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# The Japanese Big Bang: The Effects of “Free, Fair and Global”

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*“Banking doesn’t get much duller than in Japan.”*

– The Economist (May 12, 2011)

## **I. Introduction**

Ten years ago, Japan’s banks were viewed with a mixture of pity and derision. Japan’s so-called “lost decade” of sluggish growth in the 1990s was attributed by many economists and policy makers to the failure of Japan’s banks to restructure: clean up their balance sheets, find a profitable market niche, and get competitive with their more sophisticated counterparts in Europe and the United States. Financial experts from the West were flown in to Tokyo to provide fresh perspectives on how Japan’s financial institutions failed to measure up and policy advice on how to appropriately regulate and incentivize. At the G-8 meetings, Western governmental leaders clamored for Japan to clean up its sick banks.

Then came the global financial crisis of 2007-2008 and the collapse of America’s highly profitable investment banking model. Rather than being on the receiving end of advice from Western financial experts, Japan’s banks were coming to the rescue of top financial institutions in the West. It started in January 2008, when Mizuho Financial Group bought 18% in preferred shares issued by Merrill Lynch to boost up its capital, becoming the first Japanese bank to take an equity stake in a major US or European financial institution in the post-bubble period. In June of the same year, Sumitomo Mitsui Banking Corporation

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announced a 100 billion yen capital infusion to the UK-based Barclay's bank. Three months later, in September, Nomura announced it would purchase the Asia-Pacific, European and Middle Eastern operations of the failed Lehman Brothers, while in the same month Mitsubishi UFJ Financial Group came to the rescue of Morgan Stanley with a 20% stake purchase, becoming the leading shareholder of the global investment bank.

Japan's big, boring banks – with little apparent interest in fancy derivative products or fast emerging markets in their own back yard – became the dull but reliable savior for the global financial system. Indeed, the spectacular events of 2007 make Japanese banks staid investments in Japanese government bonds appear virtuous in comparison with their American counterparts' disastrous fling with unregulated securitization. However, Japan's banking industry has undergone much deregulation itself in the past several decades. How, or why, has the industry emerged in its present form? This paper attempts to answer some of these questions, exploring the evolution of Japan's banking sector from the start of the "Big Bang" financial deregulation in 1996, through its completion in 2001 and the following eight years. We focus on the key objectives of the Big Bang deregulations – profitability and efficiency of the banking sector – and in particular, how these measures have evolved over time and are influenced by bank type.

This paper is organized as follows: the next section presents a brief history of Japan's banking industry, organized around the Big Bang financial deregulations of 1996-2001 but including some description of key events pre-1996 and in the aftermath of the Big Bang. The main objectives of the Big Bang were to shake up Japan's banks, promote competition and create a more profitable and efficient financial sector. In sections three and four we investigate empirically whether these objectives were realized: section 3 looks at profitability and section 4 efficiency. In section 5 we draw some conclusions from our work and point out some directions for future research suggested by our findings.

## II. Japan’s Banking Industry

### 1. Pre-1996

The start of Japan’s modern banking system can be dated as early as July 20, 1873, when the First National Bank (*Dai-Ichi Kokuritsu Ginkou*, 第一国立銀行) was established (Hoshi and Kashyap, 2001, p. 18). Japan’s financial system underwent many changes during Japan’s militarization and the Allied Occupation of Japan after World War II. The financial system that emerged in the early 1950s is what most people think of as the “Japanese financial system”: bank-centered finance mostly funneled to *keiretsu* (系列) industrial groups centered on a *main bank* that took the lead in providing financing and other banking needs.

The mid-1950s to the early 1970s (roughly the end of the Korean War in 1953 to the 1973 oil shock) were the Japanese economic miracle years. The Japanese economy, which had come out of the post-war occupation with a standard of living at almost exactly the world average, nevertheless managed to post phenomenal economic growth over the next couple of decades *averaging* 10% growth per year, and catapult to the ranks of the high-income countries. In fact, by the late 1960s Japan had surpassed Germany to become the world’s second largest economy (to be supplanted itself much later – in 2010 – by China).

