashyap (2004) argue that most large Japanese banks were only able to comply with capital standards because regulators were lax in their inspections. To facilitate this forbearance, the banks often engaged in sham loan restructuring that kept credit flowing to otherwise insolvent borrowers (that they call zombies). Thus, the normal competitive outcome whereby the zombies would shed workers and lose market share was thwarted. Robert Dekle and Kenneth Kletzer (2003) also highlight the importance of government policies. They analyze the impact of government policies regarding bank lending on the economy and show how government deposit guarantees and regulatory forbearance can lead to permanent declines in the growth rate of the economy. The Land Revaluation law, which is the subject of this paper, can also be viewed as a form of regulatory forbearance. Akiyoshi Horiuchi and Katsutoshi Shimizu (1998) perform an empirical study to analyze whether the slowdown of credit supply by banks was a result of deterioration of equity capital. They find that "after a substantial decline in their capital base, the major Japanese banks issued subordinated debt to recover their capital".

In this paper, we examine the impact of supply shocks driven by capital requirements on lending activity.

Closest to our paper is the seminal work of Peek and Rosengren (1997) who examine the impact of supply shocks on aggregate lending behavior in Japan. They argue that the dramatic 70% decline in Japanese commercial real estate

prices from their peak in 1990 provides a natural experiment to test the extent to which a loan supply shock can affect real economic activity. Their view is that these shocks were external to U.S. credit markets, yet connected through the substantial penetration of U.S. lending markets by Japanese banks, which allows them to identify an exogenous loan supply shock. They use this exogenous shock to account for lending fluctuations and ultimately fluctuations in construction activity in major commercial real estate markets in the United States. In a related paper, Heather Montgomery (2005) examines the allocative effect on Japanese bank lending in the aftermath of Basel I. Using a time series and panel data of internationally active and domestically active Japanese banks during the period 1982 to 1999, she investigates if implementation of Basel I encouraged banks to move away from heavily weighted assets like corporate bonds and loans to unweighted assets like government bonds. She concludes that total regulatory capital requirements did not cause changes in bank portfolios. However, she finds that internationally active banks' asset portfolios are sensitive to Tier 1 capital requirements.

A possible shortcoming of these conflicting empirical studies is that the credit crunch literature suffers from an identification problem in that there are several possible supply and demand effects that may explain the apparent decline in lending that coincided with the introduction of Basel I[9]. Bizer (1993) finds that banking supervisors assigned lower CAMEL ratings to banks during the credit crunch period. Moreover, Peek and Rosengren (1995a, 1995b) find that regulatory actions, such as cease and desist orders, had a significant impact on bank lending activity, and a secular shift in banking away from on-balance sheet to more lucrative off-balance sheet activities. After controlling for these factors, Furfine (2001) finds that "some form of regulatory involvement, either raising capital requirements or increasing regulatory monitoring, was a necessary contributor to the credit crunch. That is, the observed portfolio adjustment undertaken in the early 1990s could not have been simply the result of changing economic conditions or secular change"(Furfine (2001), pp. 36.)

In this paper, we use a natural experiment (the passage of the Land Revaluation law) to disentangle demand and supply effects.

Finally, our paper is also related to the literature on bank regulations and

[9]Hancock, et al. (1995) attempt to disentangle the loan supply effect (due to shifts in regulatory capital requirements) from the loan demand effect (due to an economic contraction that reduced loan demand) using a vector-autoregression model and find that banks adjust their capital positions much more quickly than they adjust their loan positions. Moreover, credit-constrained banks reduced their lending by greater amounts than well-capitalized banks, suggesting that some, but not all, of the explanation for the credit crunch can be traced to regulatory restrictions.

Furfine (2001) incorporates the following four explanations into a theoretical model that is confronted with actual US bank data in order to simulate bank reactions to changes in capital requirements. Aggregate lending in the US decreased in the early 1990s as a result of: (1) higher capital requirements mandated by Basel I, (2) lower loan demand due to the economic recession, (3) greater regulatory scrutiny.

geographic segmentation. For example, Kroszner and Strahan (1999) examine the 1994 deregulation of intrastate and interstate branch banking and find that geographic segmentation is substantially reduced when the regulatory barriers to entry are removed. In contrast, Becker (2005) finds substantial geographic segmentation even when there are no regulatory barriers. He examines bank access to local deposit supply. Using the fraction of seniors in a community as an instrument, he finds that the local availability of bank deposits has a significant impact on loan supply. In the context of this paper, we test the geographic integration of bank lending policy across regulatory policy venues in the U.S. and Japan.

3 Data and Methodology

On March 17, 1998, the "Financial Crisis Administration Committee" in the Japanese government's Deposit Insurance Corporation announced the plan for restructuring 21 major Japanese banks using public funds. The purpose of injecting these funds was to correct the "*kashishiburi*" or the reluctance of the Japanese banks to lend to Japanese companies. One of the major reasons for "*kashishiburi*" was believed to be the strict implementation of the Basel I capital adequacy ratio. In order to further boost the capital requirements the Diet passed a bill on March 31st 1998 (law No. 34/1998) which essentially allowed banks to increase their capital requirement by revising the value of their land holdings from the original acquisition costs to the current market value. Summarizing the main clauses of the law:

1. **Land**: Land includes not for sale real property situated in Japan but not buildings and structures built on it, held in use by Japanese banks and industries

2. **Method of Revaluation**: Land holdings are permitted to be revalued at the current market value based on one of the five following methods: (1) Value of land announced by law concerning public announcement of land value (Law No. 49/1969), (2) the value of land used by government to enforce National Land Use Planning Act (3) the value of land as shown on tax rolls (4) value of land as declared by Commissioner of National Tax Administration for Land value taxation (5) value of land as certified by a real estate appraiser. Banks hold the option to revalue their land holdings.

3. **Applicable Judicial Entities**: The law applies to all banks and all other companies and financial institutions with a certain capital position (for example capital stock greater than 500 million yen)

4. **Opportunity for Revaluation**: The revaluation can be done *only once* on a settlement of accounts day within two years from the date of commencement or enforcement of the law (31st March, 1998). Thereafter the revalued land will be fixed on the banks' or company's' book at the revalued basis. Thus, banks with positive land revaluation reserves obtained a permanent regulatory capital infusion.

5. **Appropriation of the revaluation to the balance sheet**: After the difference between the revalued figure and the original entry to the value of land is calculated, the figure shall be appropriated to the assets side of the balance sheet and to the liabilities side as a reserve for revaluation. No taxation occurs until the land is actually sold and capital gains are realized.

The Land Revaluation Law provided a way for Japanese banks to meet the capital adequacy ratio. The revaluation law was based on the assumptions that (1) Japanese banks had a considerable holding of land assets (2) the acquisition costs of land were much lower than the land price in March 1998, even after the huge decline in land prices. The key benefit of the Land Revaluation Law lies on two factors (1) this is a onetime event and since the acquisition cost is much lower than the current land prices, most banks would be able to show substantial gains in land value, (2) the subsequent gains or losses though disclosed in financial statements, would not be booked and would not affect equity capital. **Figure 1** shows that while land prices increased at roughly the same pace as equity prices during the bubble period, the rate of decline in the mid to late 1990s was much slower for land than equity prices.

[INSERT FIGURE 1]

Table 1 shows that all of the top ten Japanese banks with the exception of Shizuoka bank took advantage of the Land Revaluation Law. Most banks revalued their land as soon as the law was enacted and all banks reported gains on revaluation. The gains range from 5 million Japanese Yen in case of Mitsui Trust Holdings, Inc. to 534 million Japanese Yen for Mizuho Holdings. Moreover all banks report subsequent losses in the period following revaluation. The value of these losses as a percentage of net assets range from 6.2% for Daiwa Bank Holdings to 8.4% for Chiba Bank. The fact that these losses were not reported and did not have to be accounted for in capital adequacy calculations provide further insight into the importance of Land Revaluation Law in propping up capital requirements.

[INSERT TABLE 1]

For our analysis we utilize two databases. One contains data on Japanese bank lending in Japan, whereas the other examines Japanese bank lending in the US. With regard to the Japanese domestic loan database, we take panel

data that includes aggregate quarterly observations from first quarter of 1983 until last quarter of 2003 of the three major types of Japanese banks that had commercial lending operations: City banks, Regional 1 banks and Regional 2 banks. This covers almost 70% of loan demand catered by private financial institutions in Japan. The other financial institutions that are depository institutions include the trust banks and the long term credit banks, which cater to 7% of loan demand (as reported by Japanese Bankers Association). We do not include trust banks and long term credit banks in our analysis as the balance sheet data on these banks are available only through 2000. We aggregate the data over individual banks in order to control for bank mergers[10]. After adjusting for lags in capital asset ratio, our sample contains 248 quarterly datapoints. The database is available from Bank of Japan that provides us quarterly balance sheet of commercial banks in Japan aggregated by bank types.

