What Happened to Japanese Banks?

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This paper argues that the slow and incomplete deregulation of the financial system in the 1980s was the most important factor behind the Japanese banking troubles in the 1990s. The regression analysis of Japanese banks shows that the cross-sectional variation of bad loans ratios is best explained by the variation in the growth of loans to the real estate industry. The variation of growth of real estate lending, in turn, is explained by the varied experience of losing existing customers to capital markets. The rapid appreciation of land prices in the late 1980s also fueled the growth of real estate lending.

Key words: Financial deregulation; Bad loans; Real estate lending; *Keiretsu* loans

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I. Introduction

> In a year which was the worst-ever for many US and European banks, Japan's banks turned in higher profits, increased their capital and took a larger share of world lending and capital-markets business. By the end of last year Japan had almost caught up with the UK as the key centre for international lending.
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> *The Banker*, July 1988, p. 109

This is what *The Banker* argued in 1988. The same issue ranked seven Japanese banks among the top 10 banks in the world according to size of assets. Even when *The Banker* changed the criterion and started ranking banks according to their tier-1 capital in 1989, six Japanese banks remained in the top 10.

After 10 years, in 1998, Japanese banks had lost ground to their competitors in the United States and Europe, and only three Japanese banks were ranked among the top 10 (*The Banker*, July 1998). Even in the 1980s, there were some signs that cast doubt on the continuing dominance of Japanese banks. For example, the article quoted above ends with a cautious assessment that "with increasing competition at home and the rise in the yen possibly played out, Japan's giants may start 1989 carrying less fat than they do now" (*The Banker*, July 1988, p. 109). An article in the July 1989 issue suggested "Japanese bankers may be seeing the end of a golden decade" (*The Banker*, July 1989, p. 44). But, few would have expected that Japanese banks would fall into such deep trouble. By 1998, Japan appeared to be "edging towards a financial disaster of Titanic proportions" (*The Banker*, July 1998, p. 100).

Finally, the Japanese government came up with a framework to close down weak banks and recapitalize solvent but undercapitalized banks in late 1998. The framework was backed by ¥60 trillion of public funds. The newly created Financial Reconstruction Commission (FRC) and the Financial Supervisory Agency implemented the framework rather aggressively to resolve the banking problem in Japan once and for all. They nationalized Long-Term Credit Bank of Japan and Nippon Credit Bank in late 1998, moved much of their troubled loans to the Resolution and Collection Corporation (RCC), and sold both banks to new investors. They injected about ¥7.5 trillion of public funds into 15 large banks in March 1999. Then they shifted the target for regional banks and used about ¥290 billion of public funds to recapitalize five regional banks. They closed down five regional banks and put them under receivers. One of them, Kokumin Bank, was cleaned up and sold to Yachiyo Bank. At the end of the year 2000, the banking crisis in Japan seems to be finally over, but Japanese banks still have to deal with the remaining bad loans and more importantly focus their attention on being competitive in the post-deregulation financial markets.

This paper asks how and why Japanese banks got into such trouble. It is not the first paper to ask the question. Many researchers have already examined the banking problem in Japan and by now we have a rough consensus on the factors that may have been responsible for the problems. For example, Cargill (2000) identifies five factors that eventually led Japanese banking into a crisis. First, the highly regulated financial system, which worked well during the rapid economic growth period, failed

to adjust to the new environment that began to emerge in the 1970s. Second, the Bank of Japan created too much liquidity in the late 1980s, with low interest rates, and followed it by too abrupt a tightening of monetary policy. These policy failures led to wild fluctuations in asset prices. Third, the government was slow in responding to the problems in the financial system even after their existence was clear. Fourth, Japanese taxpayers provided little support for the government to use public funds to rescue the banking system. Finally, a lack of disclosure and transparency by banks and other financial institutions and regulators contributed to the delay in the response to the problems.

The first two factors are relevant to the question asked by this paper: why banks got into trouble. The other three are explanations for why it took so long time for them to get out of trouble. Of those two factors that initiated the problem, this paper argues that the first, slow adjustment of the regulated financial system during the 1980s, was more important than the failure of monetary policy in explaining the crisis in Japanese banking. In this sense, the 1980s were not a "golden decade" for Japanese banks. They were the start of the serious problem.

In focusing on the question of how the problems started, this paper's attempt is close to a paper by Ueda (2000). The emphasis given to the role of slow deregulation, however, distinguishes this paper from that of Ueda. Ueda (2000) discusses both the legacy of regulation and the land price bubble as factors that led to the problem, but stresses the importance of land price fluctuations and criticizes the monetary policy that caused such a large swing in asset prices. Using cross-sectional regression analysis for 147 commercial banks, he shows that banks located in areas where land prices increased rapidly and where their proportion of loans collateralized by real estate were higher tended to have a higher proportion of real estate loans in their portfolios and higher ratios of bad loans by the end of fiscal 1995 (March 31, 1996).

This paper also utilizes the cross-sectional variance of banking data to find out which factors were important in creating the problems in Japanese banking. The paper tries to expand and deepen the analysis of Ueda (2000) in a couple of aspects. First, the paper uses more recent data on bad loans, which better reflect the true extent of the banking problem. Second, panel structure of the data set is exploited where possible.

The paper is organized in the following way. After briefly reviewing the bad-loan problem at the height of the crisis in Chapter II, the paper develops a hypothesis of why Japanese banks got into trouble, focusing on the role of slow and incomplete financial deregulation in Chapter III. As the hypothesis is explained, some aggregate data that are consistent overall with the story are also presented. Chapter IV examines whether the story is consistent with the cross-sectional variation of bad-loan ratios. Regression analyses similar to Ueda (2000) are carried out. Chapter IV finds that the cross-sectional variation of bad-loan ratios is closely associated with the proportion of loans to the real estate industry. Thus, in Chapter V, the paper examines which factors explain the shift of bank portfolios toward more real estate lending. The paper finds that the loss of established customers as a result of incomplete financial deregulation led to the rapid growth of real estate lending. This was important even after controlling the effects of wild swings in land prices.

II. The Bad-Loan Problem

It is not easy to grasp the extent of the bad-loan problem in Japanese banking. As Hoshi and Kashyap (1999) explain in detail, there are several different definitions of bad loans, and moreover the definitions have changed over time. Currently, there are three definitions of bad loans. Two sets of bad-loan figures are reported by individual banks on their balance sheets. "Risk management loans" include (1) loans to failed enterprises; (2) loans whose payments have been suspended for three months or more; and (3) restructured loans. The Japanese banks started publishing bad-loan figures in 1993 (for fiscal 1992), but the definition included only loans to failed enterprises.[1] The definition was expanded gradually over time, and the current definition is roughly comparable to the standard used by the U.S. Securities Exchange Commission. The second set of figures consists of bad-loan figures that are required to be published under the Financial Reconstruction Act, which was one of two laws passed in late 1998 to form the basis of the Japanese government's efforts to resolve the banking problem. The definition of bad loans according to this requirement is slightly broader than that for risk management loans, but much narrower than the third definition of bad loans, which is used in bank examinations by the Financial Services Agency (FSA).[2] Individual banks do not have to disclose the amount of bad loans according to this third definition, and the FSA only discloses the aggregate amounts for each type of bank (such as city banks, regional banks, etc.).

Table 1 shows the amount of risk management loans as of March 1998 (end of fiscal 1997), March 1999 (end of fiscal 1998), and March 2000 (end of fiscal 1999) as well as cumulative write-offs from fiscal 1992 for Japanese banks. Since this is the narrowest definition of bad loans, these figures probably understate the true extent of the problem. Moreover, the figures exclude those banks that failed during a fiscal year. Thus, the figures should be considered to give the lower bound of the extent of the problem. As of March 2000, Japanese banks have over ¥30 trillion of bad loans, which has remained even after having written off more than ¥28 trillion of loans in the past seven years. If we add these figures together, assuming that none of the ¥30 trillion is recoverable, the total loss due to the banking problem is almost 12 percent of GDP in fiscal 1999. This is an extreme assumption, but if we note that we are looking at the narrowest definition of bad loans and that the figure excludes the bad loans held by failed banks, a total loss of 12 percent of GDP seems plausible.

Table 2 shows the amount of risk management loans and cumulative write-offs since 1992 for individual banks for March 1998. This is the data set used in the regression analysis of bad loans described in Chapter IV. The data set includes the banks that failed in fiscal 1998 and 1999. Thus, the total amount of risk

1. City banks, long-term credit banks, and trust banks (together called major banks) reported loans whose payments have been suspended for 6 months or more in addition to the loans to failed enterprises. See Ueda (2000, table 1) for more details on how this definition of bad loans has changed over time.
2. The Financial Services Agency (FSA) was established in July 2000 to subsume the functions of the Financial Supervisory Agency and the Ministry of Finance's Financial System Planning Bureau. In January 2001, it also took over the functions of the FRC, which was dissolved.

management loans by banks in the data set are larger by ¥1.7 trillion than the figure reported in Table 1. The total amount of cumulative write-offs, however, is much smaller than the corresponding figure in Table 1, because the figures in Table 2 include only direct write-offs of loans and do not include loss on sales of loans and other losses.

Table 2 also shows the figure for the outstanding amounts of special loan-loss reserves, which was accumulated to prepare for losses from nonperforming loans. The figures suggest that many banks have accumulated a substantial amount of reserves, but the reserves were not sufficient to cover all the nonperforming loans.

Table 1 Risk Management Loans and Cumulative Write-Offs

¥ billions

	End of fiscal 1997 (March 1998)	End of fiscal 1998 (March 1999)	End of fiscal 1999 (March 2000)
Risk management loans	29,758	29,627	30,366
Cumulative write-offs	19,911	24,620	28,185
Total	49,669	54,247	58,551
(Proportion of GDP)	(9.78%)	(10.91%)	(11.86%)

Note: Risk management loans consist of loans to borrowers in legal bankruptcy, past due loans, and restructured loans. Write-offs include write-offs of loans, loss on sales of loans, loss on support to other financial institutions. Before fiscal 1994, however, the write-offs only include write-offs of loans and loss on sales to the Cooperative Credit Purchase Corporation (CCPC). Hokkaido Takushoku, Tokuyo City, Kyoto Kyoei, Naniwa, Fukutoku, and Midori Bank, which failed or merged with other banks during fiscal 1997, are excluded. Long-Term Credit Bank of Japan, Nippon Credit Bank, Kokumin, Kofuku, and Tokyo Sowa Bank, which were closed during fiscal 1998 or early fiscal 1999, are excluded from the figures for fiscal 1998 figures. Namihaya Bank and Niigata Chuo Bank are excluded from the fiscal 1999 data.