Although industrial policy has gotten much attention, financial repression was also a significant economic policy during the period of Japan’s economic miracle.<sup>(1)</sup> Simply put, financial repression means placing many restrictions on savers, borrowers and financial institutions so that financial markets are not driven by market pressures. Interest rates were kept artificially low, but because there were few other outlets for investments, household savings continued to pour into the banks through deposit accounts. In contrast to the vibrant securities markets that characterized Japan’s financial system in the pre-war period, heavy

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(1) As well as many other more mundane but fundamental policies crucial to economic development. In the author’s opinion these were probably more influential in Japan’s growth, if less interesting to researchers.

regulations and disincentives now also left firms with few alternatives to finance their investments other than bank loans. This regulatory environment bred close firm-bank relationships.

Most relevant to our research is the regulations on the financial institutions themselves. Regulation meant that banks couldn't effectively compete based on price (interest rates were regulated and kept artificially low), convenience (branches, hours and the locations and number of ATMs were also regulated) or product offerings (specialization – geographic or by product – was also forced). The result was a highly segmented banking system that divided even the commercial banks into city banks (*toshi ginkou*, 都市銀行) and regional banks (*chihou ginkou*, 地方銀行) and established separate trust banks (*shintaku ginkou*, 信託銀行) and long-term credit banks (*choki shinyou ginkou*, 長期信用銀行) to specialize in long-term lending to finance big investments.

As their name implies, the city banks were usually headquartered in one of the major urban areas although they operated nationwide (Hoshi and Kashyap, 2001, p. 106). Regional banks, in contrast, were supposed to focus on a specified rural region. Although the area the regional banks could serve was not legally restricted, as with the city banks, the total number of branches and locations were subject to the approval of the Ministry of Finance (now the Financial Services Agency). Currently, there are also what are called “regional II” banks, or members of the Second Association of Regional Banks. Almost all of these were mutual banks (*sougo ginkou*, 相互銀行) which converted themselves into regional banks in February 1989. Like the other regional banks, or indeed any commercial bank, they are allowed to have branches nationwide but need approval of their regulator.

In the pre-war period, trust companies were heavily involved in underwriting of bond issues, similar to American “investment banks”, but they lost that role with the passage of the 1948 Securities and Exchange Act and refocused on a more common role of trust banks: receiving and managing funds on behalf of the money's owners (for example, household trust deposits or, from 1963, company pensions). In 1952 the Loan Trust Law created a new investment

vehicle, the loan trust (*kashitsuke shintaku*, 貸付信託). From the investors’ or savers’ point of view, these were essentially 2-5 year time deposits. The use of the funds was strictly regulated. For most of the high-growth period, they could only be used for firms in the electric, steel, coal or shipping industries, or later, for key sectors identified as being important to development. Policymakers viewed the trust banks as an important source of long-term lending for sectors identified as especially important. They were a source of directed finance. For most of the post-war period, there were seven trust banks: Sumitomo Trust Bank, Chuo Trust Bank, Mitsui Trust Bank, Yasuda Trust Bank, Mitsubishi Trust Bank, Nippon Trust Bank and Toyo Trust Bank. There were also a small handful of commercial banks (by our count one city bank, Daiwa Bank, and two regional banks, Bank of the Ryukyus and Bank of Okinawa) that were allowed to operate a trust business along with their regular commercial bank business. In balance sheet and income statement accounting, trust accounts were kept completely separate from the commercial bank balance sheet.<sup>(2)</sup>

Like the trust banks, long-term credit banks specialized in long-term lending, but rather than financing those loans through trust account, they issued long-term bonds, or debentures, which the other commercial banks could not do (the long-term credit banks, in turn, could not collect deposits except from public bodies or banks). Through most of the post-war period, there were three long-term credit banks: the Long-Term Credit Bank of Japan (LTCB, *Nihon Choki Shinyou Ginkou*, 日本長期信用銀行), the Industrial Bank of Japan (IBJ, *Nihon Kougyou Ginkou*, 日本興業銀行) and the Nippon Credit Bank (NCB, *Nippon Saiken Shinyou Ginkou*, 日本債券信用銀行), originally named the Japan Hypothec Bank. LTCB and IBJ specialized in supplying long-term financing for capital equipment for large firms and NCB for smaller firms. Similar to US investment banks and the pre-war role of Japan’s trust banks, IBJ also became a

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(2) It should be noted that these separate trust accounts are not insignificant. Bank of Okinawa’s trust assets were around 13% of its total bank account assets in 1996. For the Bank of the Ryukyus, the figure was 18%. Daiwa Bank’s trust account assets were slightly larger than its commercial bank account assets in 1996.

leader in the business of underwriting the securities of large corporations.