The second database provides data on Japanese bank lending in the US. The data is obtained from quarterly US call report data over the period 1980 to 2003. In addition to City and Regional banks we also include data for other types of Japanese banks, including trust and long-term credit banks operating in US as Peek and Rosengren (1997) suggests that trust and long-term credit banks had the second most prominent presence in the US loan market after Japanese City banks. Adjusting for lags, we have 283 quarterly datapoints.

Our basic model specification is of the form:

$$\frac{\triangle L_{i,j}(t)}{A_i(t)} = P_0 X(t) + P_1 Y(t) + P_2 Z(t) + P_3 K(t) \tag{1}$$

where:

$\frac{\triangle L_{i,j}(t)}{A_{i,j}(t)}$: change in outstanding loans of bank of type i to sector j between the period $t+1$ and t as a ratio of total assets of bank i.

We consider four categories of loans, i:
(1) total loans

[10] One of the most important mergers was between Fuji Bank, the Industrial Bank of Japan and Dai-Ichi Kangyo Bank in September 2000, to form a mega bank group called Mizuho Financial Group.

This was followed by three other big mergers involving in April 2001. Bank of Tokyo-Mitsubishi, Mitsubishi Trust and Nippon Trust merged to form the Mitsubishi-Tokyo Financial Group.

The second merger was between Sakura Bank and Sumitomo Bank which established the Sumitomo Mitsui Banking Corporation (SMBC).

The third merger involved Sanwa Bank, Tokai Bank and Toyo Trust to set up the United Financial of Japan (UFJ) group.

The most recent consolidation was in December 2001 when Daiwa Bank, Kinki Osaka Bank and Nara Bank merged.

In March 2002, Asahi Bank joined them to form another financial group that was tentatively named Resona Holdings in October 2002 and Resona Bank joined them in May 2003 (see Adrian van Rixtel, Ioana Alexopoulou and Kimie Harada (2003) for more details).

(2) loans to the non-residential real estate sector
(3) loans to the housing sector[11] and
(4) commercial and industrial loans

In addition to the change in lending behavior, we also look at changes in assets and change in profitability of the Japanese banks during the period under consideration.

Our explanatory variables are summarized in the matrices: $X(t)$, $Y(t)$, $Z(t)$ and $K(t)$

$X(t)$ is a matrix of variables that describe the general characteristics of the bank category and includes the seasonal dummies where:

$$X(t) = \begin{bmatrix} Q_1(t) \\ Q_2(t) \\ Q_3(t) \\ city(t) \\ reg_i(t) \\ asset(t) \end{bmatrix}$$

$Q_i(t), i \in \{1, 2, 3\}$: denotes the dummy for the quarter under consideration and takes the value 1 or 0; the fourth quarter is omitted.

$city(t)$: denotes the dummy for "City banks" and takes a value 1 if the bank under consideration is a City bank and 0 if it not.

$reg_i(t)$: denotes the dummy for "Regional banks" and takes a value 1 if the bank under consideration is a Regional bank and 0 if it not. $i \in \{1, 2\}$ denotes the type of Regional bank under consideration, whether a Regional 1 bank or a Regional 2 bank.

$asset(t)$: denotes the log of assets of the bank. This factor reflects the size of the bank.

Loans can change due to both demand as well as supply conditions. Since we are interested in exogenous supply side shocks from regulatory policy changes, we control for demand effects in the matrix $Y(t)$.

$Y(t)$: is a matrix of variables that describe the demand conditions of the economy.

[11] Looking at the reporting requirements mandated by FDIC on branches of foreign banks operating in United States, we find that though banks are required to report aggregate real estate lending as well as lending to the non-residential real estate sector (primarily construction and land development), however banks are not required to distinguish between housing loans and loans furnished against home equity. As a result we cannot distinguish between loans made for housing from home equity line of credit that also includes second mortgages and other credit lines borrowed against ones home. This is not the case for domestic lending by Japanese banks where we can get data on housing loans, as distinguished from home equity line of credit. Hence for Japanese bank lending in the US, we report results for aggregate real estate lending only and do not separately look at housing vis-a-vis non-residential real estate loans.

$$Y(t) = \begin{bmatrix} gdp(t) \\ OtherLoan(t) \\ confidence(t) \\ loanloss(t) \end{bmatrix}$$

The demand variables are summarized as:

$gdp(t)$: rate of change of Gross Domestic Product between periods t and $t-1$. We expect lending to be a positive function of GDP. The data on GDP for Japan is available from the Japan Statistical Yearbook and that of US is available from National Income and Product Accounts of United States published by the Bureau of Economic Analysis.

$OtherLoan(t)$: rate of change in lending between periods t and $t-1$ of non Japanese banks as a share of the previous period assets. Non Japanese banks are not subject to policy regulations by the Japanese government but would respond to fluctuations in local demand so we use it as a proxy for local demand conditions. The data on foreign lending in Japan is collected from the Bank of Japan and the data of non-Japanese lending in United States is available from the call reports filed with Federal Deposit Insurance Corporation.

$confidence(t)$: an index that tells us how consumers view the future economic conditions. Consumer Confidence Index for Japan is collected from the ESRI-HISTAT-JIP database of Economic and Social Research Institute of Japan and those for United States are available from University of Michigan[12].

$loanloss(t)$: provisions made by banks for general loan loss reserves as one of the independent variables. In Japan, as pointed out by Kashyap and Hoshi (2004) and Peek and Rosengren (2003) amongst others, Japanese banks have very close lending relationships with the borrowers and so in many cases during

[12] We have also conducted a robustness check incorporating other indicators of demand with no substantial changes in our results. These other variables are:

$pop(t)$: rate of change in population between periods t and $t-1$. We expect lending to increase if population increases

$fdi(t)$: rate of change in foreign direct investment between periods t and $t-1$. This is a pure demand side factor as foreign direct investment to a country increases in response to increased demand by the firms of a country and we expect this term to capture the economic environment in the country.

$cpi(t)$: consumer price index during period t. The CPI affects the purchasing power of the consumers and thus can affect the demand for bank loans in two ways: it can directly affect the demand for housing loans by households and indirectly, a change in CPI can change a households demand for goods and services and thus affect firm behavior which in turn will affect demand for bank loans by industries.

$industry_index(t)$: we consider the future outlook for the four sectors under consideration;

$totindex$ summarizes the overall business outlook for future

$nonmanindex$: summarizes the business outlook for the non-manufacturing sector, real estate being one of them;

$manindex$: summarizes the business outlook for the manufacturing sector.

$jip(t)$:the index of industrial production prepared by the Bank of Japan that indicates how productive the economy is

the nineties recession preferred to "evergreen" the loans rather than confiscate the collateral in case of non-repayment thus potentially keeping "zombie" firms alive. They often kept substantial reserves for these loan losses which potentially can have serious consequences on their lending behavior. Such loan loss reserves can also be considered as an additional proxy for domestic economic conditions in Japan. The data on loan loss reserves is available from financial statements of Japanese banks that are filed with the Bank of Japan. Note that in Japan up to 1.25% of general loan loss provisions can also be included in Tier 2 capital.

The supply side factors in our analysis focus on exogenous regulatory policy changes. $Z(t)$ is a matrix that includes the dummies for the three periods under consideration: liberalization, post Basel I and post Land Revaluation Law. For our analysis, a particular period begins when all policies that define that particular period have been fully implemented (and not when the policies were first put in place). In our model, the period leading up to liberalization of financial markets in Japan began in the late 1970s and continued until the big bang in 1986.

$$Z(t) = \begin{bmatrix} lib(t) \\ basel1(t) \\ basel99(t) \end{bmatrix}$$

$lib(t)$: denotes the liberalization period which in our model is taken from 1986:1 to 1992:4.

$basel1(t)$: denotes the period when Basel I was fully in force, but prior to the enactment of the Land Revaluation Law. Insofar as Basel I was fully implemented by March 1993, we take the post liberalization or Basel I period as 1993:1 to 1998:4

$basel99(t)$: denotes the period when Land Revaluation Law was in force. Although a two year period was granted to the banks to adopt land revaluation, most banks that took advantage of the law completed land revaluation within a year of its enactment. Hence we take the post Land Revaluation Law period to be from 1999:1 to 2003:4.