Sources: Financial Supervisory Agency (1999), "The Status of Risk Management Loans Held by All Banks in Japan (as of the end of March, 1999)," and Financial Services Agency (2000), "The Status of Risk Management Loans Held by All Banks in Japan (as of the end of March, 2000)," from the FSA website (www.fsa.go.jp). The GDP figures are from the Economic Planning Agency website (www.epa.go.jp).

Table 2 Bad Loans, Cumulative Write-Offs, and Special Loan-Loss Reserves Outstanding for Individual Banks (as of March 1998)

¥ millions

Code Bank	Risk management loans	Cumulative write-offs since 1992	Total loans	Bad-loan ratio	"Bad loans plus write-offs" ratio	Special loan-loss reserves
1 Dai-Ichi Kangyo	1,471,362	282,132	33,921,107	4.34%	5.17%	1,014,342
2 Sakura	1,475,401	53,037	34,328,583	4.30%	4.45%	929,928
3 Fuji	1,692,701	213,889	31,306,818	5.41%	6.09%	782,636
5 Tokyo–Mitsubishi	2,250,171	92,607	41,290,834	5.45%	5.67%	1,317,891
6 Asahi	994,617	106,491	20,460,087	4.86%	5.38%	613,647
8 Sanwa	1,287,580	110,704	32,895,295	3.91%	4.25%	774,460
9 Sumitomo	1,469,122	618,445	35,215,195	4.17%	5.93%	1,114,047
10 Daiwa	915,784	25,105	10,008,772	9.15%	9.40%	379,601
11 Tokai	1,221,628	86,148	19,795,525	6.17%	6.61%	714,257
12 Hokkaido Takushoku	2,343,353	134,105	5,857,834	40.00%	42.29%	1,675,537
116 Hokkaido	201,179	5,711	2,574,109	7.82%	8.04%	101,464

Table 2 (Continued)

¥ millions

Code Bank	Risk management loans	Cumulative write-offs since 1992	Total loans	Bad-loan ratio	"Bad loans plus write-offs" ratio	Special loan-loss reserves
117 Aomori	38,347	2,426	1,370,122	2.80%	2.98%	17,583
118 Michinoku	52,955	1,149	1,221,205	4.34%	4.43%	29,717
119 Akita	33,668	1,751	1,301,434	2.59%	2.72%	20,934
120 Hokuto	28,126	3,519	877,364	3.21%	3.61%	19,246
121 Shonai	4,508	211	468,586	0.96%	1.01%	2,514
122 Yamagata	12,936	124	888,844	1.46%	1.47%	4,344
123 Iwate	13,367	229	1,069,674	1.25%	1.27%	3,862
124 Tohoku	9,506	347	427,663	2.22%	2.30%	5,404
125 77	74,881	2,418	3,013,457	2.48%	2.57%	27,042
126 Toho	64,982	1,302	1,688,533	3.85%	3.93%	25,549
128 Gumma	106,436	17,198	3,681,805	2.89%	3.36%	51,994
129 Ashikaga	445,861	196,586	4,367,019	10.21%	14.71%	167,342
130 Joyo	215,370	5,699	4,792,887	4.49%	4.61%	140,407
131 Kanto	69,998	6,140	689,975	10.15%	11.03%	30,245
133 Musashino	59,653	1,476	1,705,026	3.50%	3.59%	36,069
134 Chiba	181,273	102,691	5,652,141	3.21%	5.02%	87,151
135 Chiba Kogyo	134,601	10,746	1,579,193	8.52%	9.20%	50,259
137 Tokyo Tomin	117,967	29,907	1,745,966	6.76%	8.47%	57,485
138 Yokohama	396,366	21,729	7,876,489	5.03%	5.31%	234,608
140 Daishi	50,785	6,589	2,338,543	2.17%	2.45%	25,387
141 Hokuetsu	58,668	1,504	1,323,975	4.43%	4.54%	16,908
142 Yamanashi Chuo	34,035	625	1,275,417	2.67%	2.72%	23,025
143 Hachijuni	83,724	2,448	3,762,958	2.22%	2.29%	36,128
144 Hokuriku	392,519	57,009	4,632,940	8.47%	9.70%	207,010
145 Toyama	2,514	34	213,364	1.18%	1.19%	872
146 Hokkoku	75,478	767	1,876,254	4.02%	4.06%	27,878
147 Fukui	59,645	126	1,473,657	4.05%	4.06%	20,394
149 Shizuoka	134,439	1,463	4,799,499	2.80%	2.83%	39,617
150 Suruga	82,194	8,916	1,979,950	4.15%	4.60%	40,225
151 Shimizu	21,026	400	738,649	2.85%	2.90%	13,646
152 Ogaki Kyoritsu	40,453	1,475	1,968,316	2.06%	2.13%	25,892
153 Juroku	83,898	1,586	2,540,576	3.30%	3.36%	32,713
154 Mie	8,701	135	851,574	1.02%	1.04%	3,087
155 Hyakugo	47,514	424	1,944,197	2.44%	2.47%	24,795
157 Shiga	62,749	1,201	2,145,733	2.92%	2.98%	26,985
158 Kyoto	97,584	5,230	2,501,716	3.90%	4.11%	51,267
159 Osaka	95,779	5,004	1,231,855	7.78%	8.18%	50,434
160 Senshu	80,960	6,087	1,150,111	7.04%	7.57%	25,735
161 Ikeda	45,230	11,769	1,148,668	3.94%	4.96%	25,569
162 Nanto	69,831	19,262	2,438,877	2.86%	3.65%	47,029
163 Kiyo	131,435	8,104	1,884,140	6.98%	7.41%	77,941
164 Tajima	8,267	1,380	472,665	1.75%	2.04%	1,342
166 Tottori	7,662	488	493,441	1.55%	1.65%	4,923

Table 2 (Continued)

¥ millions

Code Bank	Risk management loans	Cumulative write-offs since 1992	Total loans	Bad-loan ratio	"Bad loans plus write-offs" ratio	Special loan-loss reserves
167 San-in Godo	55,353	2,450	2,117,434	2.61%	2.73%	39,147
168 Chugoku	50,448	7,982	2,901,381	1.74%	2.01%	17,482
169 Hiroshima	179,978	11,134	4,120,109	4.37%	4.64%	130,795
170 Yamaguchi	71,830	1,795	2,847,683	2.52%	2.59%	40,465
172 Awa	16,348	356	1,497,577	1.09%	1.12%	9,949
173 Hyakujushi	43,594	1,116	2,411,051	1.81%	1.85%	28,060
174 Iyo	83,188	5,506	2,419,816	3.44%	3.67%	48,273
175 Shikoku	45,572	500	1,681,028	2.71%	2.74%	18,326
177 Fukuoka	125,730	3,008	5,022,231	2.50%	2.56%	60,744
178 Chikuho	8,924	110	346,871	2.57%	2.60%	3,224
179 Saga	39,723	368	1,205,261	3.30%	3.33%	13,225
180 Eighteenth	28,709	3,198	1,542,015	1.86%	2.07%	13,534
181 Shinwa	55,654	2,805	1,260,804	4.41%	4.64%	35,577
182 Higo	24,501	5,635	1,719,871	1.42%	1.75%	9,344
183 Oita	17,574	4,773	1,441,256	1.22%	1.55%	8,667
184 Miyazaki	32,597	2,138	1,033,481	3.15%	3.36%	22,652
185 Kagoshima	27,082	933	1,637,153	1.65%	1.71%	20,125
187 Ryukyu	68,844	6,138	993,882	6.93%	7.54%	29,759
188 Okinawa	50,380	2,994	834,041	6.04%	6.40%	16,293
190 Nishi Nippon	124,036	2,701	3,515,467	3.53%	3.61%	34,309
287 Mitsui Trust	756,998	31,703	6,068,553	12.47%	13.00%	546,751
288 Mitsubishi Trust	692,020	138,658	9,362,583	7.39%	8.87%	489,487
289 Yasuda Trust	540,483	404,945	3,872,380	13.96%	24.41%	361,417
290 Toyo Trust	264,812	50,678	4,784,593	5.53%	6.59%	163,606
291 Chuo Trust	221,426	30,045	1,741,218	12.72%	14.44%	139,769
292 Nippon Trust	140,202	1,756	761,602	18.41%	18.64%	99,059
294 Sumitomo Trust	1,026,295	287,533	8,635,298	11.88%	15.21%	645,953
396 IBJ	1,569,426	726,899	23,082,030	6.80%	9.95%	793,366
397 LTCB	1,378,541	407,093	15,754,600	8.75%	11.33%	706,864
398 Nippon Credit	1,731,941	120,307	7,775,424	22.27%	23.82%	672,788
501 Hokuyo	75,375	6,366	1,602,660	4.70%	5.10%	26,961
502 Sapporo	37,376	2,840	611,189	6.12%	6.58%	16,879
507 Yamagata Shiawase	21,027	193	452,469	4.65%	4.69%	1,937
508 Shokusan	11,978	2,133	482,696	2.48%	2.92%	5,385
509 Kita Nippon	10,818	1,278	754,973	1.43%	1.60%	3,560
511 Tokuyo City	56,082	2,308	495,132	11.33%	11.79%	43,194
512 Sendai	15,220	777	363,427	4.19%	4.40%	7,472
513 Fukushima	41,960	1,674	580,566	7.23%	7.52%	20,900
514 Daito	21,163	301	519,824	4.07%	4.13%	7,722
516 Towa	84,464	2,198	1,185,690	7.12%	7.31%	37,817
517 Tochigi	65,135	2,403	1,239,258	5.26%	5.45%	24,745
519 Ibaragi	48,943	2,945	600,266	8.15%	8.64%	26,008
520 Tsukuba	23,881	1,172	250,389	9.54%	10.01%	7,993

Table 2 (Continued)