By the early 1970s, Japan's high-growth period was over. Recall that by this time Japan was the world's second largest economy. 10% annual growth is not a sustainable growth path for a mature developed economy. At around the same time that the high-growth period ended, Japan was hit by two severe macroeconomic shocks. In 1971, U.S. President Nixon unilaterally ended the post-war system of fixed exchange rates and began a concerted devaluation of the dollar. Just a few years later in 1973, the oil shock brought on high inflation and Japan's first post-war recession. The government needed to finance bigger and bigger deficits, leading Japan down the path of bond market liberalization. A secondary market for government bonds was established in 1977 and just a year later the Ministry of Finance began to issue some types of bonds through public auction. At around the same time, in the mid-1970s, Japan's corporate bond market started down a path of gradual deregulation. Hoshi and Kashyap (2001, p. 230) date the full liberalization of Japan's corporate bond market at January 1, 1996.

## **2. The Japanese Big Bang, 1996-2001**

In that year, the forces of deregulation turned to the other sources of financing: the securities markets and financial institutions. The "Japanese Big Bang" was begun in November 1996 under LDP Prime Minister Ryutaro Hashimoto. Hashimoto envisioned Tokyo as a global financial center on par with New York and London and aimed to reform Japan's financial sector under the guiding principles of "free, fair and global". In substance, the Japanese Big Bang revised the Foreign Exchange Law, Banking Law, Securities and Exchange Law and Insurance Business Law to liberalize cross-border transactions, asset management, entry into the financial services, and access to financing. A key pillar of the big bang was to promote "entry of banks, securities companies and insurance companies into each other's business" (Financial Services Agency, 2000).

The Big Bang promoted competition: not only between banks, but across

business lines and even national borders. Japanese banks were expected to compete more fiercely not only with each other, but also with Japanese insurance companies and securities houses, and with the increasing number of foreign institutions penetrating the Japanese market. To do this, the Ministry of Finance and later the Financial Services Agency (after its inception in June 1998) promoted mergers in the industry and the formation of holding companies that transcended old business lines. Regulators “expected that efficiency and profitability of financial institutions will improve”.

Although deregulation since 1973 had broken down the distinctions somewhat – most notably, city and regional banks had also moved into long-term lending – in 1996 at the start of the Big Bang, Japan still had a fairly segmented banking system. There were 147 commercial banks in operation: 10 city banks, 7 trust banks, 3 long-term credit banks, 64 regional banks and 63 regional banks. The banking system was also very stable, and very big. Takatoshi Ito’s popular classic textbook on the Japanese economy, the 6<sup>th</sup> edition of which was published in 1996, opens its chapter on financial markets with the statement that “No commercial bank has failed in postwar Japan. In terms of assets, the top ten banks in the world are Japanese banks.” (Ito, 1996, p. 108)

### **3. Aftermath of the Big Bang**

Things changed a lot after 1996. By the end of 2001, as the Big Bang wound to a close, 12 Japanese banks had failed and the former “Top 20” banks had begun their consolidation into the three huge financial groups that we know today: Mitsubishi UFJ (which includes Tokyo Mitsubishi UFJ Bank), Mizuho (which includes Mizuho Bank and Mizuho Corporate Bank) and Sumitomo Mitsui Financial Group (which includes SMBC, or Sumitomo Mitsui Banking Corporation).

Table 1 gives an overview of the Japanese banking industry over the period 1996-2009. Three facts stand out from data presented in table 1. The first is just how big and concentrated Japan’s banking sector was at the start of the Big Bang in 1996. The biggest banks were the city, trust and long-term credit



banks, most of which had more than 10 trillion yen in total assets and were commonly referred to as the “Big 20” banks in Japan.<sup>(3)</sup> The city banks – in 1996 including Asahi Bank, Dai-Ichi Kangyo Bank, Daiwa Bank, Fuji Bank, Sakura Bank, Sanwa Bank, Sumitomo Bank, Tokai Bank, Tokyo-Mitsubishi Bank, and Hokkaido Takushoku Bank – comprised only about 7% of the total number of banks, even at their peak in 1996, but throughout our sample period of 1996-2009 they dominated the market, with a market share as measured by total assets around 40%. The market share of the trust banks – Chuo Trust, Mitsubishi Trust, Mitsui Trust, Nippon Trust, Sumitomo Trust, Toyo Trust, and Yasuda Trust<sup>(4)</sup> – and long-term credit banks – Industrial Bank of Japan (IBJ), the Long Term Credit Bank of Japan (LTCB) and Nippon Credit Bank (NCB) – was even more skewed as they represented an even smaller share of the total number of bank (5% and 2%), but held 26% and 8% of the market share as measured by total assets, respectively. By far most of the banks, 87% were the much smaller regional or regional II banks, but combined they only claimed about 25% of the banking sector’s total assets in 1996.