Finally we examine the components of capital that are used to meet the capital adequacy requirements. $K(t)$ is a matrix that includes the variables related to capital adequacy requirements:

$$K(t) = \begin{bmatrix} tier1_i(t) \\ tier2_i(t) \end{bmatrix}$$

$Tier1_i(t)$: denotes the Tier 1 capital output ratio for a bank type i in period t. Tier 1 capital is common to all countries and primarily consists of common stock-holders equity and disclosed reserves. Due to a lack of data on risk weighted assets, particularly in the eighties and early nineties we follow Montgomery (2005) or Watanabe (2004) and calculate capital output ratio as the ratio of book value of capital to "unrisk-wighted" assets as opposed to "risk-weighted assets" used by the BIS measure.

$Tier2_i(t)$: includes the components of Tier 2 capital as a share of assets for a bank type i in period t. The elements of Tier 2 capital consists of capital-like securities. In case of Japan, they primarily consist of the market values of securities not already included in the balance sheet. In this regard, the two major securities considered are equities and land. Japanese banks are distinct from others in that they hold significant portion of their borrower's equity securities and in addition they have substantial land holdings. The Land Revaluation Law of 1998 allowed the revalued land assets to be calculated as part of Tier 2 capital in addition to equity revaluation.

In addition to the model estimated above, we estimate two other models:

$$\frac{\triangle Assets}{Assets} = P_0X(t) + P_1Y(t) + P_2Y(t) + P_3Z(t) + P_4K(t) \tag{2}$$

$$\frac{\triangle \Pr ofits}{\Pr ofits} = P_0X(t) + P_1Y(t) + P_2Y(t) + P_3Z(t) + P_4K(t) \tag{3}$$

We estimate equations (1), (2) and (3) using OLS, controlled for fixed effects due to bank types.

4 Empirical results

4.1 Descriptive statistics on Japanese bank lending in Japan

Table 2 shows the evolution of domestic lending in Japan over the different sub-periods by lending category. We provide the data on aggregate lending and lending by different types (City, Regional1 and Regional2) in panels 2-a to 2-d respectively. In the first row of each table, we provide the average value of loans in 100 million yen and in the second row we provide the loans to each industry as a percentage of total loans. Our primary interest is in evolution of bank lending during our subperiods. We provide the change in loans as a fraction of beginning of the period assets (in percentages) in row three that is a good measure of changes in lending behavior and has been used by Peek and Rosengren (2000) amongst others. We also provide the associated standard deviation in row four.

In addition, in **Table 3** we list the growth rate of assets and profits during different subperiods and by bank categories. Also, our focus of interest is the revaluation of land and equity in Japan for which data becomes available beginning in 1999. In **Table 3** we have included the associated average values of equity revaluation and land revaluation by bank types.

As we see from **Table 2** in its various panels, housing, C&I and non-residential real estate lending comprises about 40% of total loans in Japan (the

figure dropped to 38% during the post Basel I period but in the post Land Revaluation Law period, it again increased to about 43%). The liberalization period witnessed loan expansion for all bank types, the major winners being the non-residential real estate sector and the housing sector as widely believed in literature. However, commercial and industrial lending decreased. Growth rate of housing loans increased from .05% to .17%, and the growth rate of non-residential real estate loans went up from .19% to .2%. During this period, C&I loans fell from .34% to -.04%. It is plausible that liberalization increased access of bigger primarily manufacturing firms (those who demand commercial and industrial (C&I) loans) to international financial market. Given this environment, the banks turned to providing more real estate backed loans which flowed to commercial real estate sector as well as housing.

The post Basel I period when banks had implemented the regulations mandated by Basel I first hit commercial and industrial loan by the City banks, which were the major suppliers of these loans. However the loans to the real estate sector, both commercial real estate as well as housing increases[13] (though the growth rate considerably slows for commercial real estate) . This trend is consistent with arbitrage opportunities presented by Basel I accord as housing loans carry a lower risk weight so housing remained a lucrative lending opportunity. As for non-residential real estate, banks shared a close lending relationship with domestic borrowers (comprised mainly of real estate borrowers as big manufacturing firms had moved away from debt to equity financing during the liberalization period) which prevented banks from drastically reducing loans even when Basel accord put a squeeze on capital positions. The trend continued in the post Land Revaluation Law period though for the first time, non-residential real estate loans as a percentage of assets register a fall. However the rate of decline of C&I loans reduces which might be a result of a positive shock to capital due to the Land Revaluation Law.

[INSERT TABLE 2]

In **Table 3**, we look at the growth rates of assets and profits. Growth rate of assets and profits increased during the liberalization period. In the post Basel I period, though the growth rate of assets declined, it was still positive (except for Regional1 banks). However, the growth rate of profits turned negative. In an interesting turn of events, in the post land revaluation period, the growth rate of assets picked up (except for second tier Regional banks) At the same time, the rate of decline in profits reduces (for example, if we look at all banks, then the rate of decline was -2.1% in post Basel I period, it declined to -1.6% in the post Land Revaluation Law period).

Given this data, we conclude that it was in late nineties that the effect of Basel I was really being observed in the Japanese banks. The hitherto untouched non-residential real estate sector faced a decline in loans though housing loans

[13] City banks are an exception in this regard as non-residential real estate loans made by city banks drop during the post Basel one period.

did not register significant changes. At the same time, in the post land revaluation period, assets, profitability and C&I loans (of City banks in particular) show some improvement.

The Land Revaluation Law was enacted to relax the requirements of Basel I by allowing banks to count up to 45% of their unrealized gains on land holding towards Tier 2 capital. We had earlier seen in Table one that amongst the major banks that had actually taken advantage of the Land Revaluation Law, all banks reported net unrealized gains. In **Table 3**, we look at the aggregate figures by bank types. As **Table 3** shows us, revalued land accounts for .3% of assets of the banks, and all types of banks show positive land revaluation figures which we suspect, might have a significant effect on bank lending behavior. Equity revaluation for its part does not necessarily show a gain. For example, for City banks equity revaluation actually shows a loss, and it is only significant (accounting for .48% of assets) only for Regional banks.

We suspect that the Land Revaluation Law played a significant role in influencing bank lending post 1999 which can account for some of the observed trends.

[INSERT TABLE 3]

4.2 Results of Japanese bank domestic lending

In our regression analysis we statistically examine the impact of bank capital regulatory policy shocks on Japanese bank lending behavior. **Table 4** summarizes the regression results of our estimates of equation (1). There is no significant aggregate effect on bank lending in Japan as a result of either the adoption of Basel I in 1993 or the implementation of the Land Revaluation Law in 1999. That is, both the dummy variables ($Basel1, Basel99$) and the interactive terms ($Tier1 * Basel1$, $Tier1 * Basel99$ *etc*) have insignificant coefficients for all dependent variables. However, comparison of the regression results for C&I loans (column (4)) and housing loans (column (3)) illustrate the allocative effects of the passage of the Land Revaluation Law. The coefficient on the $Landreval * Basel99$ independent variable is significantly (at the 5%) negative (a coefficient of –1.72) for residential mortgage lending, whereas it is significantly (at the 1% level) positive (a coefficient of 2.06) for commercial lending. This suggests a substitution effect for banks with large positive land revaluation reserves. The capital infusion permits the Japanese banks to reduce the share of real estate lending in their portfolio and increase their holdings of higher yielding, unsecured commercial loans.

Other results are not surprising. The coefficient on ASSET in **Table 4** is negative and statistically significant at the 1% level, suggesting that Japanese bank lending declined overall during the period of the banking and financial crisis during the 1990s. Japanese financial market liberalization is reflected in the

positive and significant (at the 5% level) coefficients on foreign loans, consistent with the opening up of Japanese financial markets internationally during the post 1986 period of financial market liberalization in Japan. The negative and significant coefficient on the Liberalization variable (– 0.003) in Column (4) of **Table 4** shows that this liberalization resulted in large commercial firms' shift from Japanese bank loans to international capital markets to meet their financing needs. At the same time, the positive and significant (at 1%) coefficients associated with real estate lending (.002 for non-residential real estate and .001 for housing) indicates a shift of bank loans to real estate sector as highlighted in literature. The lack of significance on the LoanLoss variables (except for housing loans) for all subperiods reflects the inability of distressed banks to capitalize on the forbearance in Japanese bank capital regulations. During the post Basel I period, we find banks with increased loan loss reserves lent more to housing. The coefficient is significant and positive (.7 and .51 in post Basel I and Basel 99 periods). This result is very intuitive as it shows that banks that had increased loan loss reserves indicating large amounts of non-performing loans, shifted to lending for housing which carries a lower risk weight(50%) according to Basel stipulations.