¥ millions

Code Bank	Risk management loans	Cumulative write-offs since 1992	Total loans	Bad-loan ratio	"Bad loans plus write-offs" ratio	Special loan-loss reserves
522 Keiyo	90,186	4,685	1,990,728	4.53%	4.77%	41,427
525 Higashi Nippon	79,254	1,916	1,217,448	6.51%	6.67%	32,948
526 Tokyo Sowa	149,492	14,323	1,857,481	8.05%	8.82%	62,371
528 Kokumin	81,867	4,073	451,492	18.13%	19.03%	37,168
530 Kanagawa	17,187	227	273,993	6.27%	6.36%	7,078
531 Niigata Chuo	75,380	4,547	930,628	8.10%	8.59%	24,143
532 Taiko	27,206	1,389	660,608	4.12%	4.33%	13,714
533 Nagano	15,611	164	550,646	2.84%	2.86%	5,060
534 First Bank of Toyama	27,002	209	610,282	4.42%	4.46%	8,052
535 Ishikawa	38,616	1,484	489,993	7.88%	8.18%	12,430
537 Fukuho	8,786	212	318,508	2.76%	2.83%	4,993
538 Shizuoka Chuo	2,280	140	272,995	0.84%	0.89%	1,256
539 Chubu	27,458	1,733	430,214	6.38%	6.79%	12,522
541 Gifu	28,736	648	557,324	5.16%	5.27%	16,273
542 Aichi	36,867	142	1,367,170	2.70%	2.71%	20,395
543 Nagoya	34,289	435	1,779,881	1.93%	1.95%	23,187
544 Chukyo	33,796	2,011	1,173,123	2.88%	3.05%	20,965
546 Daisan	42,686	3,180	1,181,522	3.61%	3.88%	20,903
547 Biwako	69,475	1,111	903,294	7.69%	7.81%	44,316
549 Kyoto Kyoei	59,196	3,667	262,727	22.53%	23.93%	51,861
550 Kinki	170,187	6,714	1,877,856	9.06%	9.42%	54,443
551 Naniwa	30,584	5,054	310,796	9.84%	11.47%	16,185
552 Kofuku	218,580	9,673	1,456,496	15.01%	15.67%	88,791
553 Fukutoku	149,871	13,593	1,170,325	12.81%	13.97%	66,217
554 Kansai	54,682	2,229	905,180	6.04%	6.29%	23,972
555 Taisho	13,415	580	219,016	6.13%	6.39%	7,352
557 Nara	5,521	717	108,208	5.10%	5.76%	1,665
558 Wakayama	16,113	1,370	326,612	4.93%	5.35%	7,018
562 Hanshin	58,859	3,571	896,886	6.56%	6.96%	29,565
565 Shimane	8,535	728	220,350	3.87%	4.20%	4,832
566 Tomato	31,130	415	511,894	6.08%	6.16%	6,483
568 Setouchi	36,416	2,067	606,263	6.01%	6.35%	9,873
569 Hiroshima Sogo	58,240	2,722	1,539,313	3.78%	3.96%	42,103
570 Saikyo	24,347	499	471,668	5.16%	5.27%	7,572
572 Tokushima	10,147	891	694,749	1.46%	1.59%	5,229
573 Kagawa	25,238	226	919,178	2.75%	2.77%	8,987
576 Ehime	28,045	3,291	1,089,369	2.57%	2.88%	9,949
578 Kochi	25,333	1,910	707,340	3.58%	3.85%	11,367
581 Fukuoka City	70,110	3,091	2,293,271	3.06%	3.19%	28,633
582 Fukuoka Chuo	7,888	516	230,888	3.42%	3.64%	2,191
583 Saga Kyoei	8,209	83	181,363	4.53%	4.57%	2,356
585 Nagasaki	20,441	219	247,466	8.26%	8.35%	7,610
586 Kyushu	62,361	5,404	862,141	7.23%	7.86%	33,113

Table 2 (Continued)

¥ millions

Code Bank	Risk management loans	Cumulative write-offs since 1992	Total loans	Bad-loan ratio	"Bad loans plus write-offs" ratio	Special loan-loss reserves
587 Kumamoto Family	75,834	3,015	1,066,982	7.11%	7.39%	33,304
590 Howa	11,374	1,009	364,368	3.12%	3.40%	3,212
591 Miyazaki Taiyo	12,017	321	348,557	3.45%	3.54%	3,885
594 Minami Nippon	19,438	1,732	510,000	3.81%	4.15%	7,919
596 Okinawa Kaiho	16,970	1,001	313,923	5.41%	5.72%	7,375
597 Yachiyo	100,036	6,851	1,324,942	7.55%	8.07%	48,838
Total	31,459,711	4,693,681	527,839,306			17,769,051

Note: Risk management loans consist of loans to borrowers in legal bankruptcy, past due loans, and restructured loans. Write-offs include write-offs of loans only. Thus, the write-off figures are not comparable to those reported in Table 1.

Sources: Zenginkyo (Japanese Bankers Association), *Analysis of Financial Statements of All Banks*, various issues.

III. Deregulation and Banking Crisis: A Hypothesis

Before analyzing the data in Table 2, this chapter provides a hypothesis which argues that the slow adjustment of the heavily regulated financial system was the most important factor behind the banking problem in Japan. Thus, the hypothesis stresses the importance of the first factor in Cargill (2000) rather than the second factor: mistakes in monetary policy and bubbles. The story itself is not very original and similar to some explanations of the Japanese banking problem put forward by various researchers. The original part of this paper is found in the regression analysis in the following chapters that offers corroborating evidence for the hypothesis.

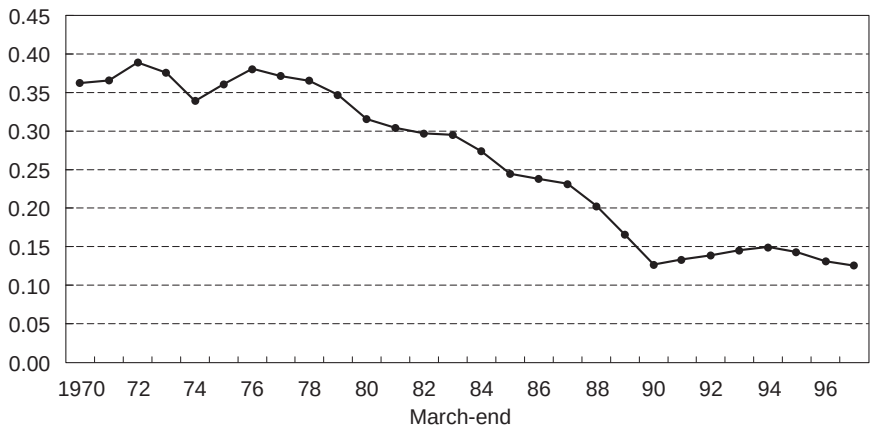
During the period of rapid economic growth (roughly the early 1950s to the early 1970s), the Japanese financial system was characterized by heavy regulation. Domestic capital markets, such as those for bond issues and new stock issues, were repressed, but neither borrowers or lenders had the option of relying on foreign markets in a significant way. As a result, Japanese corporations had to get almost all external financing from the banking sector. This encouraged Japanese firms to form close relations with their banks and led to the creation of an arrangement called the "main bank system."[3] The main bank system had certain virtues, but it became rather costly for some types of firms, as we will see below. The household sector did not have much choice but to hold their financial assets in the form of bank deposits. The heavy regulation included strict separation of business lines in the financial industry. For example, banks were prohibited from conducting securities business or insurance business. Securities houses were prohibited from taking deposits or selling insurance products. Sometimes the regulation imposed finer separations. Life insurance companies had to concentrate on providing life insurance policies only, while non-life insurance companies provided homeowners' insurance and auto insurance policies.

3. See Aoki and Patrick (1994) and Sheard (1997) for more on the main bank system.

Banks were supposed to deal with rather large customers, while *shinkin* banks and credit unions had to focus on their member firms, all of which were small. The strict separation of business lines forced Japanese banks to limit their business to the traditional banking business of taking deposits and making loans.

The situation started to change as the Japanese government began deregulating the financial system, albeit gradually, in the late 1970s.[4] Financial deregulation started with the creation of a secondary market for government bonds and gradually spread to markets for corporate bonds and equities. Also important was the relaxation of foreign exchange controls in 1980 (reform of the Foreign Exchange and Control Act) and in 1984 (abolishment of the "real demand principle"), which opened the way for Japanese corporations to raise funds abroad. Gradually, large Japanese firms obtained alternative financing options to bank borrowing. Many large firms responded to the change by replacing their bank loans with new bond financing and reducing the dependence on banks. For example, Figure 1 shows the ratio of bank loans to total assets for large manufacturing firms in Japan. The ratio was around 0.35 in the 1970s, but started to decline in the 1980s. By 1990, it fell below 0.15. This exodus from bank borrowing shows that by the 1980s many large firms had started to feel the cost of depending exclusively on banks.

Figure 1 Ratio of Bank Debt to Total Assets: Large Manufacturing Firms



Note: The figure shows the (weighted) average ratio of total bank loans to total assets for large manufacturing firms in Japan for the most recent accounting year ended in the last 12 months. Large firms are defined here as listed firms with total assets of more than ¥120 billion in 1990 prices.

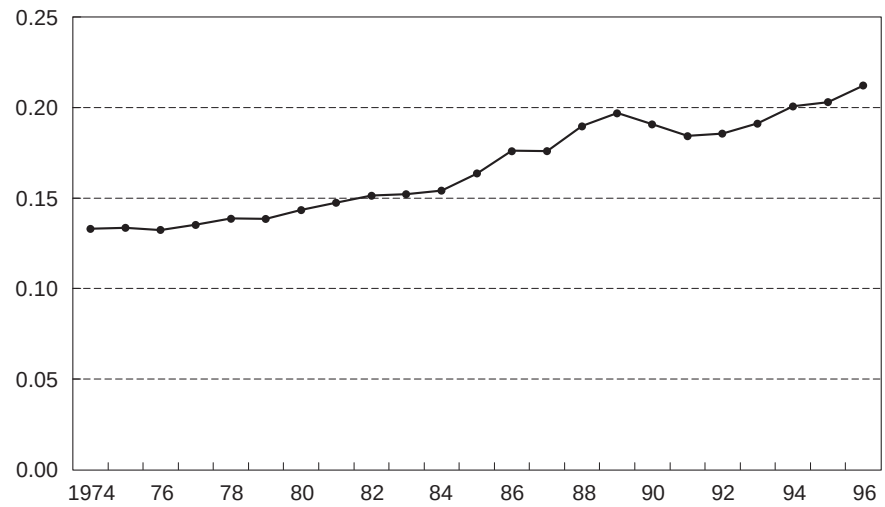
Source: Author's calculations using the Japan Development Bank Database.