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(3) Readers may note that our “large” category of banks with over 10 trillion yen in total assets only includes 19 banks. One city bank, Hokkaido Takushoku and one trust bank, Nippon Trust, were just under our threshold for “large” in 1996. The Bank of Yokohama, an unusually large regional bank that was included in references to the “Top 20” banks, is “large” by our definition.

(4) Many of the city banks were also operating trust subsidiaries. Examples would be Tokyo Trust (a subsidiary of Bank of Tokyo), Tokai Trust, Asahi Trust, Fuji Trust, Sanwa Trust and Sakura Trust. But none of these trust subsidiaries were members of the Japanese Bankers Association and therefore are not included in our data set or analysis.

Table 1. Overview of the Japanese Banking Industry, 1996-2009

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
<i>Observations by bank type</i>															
City	10	9	9	9	9	7	5	5	5	4	4	4	4	4	4
Trust	7	7	9	10	10	10	9	8	9	8	8	7	7	7	6
Long-Term Credit	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0
Regional	64	64	64	64	64	64	64	63	63	63	63	63	62	63	63
Regional II	63	62	60	54	55	53	51	49	47	46	44	44	41	41	41
Other	0	0	0	0	0	1	1	1	1	1	1	2	2	1	1
<i>By bank size</i>															
Mega	-	-	-	-	-	1	2	2	2	2	5	5	5	5	5
Large	19	19	17	19	17	16	11	11	12	7	8	7	7	7	7
Medium	84	83	85	78	79	78	79	77	77	77	76	78	76	75	75
Small	44	44	41	41	43	41	38	36	34	33	32	30	28	28	28
Total	147	145	143	138	139	136	130	126	125	122	121	120	116	115	115
<i>Market share (as measured by assets size) by bank type</i>															
City	40.6%	41.1%	39.0%	40.0%	40.6%	36.7%	40.9%	41.1%	39.2%	38.2%	35.9%	35.7%	38.4%	41.1%	41.1%
Trust	26.1%	25.1%	28.3%	29.2%	30.4%	33.4%	32.0%	32.0%	34.1%	35.9%	38.5%	38.9%	35.9%	32.7%	32.7%
LTCB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Regional	18.9%	19.3%	21.0%	20.5%	19.3%	20.3%	21.0%	20.8%	20.9%	20.4%	20.1%	19.5%	20.0%	20.9%	20.9%
Regional II	6.5%	6.6%	7.5%	6.4%	5.7%	5.9%	6.1%	6.1%	5.7%	5.5%	5.4%	5.3%	5.1%	5.4%	5.4%
Other	-	-	-	-	-	0.01%	0.02%	0.03%	0.03%	0.03%	0.05%	0.6%	0.6%	0.05%	0.05%
<i>By bank size</i>															
Mega FG	-	-	-	-	-	9.7%	22.7%	22.4%	21.1%	53.8%	53.0%	54.6%	55.6%	55.9%	55.9%
Large	74.1%	74.4%	70.7%	73.2%	74.9%	65.1%	50.8%	51.7%	52.5%	20.3%	22.4%	21.0%	19.7%	19.8%	19.8%
Medium	23.5%	23.1%	26.7%	24.2%	22.7%	23.0%	24.3%	23.7%	24.5%	24.0%	22.7%	22.7%	23.1%	22.7%	22.7%
Small	2.4%	2.5%	2.6%	2.5%	2.4%	2.3%	2.2%	2.1%	2.0%	1.9%	1.8%	1.7%	1.5%	1.6%	1.6%
<i>Aggregate assets of the banking industry (trillion yen at current price)</i>															
	1,040	1,014	936	942	1,048	1,001	958	960	992	1,047	1,080	1,121	1,103	1,103	1,103
<i>The Herfindahl Index of the banking industry</i>															
	337	345	341	342	375	427	559	569	530	683	666	693	710	728	728
<i>Number of merger events</i>															
Takeover	0	0	1	0	0	1	2	1	0	1	1	1	1	2	11
Newly Formed	1	0	1	1	2	2	2	2	2	2	0	1	0	1	17
Total	1	0	2	1	2	3	4	3	2	3	1	2	1	3	28
<i>Number of failure events</i>															
Administration	1	2	0	5	0	2	0	0	0	0	0	0	0	0	10
Nationalization	0	0	2	0	0	0	0	1	0	0	0	0	0	0	3
Total	1	2	2	5	0	2	0	1	0	0	0	0	0	0	13