[INSERT TABLE 4]

Table 5 shows the competitive advantage of the Japanese banks with larger land revaluation reserves. The change in profitability for banks with positive land revaluation after the passage of the Law is statistically significantly (at the 1% level) positive[14] as is the coefficient on equity revaluation. This suggests that the regulatory forbearance incorporated in both land revaluations and equity revaluations significantly improved Japanese bank profitability in a time of declining profits. Thus our results are consistent with bank lending behavior in Japan that was sensitive not only to the numerator (capital measurements) of the Basel Capital but also the denominator that has to do with risk weighting of assets and provides banks with a clear regulatory arbitrage opportunity. We find Japanese banks taking advantage of this opportunity.

[INSERT TABLE 5]

4.3 Descriptive statistics on Japanese bank lending in the US

Apart from its domestic lending operations, Japanese banks also have a significant international presence. As Peek and Rosengren (1997) shows, by 1990s

[14] The coefficient associated with land revaluation is extremely high. We suspect this has to do with the volatility of profitability figures. The time series on profitability shows wild fluctuations in the latter part of the nineties, with profitability change registering double digit increases in certain quarters followed by negative growth in the next.

almost all of the top 10 banks in the world were headquartered in Japan. Peek and Rosengren (1997) studies the impact of Basel I on US lending operations of the Japanese banks during the period 1988 to 1994. Given that the Land Revaluation Law was a positive boost to the capital positions of Japanese banks, we also want to investigate if it affected US lending.

We present the descriptive statistics of lending by Japanese bank branches in US in **Table 6** (there are four panels, 6-a lists aggregate lending behavior, 6-b to 6-d outline the lending behavior by bank types). We concentrate on loans to the real estate sector and the C&I loans as they constitute about 70% of total lending in US (except for the pre-liberalization period, when the share was less).

As **Table 6** shows us, over the post-liberalization period (1986:1 to 1992:1) overseas loans registered a sharp increase in all sectors, including loans backed by real estate and C&I loans. This was a result of increase in foreign investment opportunities but more so a result of gradual relaxation of the regulatory policies.

The experiences of different types of banks during the post Basel I period are varied. The rate of loan growth turns negative for all types of banks, though clearly, the City banks were not as badly hit as the Regional banks. In fact when we look at the aggregate lending, we find that though growth rate declines for all types of loans, the decline is larger for loans backed by real estate. This is a result of the fact that Regional banks played an important role in lending to real estate sector. However by 2000, most of the Regional banks had shrunk their US operations while most City banks and others (trust and long term Regional banks) continued to operate.

A comparison with domestic lending shows that real estate lending at the same period in Japan was increasing though even domestic C&I loans did decline. This is an allocative change, which might have been prompted by close domestic relationships, but also by the fact that banks that only had domestic operations faced a more lenient 4% MOF ratio.

Post 1999, though the lending by City banks and Regional 1 banks (particularly to C&I sector) improved, the aggregate lending did not show such improvement which may be a result of shrinkage of US operations by many Japanese banks (in particular second tier Regional banks).

[INSERT TABLE 6]

In comparison, lending by non-Japanese banks in United States show unilateral increase in all sectors as outlined in **Table 7**. This further establishes that changes in lending by Japanese banks were due to regulatory or policy changes affecting Japanese banks and not so much due to changes in demand for loans[15].

[INSERT TABLE 7]

[15] Had the shrinkage of loans by Japanese bank branches been a result of shifts in demand, then we would also have seen such shrinkages in lending by non-Japanese banks operating in US.

4.4 Results of Japanese bank lending in the US

Examining the reaction of Japanese bank lending behavior in the U.S., **Table 8** shows that there is an aggregate level effect of the Land Revaluation Law. The coefficients on $TierOne * Basel99$ and $TierTwo * Basel99$ are both negative and statistically significant at the 5% level, suggesting that well-capitalized Japanese banks reduced their total lending in the U.S. in the wake of the passage of the Land Revaluation Law. This result seems to be driven by real estate lending in US by Japanese banks as the coefficient on $TierOne * Basel99$ and $TierTwo * Basel99$ associated with real estate lending is negative (-.31 and -.32) respectively. We do not see such a shrinkage associated with C&I loans. Together with the earlier regression results (see **Table 4**), this suggests that the Law induced a substitution away from real estate lending in both the U.S. and Japan in the wake of Land Revaluation Law toward more profitable commercial lending. The negative, although insignificant coefficient on U.S. domestic bank lending (OtherLoan) suggests that this effect is not the result of local U.S. demand conditions.

[INSERT TABLE 8]

To further test the robustness of our result that indeed the international lending behavior of Japanese banks were an artifact of changes in regulatory policy applicable to Japanese banks and not local demand conditions, we follow Peek and Rosengren (1997) and regress the deviations in Japanese lending in United States from their non-Japanese counterparts and call this specification two to distinguish this test from the previous regression which we call specification one. We report the result in **Table 9**. Our results are exactly similar to those outlined in **Table 8**, with the coefficients on $TierOne * Basel99$ and $TierTwo * Basel99$ being negative and significant at 5% further supporting our findings that supply shocks induced by regulatory forbearance policies induced changes in Japanese bank lending behavior.

[INSERT TABLE 9]

5 Conclusion

This paper is the first to examine the allocative and aggregate lending effects of a significant divergence in Japanese bank capital regulations from the international Basel standards stemming from the 1998 passage of the Land Revaluation Law in Japan. We investigate the impact of lending in the U.S. and Japan of the Land Revaluation Law passed in 1998 that permitted banks to count 45% of the unrealized gains on their real estate holdings as Tier 2 capital. We find evidence that this induced considerable shifts in bank lending behavior. In particular,

well-capitalized Japanese banks were able to utilize this regulatory capital infusion in order to shift their lending from low margin mortgages toward higher yielding commercial loans. Moreover, we find that these banks shifted some of their lending out of U.S. lending, predominately secured by real estate, toward domestic Japanese lending to fund manufacturing. However, there does not appear to be an overall aggregate effect of this regulatory policy shock. Thus, we find that the impact of this regulatory policy divergence from international norms tends to redistribute lending across different sectors of the economy without impacting the overall amount of lending significantly.

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Table 1: Financial Statement of a sample of Japanese banks in the wake of Land Revaluation Law

Bank	Total assets	Net profits (losses)	Capital adequacy	Revaluation date	Gain (loss)	Future Gain (loss)
			Millions of Japanese Yen			
(1)Mizuho Holdings	151, 312	(976)	10.56%	03/31/98	534	(228)
(2)Sumitotmo Mitsui Banking Corp.	108, 005	(464)	10.45%	03/31/98	121	(92)
(3) Mitsubishi Tokyo Financial Group	99, 497	(152)	10.3%	03/31/98	202	(118)
(4) UFJ Holdings	79, 773	(1,227)	11.04%	03/31/98	131	(70)
(5) Daiwa Bank Holdings Inc.	44, 952	(932)	8.76%		113	(80)
(6) Sumitomo Trust & Banking Company	16, 704	(42)	10.86%	03/31/98	6	(7)
(7) Mitsui Trust Holding Inc.	13, 373	(278)	10.59%	03/31/98	5	(6)
(8) Bank of Yokohama	10, 765	20	10.72%	03/31/98	33	(27)
(9) Shizuoka Bank	8, 178	7	12.51%	No revaluation	-	-
(10) Chiba Bank	8, 146	335	10.22%	03/31/98	13	(28)

Note: The data is in millions of Japanese Yen. The gain in land value is measured as the difference in value resulting from differences in urban land prices in 1998-1999 and the historical acquisition cost of land. Note that future gains or losses is calculated as the estimated annual difference in land values.