Although deregulation of the bond market happened only gradually, the deregulation of saving options for households was even slower. U.S. mutual fund-type investment products became available only in December 1998. Investment trusts,

4. See Hoshi, Kashyap, and Scharfstein (1993), Hoshi (1996), and Hoshi and Kashyap (1999, 2001) for more detailed discussion on financial deregulation and the reactions of Japanese corporations.

which were closest to such products, had poor track records and did not offer a serious alternative to bank deposits. Almost all the investment trust companies were subsidiaries of securities houses, and they were often interested in churning all the accounts they managed to collect high commission fees for their parents. Most of the time, investment trusts underperformed the market indices by large margins.[5] Figure 2 shows the amount of deposits by individuals at city banks. The figure suggests that deposits kept flowing into the banking sector.

Figure 2 Individual Deposits at City Banks (Ratio to GDP)



Sources: Bank of Japan, *Economic Statistical Annual*, various issues.

The deregulation of separation of business lines in the financial industry was also slow. Only in 1993 were banks allowed to set up securities subsidiaries (and securities firms were allowed to set up trust bank subsidiaries). Even then, the Ministry of Finance only gradually approved the actual establishment of securities subsidiaries, and it was not until late 1995 that all the major city banks were allowed to establish them.[6] Moreover, the business of bank-owned securities subsidiaries was still limited to underwriting and related business.

Theoretically, foreign subsidiaries of Japanese banks did not face the restriction on entering securities business that their parents faced. Such a loophole, however, was quickly closed by the Ministry of Finance in the form of the "three bureaus agreement," which stated that the banks should "pay due respect to the experience gained by and the mandate given to the Japanese securities firms." This agreement was interpreted as preventing bank-owned subsidiaries from becoming the leading underwriters of bond issues by Japanese corporations (Rosenbluth [1989], p. 152).

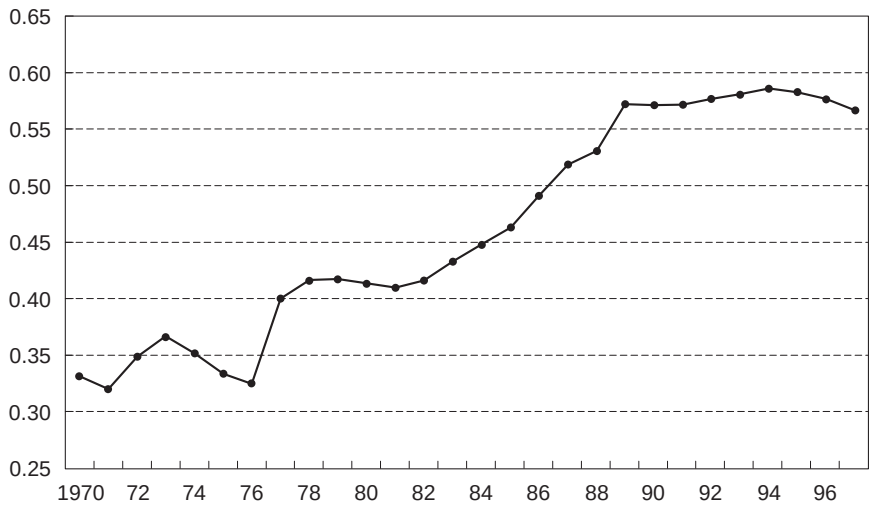
5. See Cai, Chan, and Yamada (1997), for example.
6. See Hamao and Hoshi (2000) for more details.

As a result of the continuing regulation of the scope of banking business in the 1980s, Japanese banks were forced to stay in the traditional banking business of taking deposits and making loans. As large customers moved away from bank financing, many banks started to fill the gap by lending to new and often small customers.

Several figures show such a shift of the customer base for Japanese banks. Figure 3 shows the proportion of bank loans to small and medium firms. Small and medium firms are defined here as those firms that have less than ¥100 million in equity or less than 300 regular employees. The figure shows that Japanese banks increased loans to small and medium-sized firms as they lost their large customers to the capital markets. Those large customers were mostly established firms that belonged to one of the major *keiretsu*, a group of large firms centered on major financial institutions.[7] Figure 4 shows the proportion of bank loans to those firms belonging to the major *keiretsu* (solid line), illustrating the steady decline of the *keiretsu* loan ratio. Since most listed firms in Japan belong to one *keiretsu* or another, the proportion of bank loans to listed firms shows a similar downward trend (broken line in Figure 4). Thus, Japanese banks started to rely more on loans to small, non-listed firms.

A problem was that the banks did not have intimate knowledge of these new customers. Presumably to compensate for the lack of information, the banks often required collateral for those loans. What was considered most secure for such

Figure 3 Proportion of Bank Loans to Small and Medium Firms

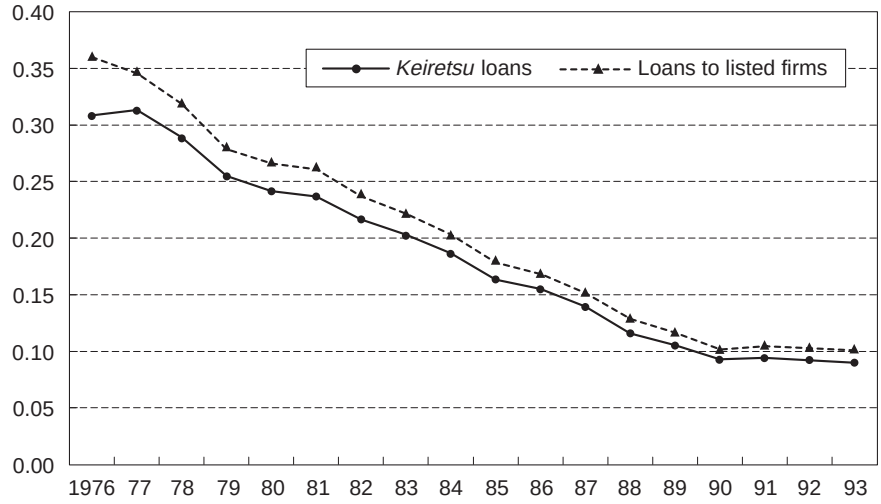


Note: Small and medium firms are defined here as firms other than "large" firms according to the definition from the Bank of Japan. The Bank of Japan defines large firms as those firms with more than ¥100 million in equity and more than 300 regular employees.

Sources: Bank of Japan, *Financial and Economic Statistical Monthly*, various years.

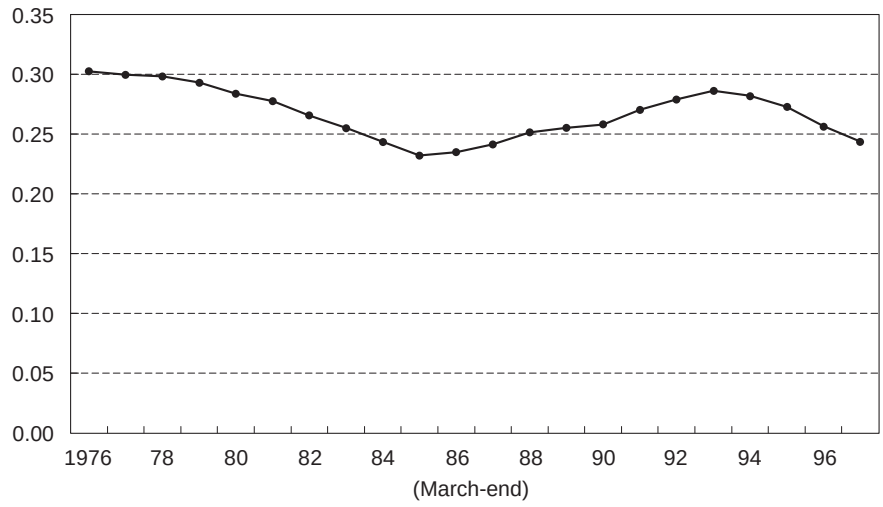
7. See Gerlach (1992) and Hoshi and Kashyap (2001) for more on *keiretsu*.

Figure 4 *Keiretsu* Loans and Loans to Listed Firms



Sources: Keizai Chosakai, *Kin'yu Kikan no Tôyushi* (Investment and Loans by Financial Institutions), various issues.

Figure 5 Proportion of Loans Collateralized by Land



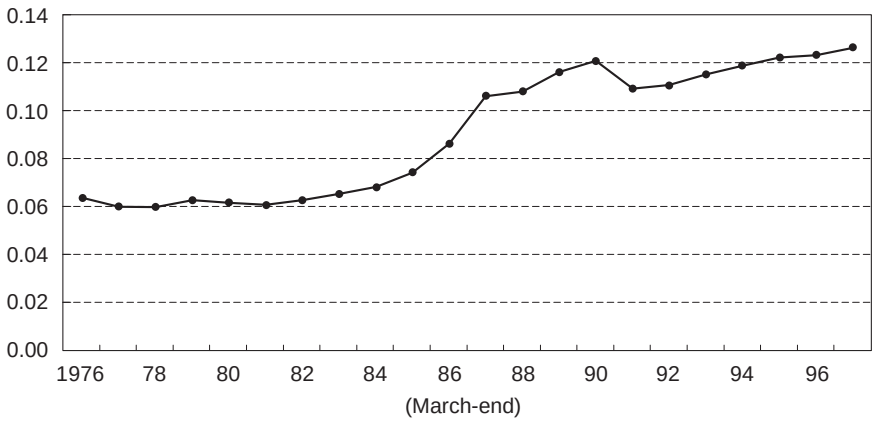
Source: Author's calculations using the Nikkei Database.

collateral was land, whose nominal value did not fall even once throughout the postwar period, until the 1990s. Figure 5 shows the proportion of bank loans secured by land, which surprisingly declined in the early 1980s but grew rapidly during the late 1980s. For the banks that shifted toward collateralized lending, corporations in the real estate business and construction business looked especially promising, having land that started to increase in value especially rapidly in the late 1980s. Sometimes,

loans to real estate developers were not initiated directly by banks but through non-bank subsidiaries, such as leasing companies, of banks. Figures 6 through 8 show the proportion of loans to these three industries (real estate, construction, and non-bank financial institutions). Figures 6 and 8 show the rapid increase of bank loans to real estate firms and non-banks during the 1980s. Figure 7 suggests, however, that the proportion of loans to the construction industry was rather flat. Contrary to the impression of many observers, Japanese banks as a whole did not really increase their exposure to the construction industry.