Unconsolidated statement is used to have a consistent panel; only the full member banks of Japanese Bankers Association are reported (some member banks are not included because their basic data such as total assets are missing in our dataset).  
 Small: total assets less than 1 trillion yen; medium: total assets 1-10 trillion yen; large: total assets 10-80 trillion yen; mega: total assets more than 80 trillion yen (total assets includes trust assets).  
 "Takeover" indicates banks that took over or absorbed an existing bank. "Newly Formed" indicates banks that were newly formed through the merger of two or more existing banks.  
 The Herfindahl Index (HHI) is an indicator of market concentration. It is defined as the sum of square of each bank's total assets as a ratio to the banking industry's aggregate assets, multiplied by 10,000.

The second salient feature to be noted from table 1 is how much the Japanese banking sector has changed since 1996. The presence of the regional and regional II banks in the market as measured by both number of banks and total assets has remained pretty constant over the sample period. However, the total number of banks has shrunk by 18% (26 banks out of a total 147 in 1996) over the period. Nearly half that total has been bank failures, a significant change from the entire post-war history, during which the “convoy system” (*gosou sendan houshiki*, 護送船団方式) led by the Ministry of Finance discouraged competition and protected inefficient banks – by coerced merger with healthy banks if necessary – but ensured stability. The decline in the total number of banks over the period 1996-2009 also reflects considerable merger activity, 11 banks were taken over, and turnovers, 17 new banks were formed, often from several existing banks.

A final point to be noted is that all the changes have left Japan’s banking system even *more* concentrated than it was at the start of the Big Bang. While the total number of banks was falling over the sample period, the size of Japan’s banking sector as measured by total assets was increasing, by a total of about 100 trillion yen by 2009. The market share of “large” commercial banks in our sample, those with total assets of more than 10 trillion yen, have shrunk substantially from 74% in 1996 to 20% in 2009, but that is only because another huge class of banks, what we term “mega-banks” emerged as the Big Bang came to a close in 2001. These are Japan’s three huge financial groups, each with total assets of over 80 trillion yen<sup>(5)</sup>: Sumitomo-Mitsui Banking Corporation (SMBC), formed in 2001, the Mizuho Financial Group, formed in 2002, and Tokyo-Mitsubishi UFJ, formed in 2005. Two trust banks, Mitsubishi UFJ Trust, also formed in 2005 when the Tokyo-Mitsubishi UFJ group was formed, and Sumitomo Trust, a former “Big 20” that had become large enough by 2005, also fall into our “mega-bank” category.

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(5) Note that our sample does not include Japan Post, the world’s largest bank, since it is not a private commercial bank.

More scientific evidence of the increased concentration of Japan’s banking sector over the period is the increase in the Herfindahl Index (HHI) from 337 in 1996 to more than twice that, 728, by 2009.<sup>(6)</sup> The Herfindahl Index is an indicator of market concentration. The higher the index, the more concentrated the market, with 10,000 being monopoly and  $10,000/N$  being perfect competition (where  $N$  is the total number of banks). The index is defined as the sum of square of each bank’s total assets as a ratio to the banking industry’s aggregate assets, multiplied by 10,000:

$$HHI_t = \sum_i (Asset_{it} / AggAsset_t)^2 \times 10,000,$$

where  $Asset_{it}$  is total assets of bank  $i$  at time  $t$  and  $AggAsset_t$  is the banking industry’s aggregate assets at time  $t$ .<sup>(7)</sup>

Did these changes meet policy makers’ objectives of creating a more profitable and efficient financial sector? We examine each of these points in turn in the following sections.

### III. Measuring Profitability

First, we take up the question of profitability.