Data source: KPMG Japan(2002)

Table 2: Descriptive Statistics on domestic lending by Japanese banks by sectors

Table 2-a: Descriptive statistics: aggregate over all banks

Aggregate over all banks	Housing loans	C&I loans	Non-residential Real estate loans	Total loans
Pre –liberalization period				
Outstanding loans- Levels	166816.15	642891.41	129395.96	2239114.1
Share of total loans	7.45%	28.71%	5.77%	
Changes in outstanding loans as a share of assets	.05%	.34%	.19%	1.75%
(standard deviation in parenthesis)	(.04%)	(.43%)	(.1%)	(1.42%)
Liberalization period				
Outstanding loans- Levels	308185.86	662436.02	322670.38	3384213.8
Share of total loans	9.11%	19.57%	9.54%	
Changes in outstanding loans as a share of assets	.17%	-.04%	.2%	1.08%
(standard deviation in parenthesis)	(.1%)	(.29%)	(.16%)	(1.12%)
Post Basel One period				
Outstanding loans- Levels	482553.33	609818.63	453296.92	4026227
Share of total loans	11.98%	15.15%	11.25%	
Changes in outstanding loans as a share of assets	.13%	-.04%	.05%	.09%
(standard deviation in parenthesis)	(.11%)	(.33%)	(.06%)	(1.02%)
Post Land Revaluation Law period				
Outstanding loans- Levels	684925.63	551949.63	464338.05	3874858.6
Share of total loans	17.66%	14.24%	11.98%	
Changes in outstanding loans as a share of assets	.16%	-.09%	-.05%	-.37%
(standard deviation in parenthesis)	(.1%)	(.26%)	(.1%)	(.93%)

Note: We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). For each sub-periods, the first row shows the amount of domestic loans outstanding by sector of Japanese banks measured in 100 million yen. The second row shows the sectoral lending as a percentage of total lending. The third row shows the change in outstanding loans as a share of beginning of the period asset. This is our measure for evolution of bank lending over time. The standard deviation of the change in loans as a share of beginning of the period assets are in parenthesis.

In Panel 2-a we provide the data aggregated over all banks by sectors and periods.

Data source: Assets and liabilities report of banks from Bank of Japan and the time series on lending by sectors also from Bank of Japan.

Table 2-b: Descriptive statistics: lending by City banks

City Banks	Housing loans	C&I loans	Non-residential Real estate loans	Total loans
Pre –liberalization period				
Outstanding loans- Levels	74032.62	390535.08	67238.413	1211443.1
Share of total loans	6.1%	32.15%	5.53%	
Changes in outstanding loans as a share of assets	.06%	.38%	.21%	2%
(standard deviation in parenthesis)	(.053%)	(.4%)	(.1%)	(.96%)
Liberalization period				
Outstanding loans- Levels	183667.89	388667.45	194524.92	1916165
Share of total loans	9.56%	20.27%	10.09%	
Changes in outstanding loans as a share of assets	.2%	-.09%	.22%	1.07%
(standard deviation in parenthesis)	(.1%)	(.27%)	(.21%)	(.95%)
Post Basel One period				
Outstanding loans- Levels	282126.63	314408	270782.96	2180057.6
Share of total loans	12.94%	14.36%	12.44%	
Changes in outstanding loans as a share of assets	.09%	-.07%	.04%	-.06%
(standard deviation in parenthesis)	(.1%)	(.37%)	(.08%)	(.1%)
Post Land Revaluation Law period				
Outstanding loans- Levels	364900.26	295693.74	282369.84	2072184.4
Share of total loans	17.58%	14.32%	13.59%	
Changes in outstanding loans as a share of assets	.1%	-.066%	-.05%	-.35%
(standard deviation in parenthesis)	(.09%)	(.33%)	(.18%)	(1.3%)

Note: We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). For each sub-periods, the first row shows the amount of domestic loans outstanding by sector of Japanese banks measured in 100 million yen. The second row shows the sectoral lending as a percentage of total lending. The third row shows the change in outstanding loans as a share of beginning of the period asset. This is our measure for evolution of bank lending over time. The standard deviation of the change in loans as a share of beginning of the period assets are in parenthesis.

In Panel 2-b we provide the mean lending of City banks by sectors and periods.

Data source: Assets and liabilities report of banks from Bank of Japan and the time series on lending by sectors also from Bank of Japan.

Table 2-c: Descriptive statistics: lending by Regional banks

Regional Banks	Housing loans	Non-residential C&I loans	Non-residential Real estate loans	Total loans
Pre-liberalization period				
Outstanding loans- Levels	60596.846	194750.92	36431.732	720861.36
Share of total loans	1.73%	20.31%	7.65%	
Changes in outstanding loans as a share of assets	.03%	.35%	.13%	1.7%
(standard deviation in parenthesis)	(.05%)	(.55%)	(.1%)	(2.15%)
Liberalization period				
Outstanding loans- Levels	80235.214	214598.96	80611.267	1045988.2
Share of total loans	7.67%	20.51%	7.67%	
Changes in outstanding loans as a share of assets	.09%	.04%	.16%	1.1%
(standard deviation in parenthesis)	(.064%)	(.4%)	(.15%)	(1.81%)
Post Basel One period				
Outstanding loans- Levels	131087.83	232651.71	121555.79	1323373.4
Share of total loans	9.9%	17.58%	9.18%	
Changes in outstanding loans as a share of assets	.16%	-(.009%)	.05%	.31%
(standard deviation in parenthesis)	(.13%)	(.36%)	(.11%)	(1.49%)
Post Land Revaluation law period				
Outstanding loans- Levels	225904.95	207863.89	128021.21	1338321.6
Share of total loans	16.87%	15.5%	9.56%	
Changes in outstanding loans as a share of assets	.28%	-.12%	-.01%	-.2%
(standard deviation in parenthesis)	.2%	(.25%)	(.08%)	(1.05%)

Note: We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). For each sub-periods, the first row shows the amount of domestic loans outstanding by sector of Japanese banks measured in 100 million yen. The second row shows the sectoral lending as a percentage of total lending. The third row shows the change in outstanding loans as a share of beginning of the period asset. This is our measure for evolution of bank lending over time. The standard deviation of the change in loans as a share of beginning of the period assets are in parenthesis.

In Panel 2-c we provide the mean lending of Regional banks by sectors and periods.

Data source: Assets and liabilities report of banks from Bank of Japan and the time series on lending by sectors also from Bank of Japan.

Table 2-d: Descriptive statistics: lending by Second Tier Regional banks

Second Tier Regional Banks	Housing loans	Non-residential C&I loans	Non-residential Real estate loans	Total loans
Pre-liberalization period				
Outstanding loans- Levels	32186.692	57605.41	25725.816	306809.64
Share of total loans	10.48%	18.77%	8.37%	
Changes in outstanding loans as a share of assets	.07%	.1%	.19%	1.04%
(standard deviation in parenthesis)	(.12%)	(.46%)	(.14%)	(2.26%)
Liberalization period				
Outstanding loans- Levels	44282.75	59169.612	47534.191	422060.59
Share of total loans	10.49%	14.02%	11.25%	
Changes in outstanding loans as a share of assets	.13%	.02%	.17%	1.1%
(standard deviation in parenthesis)	(.12%)		(.23%)	(1.17%)
Post Basel One period				
Outstanding loans- Levels	69338.875	62758.917	60958.167	522796.04
Share of total loans	13.26%	11.99%	11.66%	
Changes in outstanding loans as a share of assets	.2%	-.024%	.04%	.22%
(standard deviation in parenthesis)	(.15%)	(.28%)	(.12%)	(1.41%)
Post Land Revaluation law period				
Outstanding loans- Levels	94120.421	48392	53947	464352.63
Share of total loans	20.27%	10.42%	11.61%	
Changes in outstanding loans as a share of assets	.1%	-.16%	-.11%	-1.01%
(standard deviation in parenthesis)	(.2%)	(.24%)	(.27%)	(1.64%)

Note: We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). For each sub-periods, the first row shows the amount of domestic loans outstanding by sector of Japanese banks measured in 100 million yen. The second row shows the sectoral lending as a percentage of total lending. The third row shows the change in outstanding loans as a share of beginning of the period assets. This is our measure for evolution of bank lending over time. The standard deviation of the change in loans as a share of beginning of the period assets are in parenthesis.

In Panel 2-d we provide the mean lending of Second Tier Regional banks by sectors and periods.

Data source: Assets and liabilities report of banks from Bank of Japan and the time series on lending by sectors also from Bank of Japan.

Table 3: Assets, Profitability and equity and land evaluation figures by bank types

	Aggregate over all banks	City banks	Regional banks	Second Tier regional banks
	Pre-liberalization period			
% change in asset	1.87%	2.16%	1.8%	.88%
% change in profits	2.62%	3.2%	2.32%	1.33%
	Liberalization period			
% change in asset	2.19%	2.31%	2.13%	1.79%
% change in profits	2.83%	3.25%	2.03%	2.47%
	Post Basel One period			
% change in asset	1.16%	.2%	-3.3%	.82%
% change in profits	-2.1%	-1.98%	-.09%	-2.5%
	Post Land Revaluation law period			
% change in asset	.15%	.3%	.29%	-.85%
% change in profits	-1.6%	-.05%	.04%	-.37%
Equity revaluation as a percentage of assets	.17%	-.0003%	.48%	.06%
Land revaluation as a percentage of assets	.28%	.29%	.25%	.3%

Note: We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). We trace the percentage changes in assets and profitability aggregated over all banks and by bank types during the subperiods. In the post Land Revaluation Law period, we also have data on equity revaluation and land revaluation which we list as a share of the beginning of the period asset. The Land Revaluation Law allowed 45% of the land revaluation figures to be counted towards Tier 2 capital to meet the Basel capital requirements.