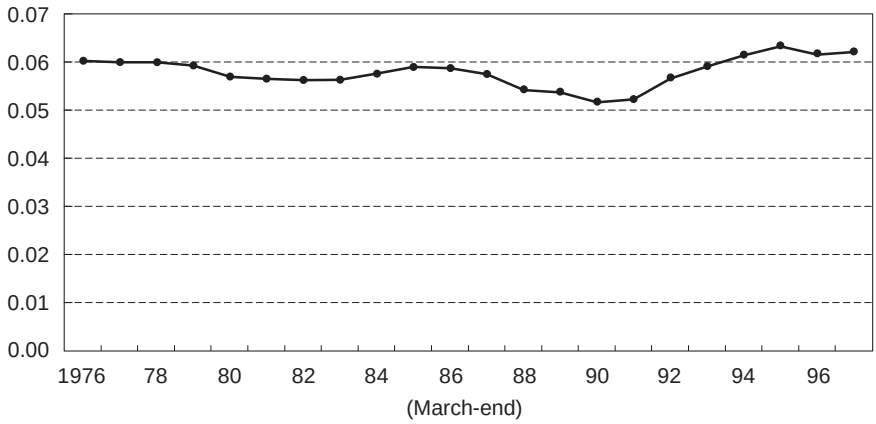
When land prices collapsed in the early 1990s, many loans to those industries became nonperforming and the collateral lost its value. This led to the bad-loan problem of Japanese banks.

Figure 6 Proportion of Loans to the Real Estate Industry



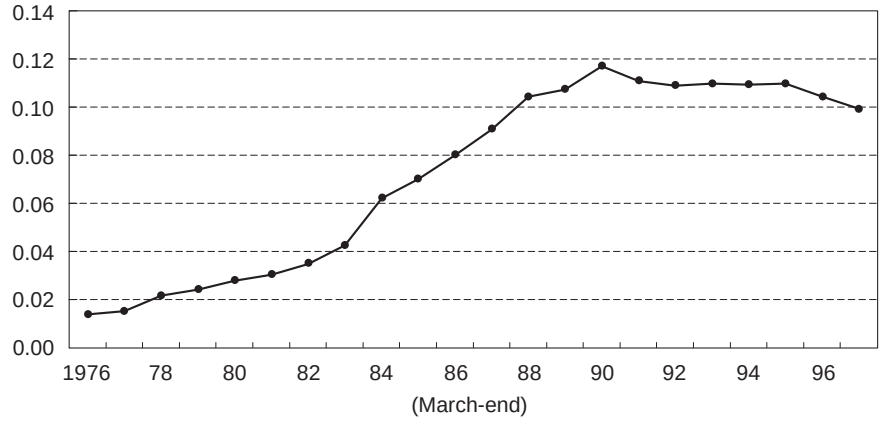
Source: Author's calculations using the Nikkei Database.

Figure 7 Proportion of Loans to the Construction Industry



Source: Author's calculations using the Nikkei Database.

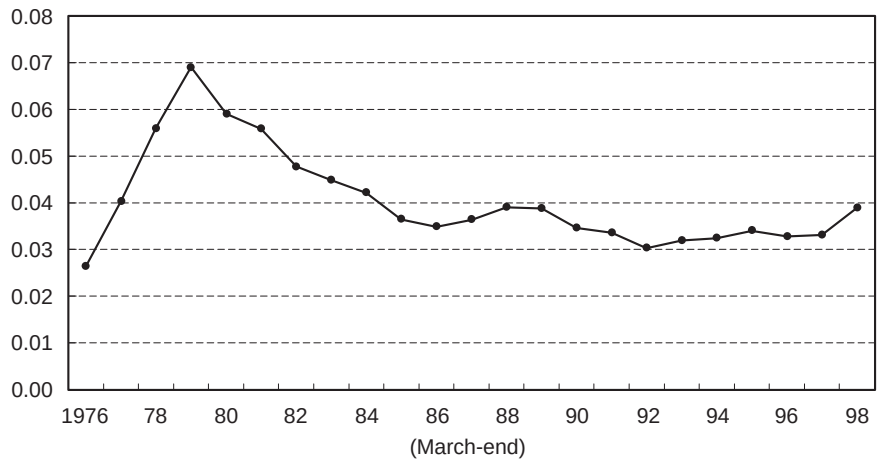
Figure 8 Proportion of Loans to Non-Bank Financial Institutions



Source: Author's calculations using the Nikkei Database.

When Japanese banks lost their large customers to the capital markets, increasing the loans to new customers was not the only choice they had. For example, they could have increased their holding of government bonds. During the 1980s, however, the Japanese government was in the middle of "administrative reform" to limit the growth of government expenditures and eliminate the budget deficit. Figure 9 shows the proportion of government bonds in the assets of Japanese banks. The ratio shot up in the late 1970s, reflecting increasing use of deficit financing. The ratio, however, declined quickly in the 1980s, reflecting the government's efforts to reduce the debt. Shifting from corporate loans to government bonds was not a viable option for Japanese banks in the 1980s.

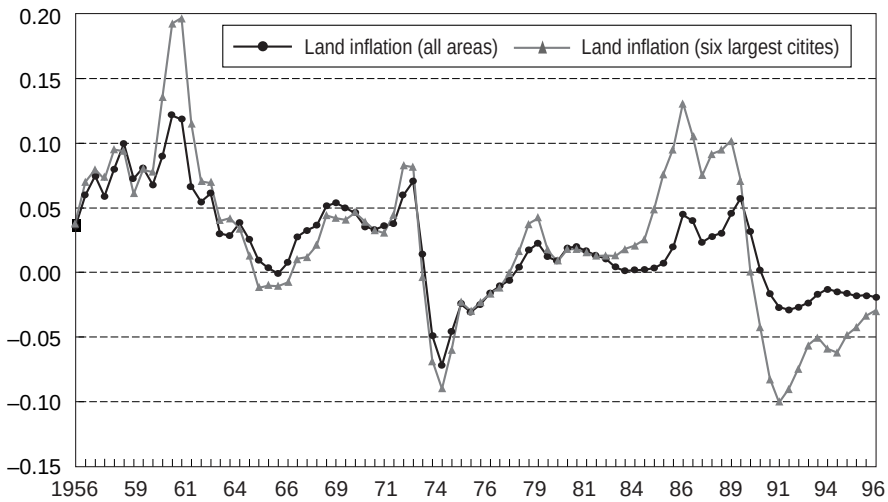
Figure 9 Proportion of Government Bonds to Total Assets



Source: Author's calculations using the Nikkei Database.

It is worth pointing out that this hypothesis does not argue that the collapse of the bubble was unimportant. It was an important event that triggered the bad-loan problem. The land price bubble alone, however, cannot explain the emergence of the problem in the Japanese banking sector. Figure 10 shows land price inflation in Japan from 1956 to 1997, indicating that the bubble in the late 1980s was not the first in the postwar period, nor even the largest. Banks' behavior and performance were not greatly influenced by land price fluctuations in the earlier episodes. The hypothesis developed in this chapter argues that the banks' response to slow and incomplete financial deregulation made them vulnerable to the movement of land prices. The hypothesis finds the fundamental problem in "over-banking," which emerged when corporations shifted to capital market financing but options for savers and banks were extremely slow to be expanded.

Figure 10 Land Price Inflation: 1956–97



Note: The solid line shows the real inflation rate of the average land price index for all uses in all areas, while the broken line shows the real inflation rate of the average land price index for all uses in the six largest cities (Tokyo, Yokohama, Nagoya, Kyoto, Osaka, and Kobe). The series is biannual. Land price indices are divided by GDP deflator to make them real, then the inflation rate is calculated as the log difference from two periods (one year) before.

Sources: Bank of Japan, *Economic Statistical Annual*, various issues.

IV. Real Estate Loans and Bad Loans

If the shift of bank portfolio toward new customers in the real estate, construction, and non-bank financial industries set the stage for the bad-loan problem, one would expect to find that the banks which shifted more aggressively toward those industries ended up with larger amounts of bad loans. This chapter examines this implication of the hypothesis developed in the last chapter, taking advantage of the cross-sectional variation of bad loans that we can find in Table 2.

A direct test of the implication would be to look at the composition of bad loans by industry. We would expect to find the majority of bad loans in those industries. Unfortunately, decomposition of bad loans by industry is not available for many banks. Only a small number of banks started publishing such information in their financial reports starting in March 1999. Table 3 shows the proportion of risk management loans for four city banks in Japan as of March 1999. In all four banks, 40 to 45 percent of bad loans are concentrated in the real estate, construction, and financial industries. Among those three, the loans to the real estate industry are the most important for all banks, and for three out of four banks listed here, the real estate industry has the largest concentration of bad loans among the seven industrial categories in the table.

Table 3 Proportion of Risk Management Loans by Industry (March 1999)

	Sanwa	Sumitomo	Dai-Ichi Kangyo	Tokyo Mitsubishi
Real estate	21.59%	39.51%	15.76%	31.59%
Construction	4.62%	3.13%	12.26%	6.90%
Financial institutions	15.97%	5.72%	15.66%	7.83%
Manufacturing	13.75%	3.64%	7.69%	8.27%
Services	17.84%	36.55%	21.43%	16.99%
Wholesale and retail	14.14%	6.92%	12.39%	22.15%
Individuals and other Industries	12.09%	4.54%	14.81%	6.27%

Note: The figures for Bank of Tokyo-Mitsubishi are from the consolidated report, but include only the loans to failed enterprises.

Sources: *Tanshin* report of each bank.