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(6) For reference, the Herfindahl Index of the US banking industry was about 220 in 1999 and 490 in 2009 (authors’ calculation). So Japan’s banking sector started out more concentrated than the US banking sector and became even more so over the sample period. However, readers should exercise caution in comparing Herfindahl Indices across countries as the standard of “perfect competition” will vary. For example,  $10,000/N$  for Japan is 68 in 1996 and 87 in 2009, much bigger than in the United States, where  $10,000/N$  would be 1.3 in 1999 and 1.4 in 2009.

(7) The HHI is usually multiplied by 10,000, and that is why monopoly would be 10,000 and perfect competition  $10,000/N$ .

## 1. Trends in Profitability, 1996-2001

Figure 1: The Aggregate Profits of the Japanese Banking Industry, 1996-2009

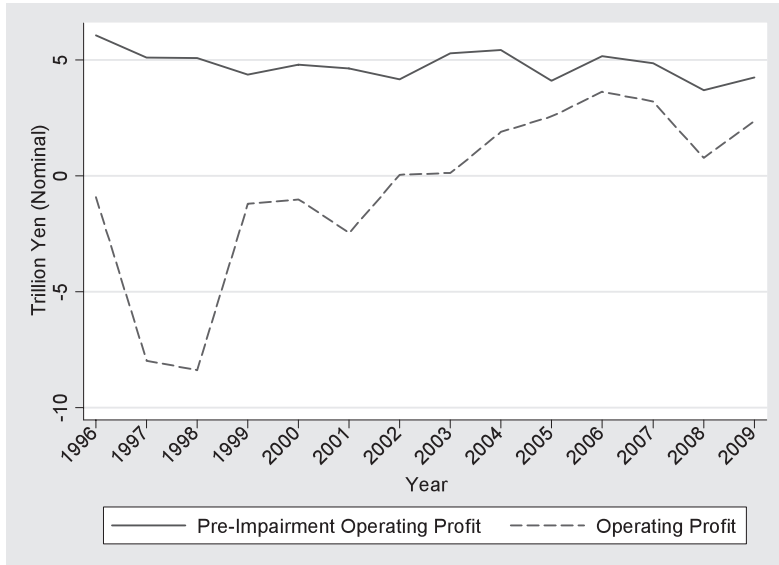


Figure 1 plots aggregate banking sector operating profits over the years of our sample, 1996-2009. At the start of the sample in 1996 aggregate operating profits were negative, and they took another sharp downward plunge in the 1997 and 1998 as Japan's banking crisis hit full-force. After hitting bottom in 1998, operating profits began to recover and we can see a steady rise from then on. Even so, operating profits were not even (barely) positive until 2002, and after peaking in 2006, took another downward dip – this time remaining slightly positive – in 2007 and 2008.

The definition of operating profits discussed above includes loan loss provisions so may not accurately reflect the underlying trend in bank profitability. For example, risk-averse bank managers may tend to provision more and thus report lower operating profits than banks with similar profitability levels operating under less careful management. In years when regulators tightened non-performing loan definitions or conducted special bank examinations, we may tend to see an increase in loan loss provisions that is

unrelated to the trend in bank profitability. Thus, as a robustness check we also look at pre-impairment operating profits (operating profits before provisioning). The trend in pre-impairment operating profits looks quite different from overall operating profits. Pre-impairment operating profits remain positive throughout the sample period and do not show a sharp decline in 1997-1998. Rather, we see a slow, steady decline over the entire sample period.

## 2. Profitability by Bank Type

Table 2: Average Profitability by Bank Type

	Return on Assets (%)	Return on Equity (%)	Observations	Number of Banks
City	-0.36(---) (0.80)	-8.28 (49.57)	81	15
Trust	0.03 (1.21)	-14.03(---) (97.25)	85	11
Long-Term Credit	-0.62(--) (0.86)	-24.39 (38.64)	10	3
Regional	0.12(+++) (0.58)	0.96(+) (25.60)	884	68
Regional II	-0.13(---) (1.28)	-0.87 (57.82)	700	69
Other	0.69 -	15.41 -	1	1
Full Sample	-0.01 (0.97)	-1.05 (47.36)	1,761	167

Note: Standard errors in parentheses below each mean estimate.

(+), (++) , (+++) (-), (--) , (---) indicate that the estimate is statistically significantly positive (negative) against the other groups at the 10, 5 and 1 percent level respectively.

Return on assets is operating profit divided by average total assets. Return on equity is operating profit divided by average equity.