Data source: Assets and liabilities report of banks from Bank of Japan.

Table 4: Results of regressing the change in outstanding loans as a share of assets: domestic lending by Japanese banks on relevant explanatory variables (Equation 1)

Determinants of domestic lending by Japanese banks				
Dependent variables	Change in aggregate loans divided by asset (1)	Change in non-residential real estate loans divided by asset (2)	Change in housing loans divided by asset (3)	Change in C&I loans divided by asset (4)
Constant	.28*** (3.4)	.06***(2.62)	.04**(2.94)	.003(.13)
Q1	-.02*** (8.31)	-.0004(-1.36)	-.0004**(-2.52)	-.006***(-13.3)
Q2	-.02***(-10.7)	-.001***(-4.97)	-.0007***(-3.07)	-.005***(-11.8)
Q3	-.002(-1.36)	-.0003(-1.5)	.0002(1.11)	-.002***(-3.55)
City	.03***(3.59)	.007***(3.06)	.003**(2.26)	-.0002(-.06)
Reg1	.02***(3.75)	.005***(3.05)	.002**(2.38)	.0007(.4)
Loans by non-Japanese banks	.08**(2.14)	.002(.28)	.012**(2.04)	.01*(1.88)
Asset	-.02***(-3.45)	-.005***(-2.97)	-.002**(-2.58)	.00005(.03)
GDP	-.08(-1.21)	-.004(-.5)	.007(.94)	-.02(-1.44)
Confidence	.0004*(1.91)	.0001(.13)	.00004(1.12)	.00008*(1.8)
Liberalization	.005(1.42)	.002***(3.29)	.001***(3.04)	-.003***(-3.31)
Basel One	.0003(.02)	.0003(.05)	-.01***(-4.45)	.0003(.08)
Basel99	-.01(-.53)	-.004(-.86)	-.0002(-.07)	-.01**(-2.57)
Tier 1	-.63(-1.22)	-.14(-1.2)	-.29***(-3.97)	-.02(-.16)
Tier1*Basel1	.16(.33)	.1(.83)	.37***(5.53)	-.14(-.94)
Tier1*Basel99	.7(1.53)	.23**(2.02)	.27***(4.13)	.03(.24)
Eqreval*Basel99	-.16(-.38)	-.12(-1.33)	.16(1.38)	-.02(-.32)
Landreval*Basel99	-.3(-.09)	.85(1.05)	-1.72**(-3.2)	2.06***(3.64)
Loanloss	-.69(-.37)	.004(.007)	-.59**(-2.53)	-.24(-.61)
Loanloss*Basel1	.07(.04)	-.07(-.13)	.7***(3.06)	.11(.27)
Loanloss*Basel99	.2(.11)	-.08(-.17)	.51**(2.29)	.21(.56)
R-squared	.67	.5	.34	.62
Observations	248	248	248	248
SSR	.02	.0005	.0003	.001
SER	.009	.0014	.001	.002

Note: The time period under consideration is 1983:1 to 2003:4. All the explanatory variables except for loans made by non-Japanese banks in Japan are beginning of the period values. For loans made by non-Japanese banks, we take the change in loans over a quarter divided by beginning of the period asset. Tier 1 is measured as the book-value of capital divided by beginning of the period "unrisk-weighted" asset. Equity revaluation, Land revaluation and reserves for loan loss are also calculated as shares of beginning of the period asset. The regression method is OLS adjusting for fixed effects. Values of t-statistics are in parenthesis

* significant at 10%

** significant at 5%

*** significant at 1%

Table 5: Results of regressing the percentage change in assets and profitability of domestic branches of Japanese banks on relevant explanatory variables (Equations 2 & 3)

Determinants of assets and profitability of domestic branches of Japanese banks		
	Change in assets (in levels)	Change in profits (in levels)
Constant	.67*** (3.8)	.96 (.53)
Q1	.09*** (9.99)	.09* (1.93)
Q2	.003 (.85)	-.03 (-.27)
Q3	.08*** (10.21)	.09* (1.82)
City	.08*** (4.48)	.03 (.16)
Reg1	.06*** (4.68)	.11 (.97)
Loans by non-Japanese banks	.14* (1.75)	-1.87* (-1.86)
Asset	-.05*** (-4.25)	-.02 (-.21)
Change in asset/profit last period	.25** (2.15)	.48*** (2.72)
GDP	-.1 (-.58)	2.23 (.66)
Confidence	.0005 (1.34)	-.003 (-.42)
Liberalization	.02** (3.17)	.002 (.06)
Basel One	-.04 (-1.24)	-.31 (-1.17)
Basel99	-.008 (-.32)	-3.6*** (-3.87)
Tier 1	-2.16*** (-3.05)	-21.6** (-2.38)
Tier1*Basel1	1.88** (2.33)	10.57 (1.31)
Tier1*Basel99	1.62** (2.58)	38.18*** (3.15)
Eqreval*Basel99	.09 (.09)	46.26* (1.77)
Land-reval*Basel99	.25 (.04)	834.18*** (3.49)
Loanloss	-3.01 (-1.25)	-22.11 (-.93)
Loanloss*Basel1	3.24 (1.29)	18.96 (.78)
Loanloss*Basel99	1.95 (.85)	35.02** (2.05)
R-squared	.84	.28
Observations	241	241
SSR	.06	19.47
SER	.02	.3

Note: The time period under consideration is 1983:1 to 2003:4. All the explanatory variables except for loans made by non-Japanese banks in Japan are beginning of the period values. For loans made by non-Japanese banks, we take the change in loans over a quarter divided by beginning of the period asset. Tier 1 is measured as the book-value of capital divided by beginning of the period "unrisk-weighted" asset. Equity revaluation, Land revaluation and reserves for loan loss are also calculated as shares of beginning of the period asset. The regression method is OLS adjusting for fixed effects. Values of t-statistics are in parenthesis

* significant at 10%

** significant at 5%

*** significant at 1%

Table 6: Descriptive Statistics on US lending by branches of Japanese banks classified by sectors

Table 6-a: Descriptive statistics: aggregate over all branches of Japanese banks in US

Aggregate over all Japanese bank branches in US	Real estate loans	C&I loans	Total loans
Pre-liberalization period			
Outstanding loans- Levels	1470007	2122941	17653670
Share of total loans	8.32%	11.06%	
Changes in outstanding loans as a share of assets	.18%	1.74%	1.74%
(standard deviation in parenthesis)	(.17%)	(4.09%)	(5.62%)
Liberalization period			
Outstanding loans- Levels	20191030	51621979	17653670
Share of total loans	17.42%	48.4%	
Changes in outstanding loans as a share of assets	.67%	1.74%	3.39%
(standard deviation in parenthesis)	(.56%)	(2.61%)	5.2%
Post Basel One period			
Outstanding loans- Levels	20688542	70406170	12200000
Share of total loans	17.37%	62%	
Changes in outstanding loans as a share of assets	.18%	1.74%	1.74%
(standard deviation in parenthesis)	(.17%)	(4.1%)	(4.6%)
Post Land Revaluation law period			
Outstanding loans- Levels	2857214	50141417	71407475
Share of total loans	4.02%	70.15%	
Changes in outstanding loans as a share of assets	-.16%	-.43%	-.93%
(standard deviation in parenthesis)	(.17%)	(2.16%)	(2.4%)

Note: In row one we provide the average amount of loans in United States by sector of Japanese banks measured in 100 million yen. In row 2 we look at the share of real estate loans and C&I loans in aggregate lending and in rows three and four, we provide the evolution of bank loans by sector where the variable of interest is the change in outstanding loans as a share of beginning of the period asset. Note that for United States, we do not get enough data points for housing loans separately. We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4).

In Panel 6-a we provide the mean lending of all US branches of Japanese banks by sectors and periods.

Data source: Call reports filed by Japanese banks operating in US according to FFIEC 021 forms. For US operations we do not separate out the non-residential real estate loans and loans to housing as data on housing loans and loans against home equity are not separately filed by the foreign banks in US including Japanese bank branches.