For many banks, such a breakdown of bad loans by industry is not available. Thus, we cannot see directly if the loans to the real estate, construction, and financial industries constituted a substantial portion of bad loans. All we can establish is an indirect link through correlation. Since every bank publishes an industrial distribution of *total* loans, we can examine if the banks that shifted their loan portfolios more quickly toward particular industries ended up having more bad loans. This is what the paper does in this chapter through a regression analysis.

The dependent variable of the regression is the ratio of bad loans and cumulative write-offs to total loans outstanding. This is the figure reported in the next-to-last column of Table 2. The data are collected from *Analysis of Financial Statements of All Banks* published by Zenginkyo (Japanese Bankers Association). This variable is regressed on the changes in proportions of loans to the industries to see how the amount of bad loans is correlated with the shift of bank portfolio in the late 1980s. The shift of bank portfolio is measured by the changes in the proportions of loans to particular industries from fiscal 1982 (which ended in March 1983) to fiscal 1989 (which ended in March 1990).[8] The data for the distribution of loans across different industries are obtained from financial data for the banking sector in the Nikkei Database.

8. The results reported below are robust to small changes in the timing of measuring the portfolio shift. The results are also robust to exclusion of some large values of bad-loan ratios that we find in Table 2 (e.g., more than 40 percent for Hokkaido Takushoku).

Another implication of the hypothesis developed in the last chapter is that the growth of bad loans is related to the growth of loans with land as collateral during the late 1980s. To examine this link, the bad-loan ratio (including write-offs) is regressed on the growth of land-collateralized loans. The data on loans with land as collateral are also taken from the Nikkei Database.

Table 4 shows the result of the estimation. The sample includes 145 banks (10 city banks, 3 long-term credit banks, 7 trust banks, 64 regional banks, and 61 second-tier regional banks).[9] Each column represents a different specification. Model 1 tries to explain the amount of bad loans in 1998 by the growth of the proportion of loans to real estate developers from 1983 to 1990. Model 2 similarly examines the relation between the amount of bad loans and the growth of loans to the construction industry. Model 3 focuses on the relation to the growth of loans to non-bank financial institutions. Model 4 uses the growth of loans collateralized by land as an explanatory variable for the amount of bad loans. Finally, Model 5 includes both the growths of loans to the real estate industry and the loans collateralized by land.

In every specification, four dummy variables to identify the type of bank are included in addition to the constant term. LTCB takes one if the bank is a long-term

Table 4 Bad Loans (as of March 1998) and Shift in Bank Portfolios: OLS Estimation

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	.060 (1.58)	.098 (2.69)	.098 (2.73)	.088 (2.60)	.060 (1.59)
LTCB	.031 (0.54)	.050 (1.15)	.074 (1.45)	.075 (1.60)	.040 (0.74)
TRST	.057 (1.34)	.048 (1.15)	.067 (1.65)	.066 (1.67)	.063 (1.55)
REG1	–.039 (–1.05)	–.058 (–1.59)	–.053 (–1.50)	–.048 (–1.42)	–.038 (–1.04)
REG2	–.021 (–0.57)	–.033 (–0.92)	–.035 (–0.96)	–.026 (–0.75)	–.020 (–0.54)
Real estate	.587 (4.75)				.546 (4.03)
Construction		.254 (1.02)			
Non-bank			–.118 (–1.21)		
Land collateral				.132 (2.57)	.050 (1.08)
Adjusted R-squared	.369	.252	.255	.282	.368
Number of observations	145	145	145	145	145

Note: The figures in parentheses are *t*-statistics. Heteroskedasticity consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

9. Table 2 has information on 146 banks. We lose one bank in the regression analysis because the information on loan portfolio for the 1980s at Yachiyo Bank, which was converted from a *shinkin* bank to a second-tier regional bank in 1991, is not available in the database.

credit bank and takes zero otherwise. TRST, REG1, and REG2 are similarly defined dummy variables for trust banks, regional banks, and second-tier regional banks, respectively. The coefficient on a dummy variable shows the difference between the average amount of bad loans for a particular category of banks and those for city banks (all dummy variables are zero for a city bank).

To get consistent estimates for standard errors of the coefficient even when the disturbances exhibit heteroskedasticity, I calculate the robust standard errors developed by White (1980). The standard tests of homoskedasticity suggested by White (1980) reject the null hypothesis of homoskedasticity in all the models except for Model 3, where the hypothesis of homoskedasticity is rejected only at an 8 percent significance level. Thus, controlling for heteroskedasticity is important in examining the statistical significance of our regression results. If we knew the source of heteroskedasticity, we could use more efficient estimators than OLS estimators. For example, if the variance of the disturbance term were known to be proportional to the amount of total assets of the bank, then a weighted least squares with total assets would give us the efficient estimator. Unfortunately, we do not know exactly the source of heteroskedasticity in our sample. Thus, I use the OLS estimator, which is not the most efficient one but is consistent. As we will see below, we find many interesting and statistical significant results in spite of the possible loss of efficiency.

The table clearly shows that the amount of bad loans and the cumulative loss from write-offs is highly correlated with the shift toward lending to real estate developers and collateralized lending. The correlation between bad loans and real estate lending is especially high, and when both real estate lending and collateralized lending are included in the regression, the coefficient on collateralized lending loses its statistical significance. The correlation between bad loans and loans to the construction industry or non-banks is not statistically significant.[10]

One potential problem of the regressions in Table 4 is simultaneity. A shift in bank portfolios is a result of a decision at a bank. Thus, it is possible that a bank decision that eventually led to the accumulation of bad loans also increased the exposure to the real estate industry even though there is no direct link between the real estate lending and bad loans. To mitigate such a simultaneity problem, the regressions in Table 4 regress bad loans in 1998 to the shift in bank portfolio that happened about 10 years ago, but this may not be perfect. To further mitigate the problem of simultaneity, we use the proportions of loans to the three industries and the proportion of collateralized loans as of 1982, which is very early in the deregulation process, as instruments in the regression analysis. Thus, the variable is not likely to have a high correlation with the decision of the banks during the bubble period. Yet the variable should be correlated with the shift in the bank portfolio in the 1980s. One drawback of this approach is that we do not have information on the loans to real estate, construction, and non-bank financial institutions as of 1982 for two long-term credit banks (Industrial Bank of Japan and Long-Term Credit Bank of Japan). This reduces the number of long-term credit banks in the sample to only one. Thus, the number of observations in the

10. To check the possibility of nonlinear relations, a square-term(s) of the loan variable(s) was added to each specification. None of them was found to be statistically significant.

instrumental variable regressions drops to 143.[11] Since a dummy variable for long-term credit banks is included in the regression, it is the equivalent of excluding all the long-term credit banks from the sample.

Table 5 shows the results of the instrumental variable estimation. The change in the proportion of loans to real estate developers again appears to be most closely correlated with the amount of bad loans. Thus, the result here reinforces the result obtained in the regressions in Table 4. The land-collateralized loan is not statistically significant even when it is included in the regression alone (with the dummy variables). Interestingly, the changes in the loans to the construction and financial industries become statistically significant in this instrumental variable estimation, but the coefficient on non-bank loans has the sign opposite to what one would expect.

In summary, we find that the amount of bad loans is closely related to the shift into real estate lending in the 1980s. Instead of using the bad-loan data for March 1998, we can use the data for March 1997. One advantage of using 1997 data is that

Table 5 Bad Loans (as of March 1998) and Shift in Bank Portfolios: Two-Stage Least Squares Estimation

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	.020 (0.50)	.109 (3.19)	.115 (3.04)	.084 (2.31)	.021 (0.51)
LTCB	.125 (3.34)	.137 (4.00)	.204 (4.81)	.161 (4.20)	.116 (2.77)
TRST	.066 (1.46)	.042 (1.03)	.165 (2.56)	.074 (1.60)	.055 (1.11)
REG1	–.020 (–0.53)	–.071 (–2.07)	–.041 (–1.14)	–.045 (–1.22)	–.023 (–0.59)
REG2	–.008 (–0.22)	–.037 (–1.08)	–.048 (–1.29)	–.022 (–0.61)	–.012 (–0.29)
Real estate	1.263 (5.98)				1.339 (5.49)
Construction		1.451 (2.68)			
Non-bank			–.775 (–2.12)		
Land collateral				.197 (1.41)	–.093 (–0.89)
Adjusted R-squared	.261	.219	.076	.287	.232
Number of observations	143	143	143	143	143

Note: The proportions of loans to real estate, construction, and financial industries, and the proportion of loans collateralized by land as of March 1982, in addition to the constant and the dummy variables, are used as the instruments in the two-stage least squares estimation. The figures in parentheses are *t*-statistics. Heteroskedasticity-consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

11. I replicated the regression estimation in Table 4 using only the 143 observations. The results did not change in any significant way. Growth of the loans to real estate developers and the loans collateralized with land are positively related with the bad-loan ratio. No significant relation between the growth of loans to the construction industry or non-bank financial institutions and the bad-loan ratio is found. When we include both the growth of real estate lending and land-collateralized loans at the same time (Model 5), only the real estate loan variable comes in significantly.

they do not include an extreme value such as the one for Hokkaido Takushoku Bank in March 1998. When the regressions for Tables 4 and 5 are replicated using the bad-loan data for 1997, we get the same qualitative result. The growth of loans to the real estate industry is most closely correlated with the amount of bad loans.

Thus, the result in this chapter confirms an important part of the hypothesis developed in the previous chapter. The shift of bank portfolio, especially into the real estate industry, led to the bad loans. The story also explains why such a shift took place. The plausibility of that part of the hypothesis is examined in the next chapter.

V. Slow Deregulation and Growth of Real Estate Loans

According to the hypothesis developed in Chapter III, the reason for the shift in bank portfolios toward more real estate lending is found in the slow and incomplete deregulation. Corporate financing options for large firms were expanded, though gradually, and many firms reduced the dependence on bank loans. On the liability (deposits) side, however, the banks continued to be dominant in the Japanese financial system, because the deregulation to expand the savers' options was even slower than the deregulation of corporate finance. The deregulation of separation of business lines in the financial industry was also slow, which severely limited the banks' ability to move beyond the traditional banking business. Thus, when the banks started to lose their customers to the capital markets, many of them increased exposures to real estate developers. Holding more government bonds instead was not really an option, because the Japanese government was aggressively reducing the budget deficit.