Table 6-b: Descriptive statistics: aggregate over all branches of Japanese City banks in US

City Banks	Real estate loans	C&I loans	Total loans
Pre-liberalization period			
Outstanding loans- Levels	1297277	1461095	11228507
Share of total loans	11.54%	13%	
Changes in outstanding loans as a share of assets	.29%	1.21%	.32%
(standard deviation in parenthesis)	(.29%)	(2.6%)	(6.5%)
Liberalization period			
Outstanding loans- Levels	10117548	24857505	50457836
Share of total loans	20.05%	49.26%	
Changes in outstanding loans as a share of assets	.59%	1.67%	3.32%
(standard deviation in parenthesis)	(.74%)	(3.24%)	(6.25%)
Post Basel One period			
Outstanding loans- Levels	9510780	29850789	53327413
Share of total loans	17.82%	55.97%	
Changes in outstanding loans as a share of assets	-.54%	-.08%	-.9%
(standard deviation in parenthesis)	(.62%)	(1.41%)	(2.46%)
Post Land Revaluation law period			
Outstanding loans- Levels	1257407	26920334	37492579
Share of total loans	3.35%	71.81%	
Changes in outstanding loans as a share of assets	-.08%	1.41%	1.99%
(standard deviation in parenthesis)	(.23%)	(7.8%)	(10.7%)

Note: In row one we provide the average amount of loans in United States by sector of Japanese banks measured in 100 million yen. In row 2 we look at the share of real estate loans and C&I loans in aggregate lending and in rows three and four, we provide the evolution of bank loans by sector where the variable of interest is the change in outstanding loans as a share of beginning of the period asset. Note that for United States, we do not get enough data points for housing loans separately. We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4).

In Panel 6-b we provide the mean lending of all US branches of Japanese City banks by sectors and periods.

Data source: Call reports filed by Japanese banks operating in US according to FFIEC 021 forms. For US operations we do not separate out the non-residential real estate loans and loans to housing as data on housing loans and loans against home equity are not separately filed by the foreign banks in US including Japanese bank branches.

Table 6-c: Descriptive statistics: aggregate over all branches of Japanese Regional banks in US

Regional banks	Real estate loans	C&I loans	Total loans
Pre-liberalization period			
Outstanding loans- Levels	12302.38	128501.1	1760366
Share of total loans	.7%	7.3%	
Changes in outstanding loans as a share of assets	.09%	3.3%	7.09%
(standard deviation in parenthesis)	(.17%)	(8.49%)	(15.32%)
Liberalization period			
Outstanding loans- Levels	1968420	5828139	11215931
Share of total loans	17.56%	51.98%	
Changes in outstanding loans as a share of assets	.67%	1.39%	2.49%
(standard deviation in parenthesis)	(.76%)	(2.28%)	(3.61%)
Post Basel one period			
Outstanding loans- Levels	2083304	4490676	8447440
Share of total loans	24.66%	53.13%	
Changes in outstanding loans as a share of assets	-.97%	-2.2%	-9.8%
(standard deviation in parenthesis)	(1.17%)	(3.16%)	(14.96%)
Post Land Revaluation law period			
Outstanding loans- Levels	566	174416	604058.5
Share of total loans	.17%	28.86%	
Changes in outstanding loans as a share of assets	-.23%	2.39%	7.46%
(standard deviation in parenthesis)	(.5%)	(5.6%)	(6.91%)

Note: In row one we provide the average amount of loans in United States by sector of Japanese banks measured in 100 million yen. In row 2 we look at the share of real estate loans and C&I loans in aggregate lending and in rows three and four, we provide the evolution of bank loans by sector where the variable of interest is the change in outstanding loans as a share of beginning of the period asset. Note that for United States, we do not get enough data points for housing loans separately. We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). Most of the Japanese Regional banks had ceased their US operations (either by closing the branches or mergers) by 2000.

In Panel 6-c we provide the mean lending of all US branches of Japanese Regional banks by sectors and periods.

Data source: Call reports filed by Japanese banks operating in US according to FFIEC 021 forms. For US operations we do not separate out the non-residential real estate loans and loans to housing as data on housing loans and loans against home equity are not separately filed by the foreign banks in US including Japanese bank branches.

Table 6-d: Descriptive statistics: aggregate over all branches of Japanese Second Tier Regional banks in US

Second Tier Regional banks	Real estate loans	C&I loans	Total loans
Pre-liberalization period			
Outstanding loans- Levels	32131.38	85482	288138.2
Share of total loans	11.14%	29.66%	
Changes in outstanding loans as a share of assets	-.2%	3.1%	1.37%
(standard deviation in parenthesis)	(.12%)	(7.28%)	(4.78%)
Liberalization period			
Outstanding loans- Levels	32131.38	85482	288138.2
Share of total loans	22.07%	66.53%	
Changes in outstanding loans as a share of assets	6.26%	20.1%	29.04%
(standard deviation in parenthesis)	(31.53%)	(30.42%)	(50.26%)
Post Basel One period			
Outstanding loans- Levels	295118.2	889697.6	1337450
Share of total loans	7.73%	89.57%	
Changes in outstanding loans as a share of assets	-1.77%	-2.56%	-5.09%
(standard deviation in parenthesis)	(4.45%)	(9.93%)	(16.71%)

Note: In row one we provide the average amount of loans in United States by sector of Japanese banks measured in 100 million yen. In row 2 we look at the share of real estate loans and C&I loans in aggregate lending and in rows three and four, we provide the evolution of bank loans by sector where the variable of interest is the change in outstanding loans as a share of beginning of the period asset. Note that for United States, we do not get enough data points for housing loans separately. We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4). Most of the Japanese Second Tier Regional banks had ceased their US operations (either by closing the branches or mergers) by 1996 so Land Revaluation Law would not affect their US lending operations..

In Panel 6-d we provide the mean lending of all US branches of Japanese Regional banks by sectors and periods.

Data source: Call reports filed by Japanese banks operating in US according to FFIEC 021 forms. For US operations we do not separate out the non-residential real estate loans and loans to housing as data on housing loans and loans against home equity are not separately filed by the foreign banks in US including Japanese bank branches.

Table 7: Descriptive statistics: aggregate over all branches of non-Japanese banks operating in US during 1980 to 2003

Non-Japanese bank branches operating in US	Real estate loans	C&I loans	Total loans
Pre-liberalization period			
Outstanding loans- Levels	318.24167	358.3	1056.7083
Share of total loans	30.16%	33.83%	
Changes in outstanding loans as a share of assets	.41%	.48%	1.35%
(standard deviation in parenthesis)	(.18%)	(.36%)	(.71%)
Liberalization period			
Outstanding loans- Levels	687.6	490.6	1738.25
Share of total loans	39.65%	28.27%	
Changes in outstanding loans as a share of assets	.58%	.008%	.65%
(standard deviation in parenthesis)	(.3%)	(.27%)	(.7%)
Post Basel one period			
Outstanding loans- Levels	1066.21	546.7	2324.08
Share of total loans	45.87%	23.47%	
Changes in outstanding loans as a share of assets	.52%	.3%	1.2%
(standard deviation in parenthesis)	(.25%)	(.21%)	(.5%)
Post Land Revaluation law period			
Outstanding loans- Levels	2133.95	819.9	4004.72
Share of total loans	53.27%	20.39%	
Changes in outstanding loans as a share of assets	.96%	.12%	1.26%
(standard deviation in parenthesis)	(.51%)	(.27%)	(.67%)

Note: In row one we provide the average amount of loans in United States by sector of non-Japanese banks measured in billions of dollars. In row 2 we look at the share of real estate loans and C&I loans in aggregate lending and in rows three and four, we provide the evolution of bank loans by sector where the variable of interest is the change in outstanding loans as a share of beginning of the period asset. Note that for United States, we do not get enough data points for housing loans separately. We subdivide the sample period of 1983:1 to 2003:4 into 4 sub-periods: pre-liberalization period (1983:1 to 1985:4), Post liberalization period (1986:1 to 1992:4), Post Basel I period (1993:1 to 1998:4), and Post Land Revaluation Law period (1991:1 to 2003:4).

Data source: Call reports filed by commercial banks in US filed according to FFIEC 031 forms

Table 8: Results of regressing the change in outstanding loans in US (by sectors) as a share of beginning of the period asset of Japanese bank branches.

In Specification 1, the dependent variable is the change in outstanding loans as a share of beginning of the period assets of US branches of Japanese banks.