This story suggests several variables that would explain the shift of bank portfolios toward the real estate industry. This chapter considers five such factors and examines how closely they are correlated with the growth of loans to the real estate industry. First, two measures of the loss of existing customers are considered. According to the hypothesis, the financial deregulation allowed established firms, which previously relied on banks, to reduce their bank dependence. Thus, these two measures look at changes in the bank's loans to those established firms. The first measure defines the established firms as those belonging to major *keiretsu*. The average of this measure for all banks was plotted as the solid line in Figure 4. The second measure defines the established firms as all listed firms, which covers not only *keiretsu* firms but also independent firms. The average for this measure was plotted as the broken line in Figure 4. Since there are not many independent listed firms in Japan (see Nakatani [1984], for example), the first measure (*keiretsu* loans) and the second measure (loans to listed firms) show similar movements both over time and across banks.

The third measure is the change in the loans to small firms. As we saw in Figure 3, many banks found new customers in small firms. This shift toward loans to small firms is expected to have been related to the shift toward real estate loans.

The fourth measure is the change in the proportion of government bonds in bank assets. As we discussed in Chapter III, Japanese banks could not increase their government bondholdings substantially when they lost their large customers to capital markets, because the Japanese government was in the process of reducing its

debt. We would expect that banks which were relatively more successful in increasing their government bondholdings had less need to increase their exposure to the real estate industry.

Instead of holding government bonds, the banks could have increased foreign loans or asset holdings to stay away from loans to the real estate industry.[12] The fifth measure tries to capture this relation. Unfortunately, the data set does not contain a series that shows the amount of foreign loans or foreign investments made by each bank. As a proxy, I calculate the proportion of bank branches located overseas for each bank each year. Banks that increased the proportion of overseas branches more rapidly are expected to have had less urgency to find customers in the real estate industry.

In the regressions, we take the change in the proportion of loans to real estate developers as the dependent variables. The most important independent variable is the five measures discussed above. Note that all the factors are measured as change in the ratios. For example, the dependent variable that measure the loss of *keiretsu* loans is calculated as the change in proportion of *keiretsu* loans in the total loans. To allow for the response of real estate loans with some lags, four lags of a factor are included in each regression.

The sample period of the regressions is from fiscal 1983 (which ended in March 1984) to fiscal 1989 (which ended in March 1990), corresponding to the period of rapid shift of bank portfolio toward the real estate industry. The number of banks in the sample is 150, which is slightly larger than that for bad-loan regressions, because it includes some banks that existed in 1990 but had failed or merged by 1998. The sample includes 11 city banks, 3 long-term credit banks, 7 trust banks, 64 regional banks, and 65 second-tier regional banks (called *sogo* banks before 1989).

To control for the individual effects, 150 bank dummies are included in each regression, although the coefficient estimates are not reported in the tables.[13] By including the individual effects in estimation, we can also control for some simultaneity problems as long as the problems are caused by bank-specific factors (such as a managerial bias toward more real estate lending).

Four different sets of specifications are considered, which differ in how the aggregate (time-specific) factors are controlled. The first set of specifications just includes six year dummy variables. The coefficient on a year dummy captures any factors that influenced the real estate lending of all banks in the same way in a specific year. The second set of specifications includes the lags of aggregate land price inflation instead of year dummies. This allows us to examine the importance of land price inflation in fueling the growth of real estate loans, which is a part of standard "bubble" explanation. The average price index for all uses in the six largest cities

12. I thank the referee for the suggestion.

13. An alternative estimation strategy is to use random effect estimation. If the bank-specific part of the disturbance is independent and identically distributed across firms and is uncorrelated with any explanatory variables in the regression, the random effect estimation gives us the efficient estimator. If the bank-specific part is correlated with some explanatory variables, however, the random effect estimators will be inconsistent. The estimation with bank dummies gives us consistent estimates even when there is a correlation between the bank-specific disturbance and explanatory variables. We may be losing some efficiency but use more robust estimation. See, for example, Judge et al. ([1985], pp. 527–529) for a discussion on the choice between random effect versus fixed effect.

(Tokyo, Yokohama, Nagoya, Kyoto, Osaka, and Kobe), published by the Real Estate Research Institute, is used to construct the inflation series.[14] The price index is first divided by the GDP deflator to convert it to a real (rather than nominal) price. The third set of specifications includes land price inflation calculated from the average land price for the prefecture where the bank's headquarters are located. The prefecture-level land price is obtained from the Prefecture Land Price Survey conducted in July each year. Thus, in the third set of specifications, land inflation has not only time-series but also cross-sectional variations. Ueda (2000) found prefecture land price inflation to be one of the most important determinants of real estate loans and bad loans. Finally, the fourth set of specifications includes both prefecture-specific land price inflation and six year dummies.

Table 6 shows the regression results for the specifications with six year dummies. A dummy variable is assigned for each year except 1990. Thus, the coefficient on a

Table 6 Regression Analysis of Real Estate Lending (1): Year Dummies

Independent variable	*Keiretsu* loans	Loans to listed firms	Loans to small firms	Government bond ratio	Overseas branch ratio
1984 dummy	–.0034 (–3.49)	–.0035 (–3.55)	–.0029 (–2.90)	–.0037 (–3.46)	–0.0031 (–3.02)
1985 dummy	–.0032 (–2.91)	–.0033 (–2.97)	–.0027 (–2.50)	–.0031 (–2.67)	–.0028 (–2.64)
1986 dummy	.0004 (0.36)	.0003 (0.24)	.0014 (1.21)	.0010 (0.78)	.0014 (1.16)
1987 dummy	.0029 (2.47)	.0028 (2.40)	.0037 (3.07)	.0032 (2.56)	.0038 (3.14)
1988 dummy	–.0005 (–0.44)	–.0006 (–0.55)	–.0002 (–0.17)	–.0006 (–0.54)	–.0001 (–0.06)
1989 dummy	.0004 (0.29)	.0003 (0.27)	.0005 (0.42)	.0001 (0.08)	.0005 (0.42)
Lag 1 of the variable	–.0183 (–2.05)	–.0145 (–1.73)	–.0038 (–0.59)	–.0219 (–0.48)	.2727 (1.33)
Lag 2 of the variable	–.0563 (–5.15)	–.0506 (–5.04)	–.0072 (–1.60)	–.0134 (–0.25)	–.2009 (–1.94)
Lag 3 of the variable	–.0512 (–4.05)	–.0500 (–4.59)	–.0061 (–1.52)	–.0515 (–1.17)	–.0335 (–0.27)
Lag 4 of the variable	–.0406 (–3.16)	–0.0408 (–3.84)	–.0098 (–2.36)	–.0405 (–1.18)	–.3463 (–1.73)
R-squared	.254	.256	.233	.230	.251
Number of observations	1050	1050	1050	1050	1050

Note: The dependent variable is the change in the proportion of loans to real estate industry from the previous year. All the specifications include six year dummy variables as independent variables. Each column differs in the main independent variable, which is specified in the first row of each column. The main independent variables are also measured as changes from the previous year. Each regression includes dummy variables for banks to eliminate the fixed effects. The coefficients on dummy variables are not reported. The figures in parentheses are *t*-statistics. Heteroskedasticity-consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

14. An earlier version of the paper used the price index for all uses in all areas in Japan, and failed to find the positive influence of land inflation on the growth of loans to the real estate industry. I thank the referee for suggesting the use of the price index for the six largest cities.

year dummy suggests how much that year differed from 1990 in terms of the growth of real estate lending. The coefficient estimates on year dummies suggest that the growth of real estate loans was slower for 1984 and 1985, implying that the rate of growth picked up especially in the late 1980s. The year 1987 was a particularly strong year for the growth of loans to the real estate industry.

The first specification using *keiretsu* loans shows that loss of *keiretsu* loans in fact led to the growth of real estate loans. The effect of the first lag is somewhat smaller than the effects of higher orders of lags, suggesting some time lags between the loss of *keiretsu* firms and the increase of real estate lending. A similar result is obtained for the specification using loans to listed firms. A decline in loans to listed firms leads to an increase in real estate loans, perhaps with a time lag of two or more years.

The third specification examines the effect of the growth of loans to small firms. We would expect positive coefficients on the changes in loans to small firms, but all the coefficient estimates are negative, suggesting that an increase in loans to small firms leads to a fall in real estate lending. The result is not consistent with the story developed in Chapter III, although one could interpret the result as showing that those banks that were successful in finding small firms did not have to move so much into real estate lending. The coefficient estimates, however, are not statistically significant except for the one on the fourth lag.[15]

The fourth specification uses the proportion of government bonds to total assets of a bank as the major explanatory variable. The coefficient estimates are all negative, suggesting that the banks that were successful in increasing their government bondholdings saw lower growth of loans to the real estate industry. Thus, the result is consistent with the hypothesis that the effort of the Japanese government to reduce its debt contributed to the shift of bank portfolios toward real estate lending. The coefficient estimates, however, are not statistically significant.

The final specification examines the relation between the growth of overseas branches and the growth of real estate loans. The coefficients on the first and fourth lags are positive, but those on the second and the third lags are negative. The sum of the coefficients is positive, suggesting that high growth of overseas branches was associated with high growth of loans to the real estate industry. Combined with the result for government bondholdings, this result seems to suggest the existence of two types of banks: one type increased its government bondholdings and the other increased both real estate lending and foreign investment. The statistical significance of the coefficients, however, is marginal at best.

Table 7 reports the regression results with aggregate land price inflation. The results for *keiretsu* loans, loans to listed firms, loans to small firms, the government bond ratio, and the overseas branch ratio are very much the same as those in Table 6.

15. Closer examination of this specification reveals that the significantly negative correlation between some lagged increases in loans to small firms and the growth of loans to the real estate industry is driven by the observations for long-term credit banks and trust banks. For regional and second-tier regional banks, the coefficients on the changes in the loans to small firms are insignificantly different from zero. For city banks, in the specification that uses the aggregate land inflation (the specification in Table 7), the third lag of the change in the loans to small firms comes in significantly with a *positive* sign, but the coefficients in other cases are all insignificant. Thus, the failure of finding small customers seems to have been an important driving force toward more real estate lending for long-term credit and trust banks, but not for other banks.