Determinants of Japanese Bank Lending in United States over the period Specification One: Dependent variable is the change in outstanding loans as a share of beginning of the period asset			
Dependent variables	Change in aggregate loans divided by asset (1)	Change in real estate loans divided by asset (2)	Change in C&I loans divided by asset (3)
Constant	1.65 (1.24)	0.31 (1.11)	1.42 (1.24)
Q1	-0.011 (.6)	0.0002 (.06)	-0.009 (.54)
Q2	0.11 (.94)	0.024 (.98)	0.075 (.79)
Q3	-0.012 (1.006)	0.0007 (.33)	-0.017 (1.46)
City	0.055 (1.02)	0.011 (.98)	0.01 (.36)
Reg1	-0.039 (.53)	-0.01 (.68)	-0.09 (1.19)
Reg2	-0.27 (1.28)	-0.048 (1.07)	-0.24 (1.3)
Loans by non-Japanese banks	-10.14 (.92)	-2.28 (.99)	-6.79 (.83)
Asset	-0.09 (1.17)	-0.017 (1.06)	-0.071 (1.14)
GDP	4.37 (.90)	1.148 (1.16)	4.8 (1.1)
Confidence	-0.001 (.86)	-0.0003(.97)	-0.001 (1.43)
Liberalization	0.21 (1.23)	0.05 (1.32)	0.14 (1.37)
Basel One	0.12 (.82)	0.026 (.86)	0.081 (.82)
Basel99	-0.011 (.11)	0.009 (.67)	-0.025 (.34)
Tier One	-0.016 (1.34)	-0.003 (1.1)	-0.009 (1.3)
Tier1*Basel 1	-1.59 (.86)	-0.37 (.95)	-1.26 (.86)
Tier1*Basel99	-2.17** (2.5)	-0.31 *(1.9)	-0.69 (.99)
Tier2*Basel1	-1.61 (.86)	-0.37 (.95)	-1.27 (.86)
Tier2*Basel99	-2.19 **(2.53)	-0.32*(1.03)	-0.7 (1.03)
R-squared	.06	.06	.06
Observations	283	287	287
SSR	63	2.65	29.1
SER	.45	.1	.36

Note: The dependent variable is the change in loans by branches of Japanese banks over a quarter as a share of beginning of the period asset, that we refer to as specification one. The time period under consideration is 1980:1 to 2003:4. All the explanatory variables except for loans made by non-Japanese banks are beginning of the period values. For loans made by non-Japanese banks, we take the change in loans over a quarter divided by beginning of the period asset. The regression method is OLS adjusting for fixed effects. Values of t-statistics are in parenthesis.

* significant at 10%

** significant at 5%

*** significant at 1%

Table 9: Results of regressing the change in outstanding loans in US (by sectors) as a share of beginning of the period asset of Japanese bank branches.

In Specification 2, the dependent variable is the deviation of change in outstanding loans as a share of beginning of the period assets of US branches of Japanese banks from the change in outstanding loans as a share of assets of branches of non-Japanese banks in US

Determinants of Japanese Bank Lending in United States over the period Specification Two: Change in loans by Japanese banks in US as a share of beginning of the period asset Change in loans by non-Japanese banks in US as a share of beginning of the period asset			
Dependent variables	Change in aggregate loans Japanese banks divided by asset-Change in non-Japanese lending divided by asset (1)	Change in real estate loans divided by asset-Change in non-Japanese real estate lending divided by asset (2)	Change in C&I loans divided by asset-Change in non-Japanese C&I lending divided by asset (3)
Constant	1.53 (1.29)	0.29 (1.17)	1.38 (1.31)
Q1	-0.009 (-.49)	0.0006 (.18)	-0.007 (-.42)
Q2	0.12 (.93)	0.025 (.96)	0.081 (.79)
Q3	-0.005 (-.38)	0.002 (.89)	-0.009 (-.64)
City	0.047 (1.05)	0.009 (.97)	0.008 (.32)
Reg1	-0.028 (-.45)	-0.008 (-.66)	-0.078 (-1.33)
Reg2	-0.18 (-1.39)	-0.027 (-.97)	-0.18 (-1.56)
Asset	-0.069 (-1.23)	-0.01 (-1.06)	-0.057 (-1.26)
GDP	4.68 (.93)	1.185 (1.15)	4.57 (1.11)
Confidence	-0.006 (-1.18)	-0.001 (-1.33)	-0.005 (-1.17)
Liberalization	0.25 (1.20)	0.053 (1.21)	0.17 (1.29)
Basel One	0.16 (.91)	0.033 (.93)	0.099 (.87)
Basel99	0.034 (.33)	0.017 (1.19)	0.008 (.10)
Tier One	-0.014 (-1.33)	-0.002 (-1.01)	-0.008 (-1.35)
Tier1*Basel 1	-1.78 (-.91)	-0.41 (-1.02)	-1.38 (-.89)
Tier1*Basel99	-2.45** (-2.49)	-0.41** (-2.14)	-0.88 (-1.06)
Tier2*Basel1	-1.79 (-.91)	-0.42 (-1.02)	-1.39 (-.89)
Tier2*Basel99	-2.46** (-2.5)	-0.41** (-2.13)	-0.89 (-1.08)
R-squared	.05	.05	.06
Observations	283	283	283
SSR	63.76	2.69	29.47
SER	.49	.1	.36

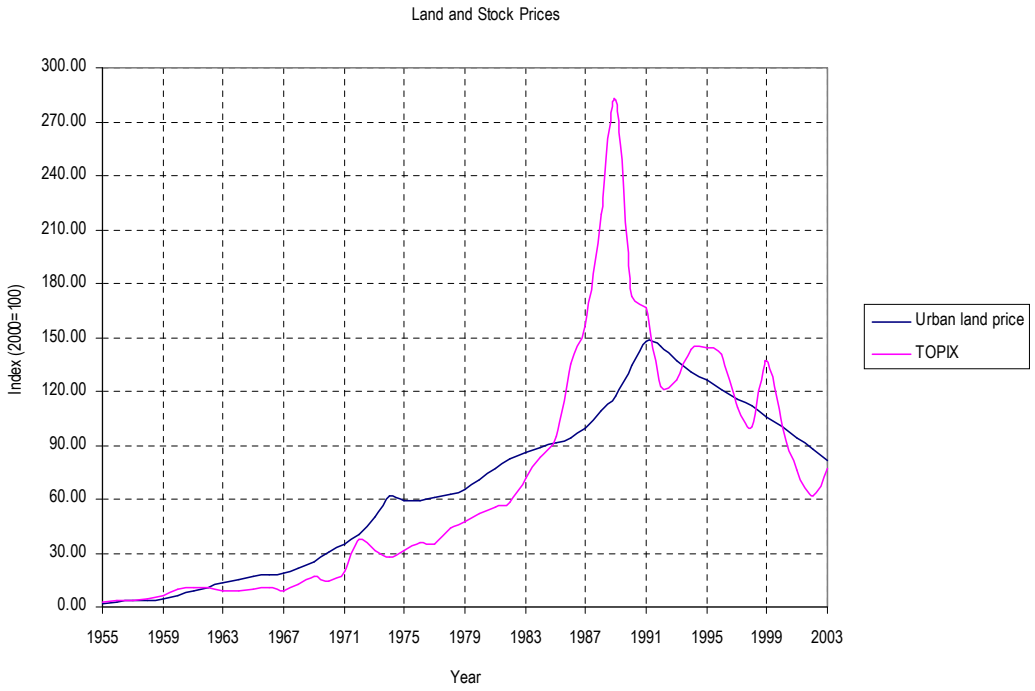
Note: The dependent variable is the (change in loans by branches of Japanese banks over a quarter as a share of beginning of the period asset-change in loans by non-Japanese banks over a quarter as a share of beginning of the period asset), that we refer to as specification two. The time period under consideration is 1980:1 to 2003:4. All the explanatory variables are beginning of the period values. The regression method is OLS adjusting for fixed effects. Values of t-statistics are in parenthesis.

* significant at 10%

** significant at 5%

*** significant at 1%

Figure 1: Historical index of average urban land prices and the stock prices (TOPIX) in Japan



Note: TOPIX and the Land price index in 2000 is taken as 100

Data source: Japan Land Research Institute and Tokyo Stock Exchange

Looking at Figure 1 we find that land prices started declining since 1991 and by 1998 were almost half of their value in 1991. Even then, the land price in 1998 is much higher than the land price in sixties or seventies. Stock prices follow a similar trend but they are much more volatile than land prices. The downturn of the stock market preceded the downturn of land prices by 2 years.