Table 7 Regression Analysis of Real Estate Lending (2): Aggregate Land Price Index

Independent variable	*Keiretsu* loans	Loans to listed firms	Loans to small firms	Government bond ratio	Overseas branch ratio
Lag 1 of land inflation	.0226 (3.20)	.0220 (3.12)	.0232 (3.26)	.0232 (3.23)	
Lag 2 of land inflation	–.0144 (–1.91)	–.0134 (–1.79)	–.0183 (–2.44)	–.0158 (–1.99)	–.0158 (–1.99)
Lag 1 of the variable	–.0176 (–1.91)	–.0135 (–1.57)	–.0048 (–0.74)	–.0540 (–1.16)	–.0540 (–1.16)
Lag 2 of the variable	–.0612 (–5.01)	–.0545 (–4.88)	–.0059 (–1.40)	–.0189 (–0.35)	–.0189 (–0.35)
Lag 3 of the variable	–.0548 (–4.17)	–.0537 (–4.74)	–.0063 (–1.54)	–.0333 (–0.80)	–.0333 (–0.80)
Lag 4 of the variable	–.0486 (–3.66)	–0.0477 (–4.35)	–.0114 (–2.52)	–.0340 (–1.00)	–.0340 (–1.00)
R-squared	.230	.232	.205	.200	.200
Number of observations	1050	1050	1050	1050	1050

Note: The dependent variable is the change in the proportion of loans to real estate industry from the previous year. All the specifications include the first two lags of the inflation rate of land price (average of all uses for the six largest cities) as independent variables. Each column differs in the main independent variable, which is specified in the first row of each column. The main independent variables are also measured as changes from the previous year. Each regression includes dummy variables for banks to eliminate the fixed effects. The coefficients on dummy variables are not reported. The figures in parentheses are *t*-statistics. Heteroskedasticity-consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

The loss of *keiretsu* loans and loans to listed firms led to a significant increase in real estate lending. The effect of changes in loans to small firms is insignificant overall. An increase in government bondholdings also tended to reduce the growth of real estate lending, but the effect is not statistically significant. The growth of overseas branches was accompanied by a subsequent increase in loans to real estate developers, but the effect is not statistically significant.

The estimated coefficients on land price inflation are consistent with what we would expect. The coefficient on the first lag is positive and significant, suggesting that higher land price inflation leads to higher growth of real estate lending. The coefficient on the second lag is negative, but smaller than the coefficient on the first lag in its magnitude, and often statistically insignificant. Thus, the growth of real estate loans by banks in the 1980s was positively influenced by high land inflation.

As Table 8 shows, the use of prefecture-specific land price inflation does not change the result in any substantial way. The coefficient estimate on the first lag of land inflation is positive and significant. The coefficient on the second lag is negative, but smaller in magnitude and statistically insignificant. Thus, when we consider the cross-sectional variation of land price inflation, we find that banks located in a prefecture where land price inflation was higher than elsewhere tended to see higher growth of real estate lending. *Keiretsu* loans and loans to listed firms continued to exhibit an important effect on the growth of real estate lending. The results for loans for small firms, the government bond ratio, and the overseas branch ratio are basically the same as those in earlier tables.

Table 8 Regression Analysis of Real Estate Lending (3): Prefecture Land Price Indices

Independent variable	*Keiretsu* loans	Loans to listed firms	Loans to small firms	Government bond ratio	Overseas branch ratio
Lag 1 of land inflation	.0070 (3.00)	.0069 (2.99)	.0079 (3.18)	.0080 (3.24)	.0082 (3.32)
Lag 2 of land inflation	–.0038 (–1.47)	–.0038 (–1.46)	–.0038 (–1.40)	–.0036 (–1.32)	–.0036 (–1.34)
Lag 1 of the variable	–.0148 (–1.82)	–.0109 (–1.45)	–.0044 (–0.67)	–.0388 (–0.86)	.2954 (1.45)
Lag 2 of the variable	–.0522 (–4.65)	–.0460 (–4.52)	–.0055 (–1.38)	–.0013 (–0.02)	–.2059 (–2.01)
Lag 3 of the variable	–.0507 (–4.24)	–.0500 (–4.88)	–.0061 (–1.60)	–.0548 (–1.36)	–.0535 (–0.43)
Lag 4 of the variable	–.0481 (–3.87)	–0.0465 (–4.54)	–.0121 (–2.90)	–.0141 (–0.41)	.3241 (1.65)
R-squared	.242	.244	.222	.217	.239
Number of observations	1050	1050	1050	1050	1050

Note: The dependent variable is the change in the proportion of loans to real estate industry from the previous year. All the specifications include the first two lags of the inflation rate of the land price (average of all uses) of the prefecture where the bank has its headquarter as independent variables. Each column differs in the main independent variable, which is specified in the first row of each column. The main independent variables are also measured as changes from the previous year. Each regression includes dummy variables for banks to eliminate the fixed effects. The coefficients on dummy variables are not reported. The figures in parentheses are *t*-statistics. Heteroskedasticity-consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

Finally, Table 9 shows the regressions that include both prefecture-level land inflation and year dummies. The results are qualitatively the same as those in Tables 6 through 8.

In summary, the regression analysis suggests that the loss of existing customers measured by changes in *keiretsu* loans or loans to listed firms led to the rapid growth of real estate lending by Japanese banks. Land price inflation also seems to have contributed to the increase of loans to the real estate industry.

VI. Conclusion

This paper has advanced a hypothesis which explains why Japanese banks got into massive trouble in the 1990s. The hypothesis stresses the importance of the slow and incomplete deregulation of the financial system that started in the late 1970s. The hypothesis puts less emphasis on the wild swings in land prices. The collapse of land prices was an important shock initiating the bad-loan problem, but more important were the effects of partial deregulation that made the Japanese banking sector more vulnerable to such swings in the land market. Financial deregulation provided large corporations with serious alternatives to bank financing, and many corporations started to reduce their dependence on bank loans. The deregulation of savers' options and the scope of financial business that banks were allowed to conduct was

Table 9 Regression Analysis of Real Estate Lending (4): Prefecture Land Price Indices and Year Dummies

Independent variable	*Keiretsu* loans	Loans to listed firms	Loans to small firms	Government bond ratio	Overseas branch ratio
Lag 1 of land inflation	.0080 (3.45)	.0079 (3.43)	.0090 (3.76)	.0090 (3.78)	.0095 (3.95)
Lag 2 of land inflation	–.0019 (–0.82)	–.0020 (–0.83)	–.0017 (–0.68)	–.0016 (–0.66)	–.0013 (–0.52)
1984 dummy	–.0033 (–3.46)	–.0034 (–3.52)	–.0028 (–2.87)	–.0035 (–3.30)	–.0029 (–2.95)
1985 dummy	–.0019 (–1.67)	–.0020 (–1.74)	–.0013 (–1.19)	–.0016 (–1.38)	–.0013 (–1.21)
1986 dummy	.0014 (1.18)	.0013 (1.05)	.0025 (2.08)	.0021 (1.65)	.0026 (2.18)
1987 dummy	.0034 (2.91)	.0033 (2.83)	.0042 (3.60)	.0039 (3.16)	.0044 (3.78)
1988 dummy	–.0005 (–0.41)	–.0006 (–0.52)	–.0002 (–0.20)	–.0005 (–0.46)	–.00003 (–0.02)
1989 dummy	.0009 (0.76)	.0009 (0.73)	.0011 (0.90)	.0007 (0.58)	.0011 (0.93)
Lag 1 of the variable	–.0166 (–2.05)	–.0131 (–1.73)	–.0032 (–0.51)	–.0235 (–0.53)	.2975 (1.48)
Lag 2 of the variable	–.0526 (–5.06)	–.0474 (–4.98)	–.0067 (–1.54)	–.00003 (–0.0005)	–.1490 (–1.54)
Lag 3 of the variable	–.0440 (–3.71)	–.0436 (–4.26)	–.0055 (–1.48)	–.0436 (–0.98)	.0257 (0.21)
Lag 4 of the variable	–.0354 (–2.78)	–0.0360 (–3.39)	–.0099 (–2.63)	–.0365 (–1.07)	.4010 (2.02)
R-squared	.274	.276	.259	.255	.278
Number of observations	1050	1050	1050	1050	1050

Note: The dependent variable is the change in the proportion of loans to real estate industry from the previous year. All the specifications include the first two lags of the inflation rate of the land price (average of all uses) of the prefecture where the bank has its headquarter as independent variables. Six year dummies are also included in all the specifications. Each column differs in the main independent variable, which is specified in the first row of each column. The main independent variables are also measured as changes from the previous year. Each regression includes dummy variables for banks to eliminate the fixed effects. The coefficients on dummy variables are not reported. The figures in parentheses are *t*-statistics. Heteroskedasticity-consistent estimates of standard errors by White (1980) are used to calculate the *t*-statistics.

much slower. As a result, the banks did not reduce their loans and shifted their loan portfolios more toward firms that were not well known to banks but had land as collateral. When land prices collapsed, many of those loans became nonperforming.

Through a series of regression analyses, the paper finds that the hypothesis has a reasonable explanatory power for the cross-sectional variation of growth in real estate lending and nonperforming loans. The result has an important implication for the future of the Japanese banking sector. It implies that even if land prices in Japan recover, the fundamental problem of the Japanese banking sector will not go away. The solution must be found in the completion of financial deregulation, which will allow depositors to migrate out of bank deposits and allow traditional banking business to shrink to fit the demand for bank loans by corporations. The incomplete

deregulation in the 1980s created "over-banking" that eventually led to the crisis in the Japanese banking. The Big Bang deregulation completes the long process of deregulation in the Japanese financial system. When the effects of the Big Bang are all played out, the Japanese banking sector will be smaller.[16] The banks that survive the transition will be much healthier and profitable than they really were in the "golden decade" of the 1980s.

16. Hoshi and Kashyap (1999) provide a simple calculation of how much the traditional banking business must shrink in Japan. They estimate shrinkage of 20 to 40 percent. If the banks successfully expand into the financial business that they did not (or could not) handle in the past, the total assets in the banking sector may not shrink even when the traditional banking business shrinks. There is no guarantee, however, that Japanese banks can dominate the competition with other financial institutions and foreign banks outside traditional banking.

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