Next we examine profitability by bank type. Table 2 reports both return on assets (ROA) and return on equity (ROE) for the city, trust, long-term credit, regional and regional II banks over the sample period 1996-2009. Reflecting the sharp drop to negative operating profits for the first half of the sample during Japan’s Big Bang, both ROA and ROE are negative on aggregate for the entire sample. Looking at the breakdown by bank type, only the small regional banks

post an aggregate ROA or ROE that is positive and statistically significantly higher than the other banks in the sample.

On the whole, we don't find much empirical evidence that the Big Bang spurred banks to become more profitable. On the contrary, only the small regional banks post statistically significantly positive ROA or ROE during the period, and profitability of the banking sector overall shows a gradual decline over the six years of the Big Bang deregulations and in the eight years since.

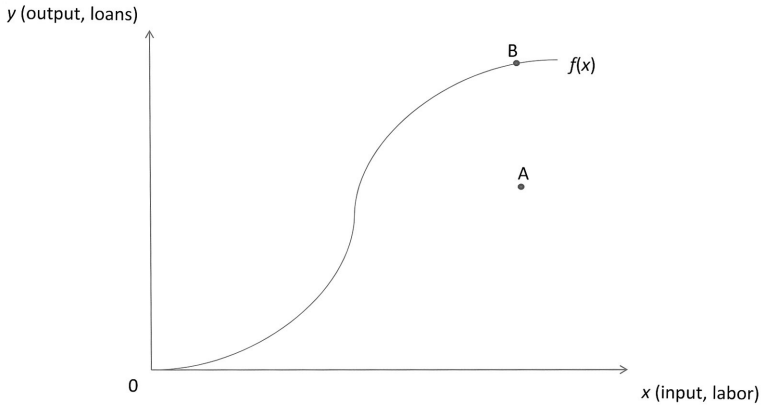
#### **IV. Measuring Efficiency**

Next, we examine the efficiency of Japan's banking sector. First, a short, intuitive explanation of what we mean by efficiency.

##### **1. What is efficiency?**

Efficiency is one way to measure the performance of firms. A nice introduction to the topic is given by Coelli et. al. (2005), who use the example of a shirt factory which uses materials, or inputs, such as labor, to produce their goods, or outputs, such as shirts. In the field of banking and finance the concept of inputs and outputs are perhaps less intuitive, but an input could again be labor and an output might be loans, for example. In figure 2, the production frontier,  $f(x)$ , represents the maximum amount of output, loans, that can be obtained from each amount of input, labor. Firms that are *technically efficient* operate on the production frontier. Firms that are not technically efficient operate below the production frontier. In figure 2, a bank operating at point A is inefficient because it is technically possible to increase the number of loans to the level indicated at point B with the same amount of labor.

Figure 2: A Graphical Presentation of Technical Efficiency Concept



When price information of inputs and outputs and firms’ behavioral assumptions are available, technical efficiency can incorporate *allocative efficiency*, the measure how well firms allocate inputs-outputs. Allocative and technical efficiency combine to provide more inclusive *economic efficiency* measure, which in the banking literature is often called *x-efficiency*. Our measure of efficiency below is this *x-efficiency* since we have price information of inputs and outputs and we can assume that banks try to minimize cost and maximize revenue.

We first estimate *x-efficiency* of each bank, based on the following parametric model,

$$\ln q_{it} = x'_{it} \beta + T_t + v_{it} - u_{it}$$

where  $q$  represents an outcome (such as profit or cost) of the  $i$ th firm at time  $t$ ,  $x$  is a vector containing the logarithms of inputs-outputs,  $\beta$  is a vector of unknown parameters,  $T_t$  is time-fixed effects,  $v$  is a random error to account for statistical noise (from omitted variables, measurement error or other errors that might be associated with the choice of functional form) and  $u$  is a non-negative random variable associated with *inefficiency* – *x-inefficiency* in our banking sector analysis – whose inverse of exponent is efficiency.

For the functional form of  $x'_{it} \beta$  we use a translog (transcendental



logarithmic) functional form based on second order Taylor approximation, which is commonly used in banking industry analysis. A Fourier-flexible function form is also commonly used and has the advantage of more flexibility, but we consider the translog form to be more suitable to our relatively small Japanese banking sector.<sup>(8)</sup>

We estimate this parametric model using stochastic frontier analysis of pooled cross-section with panel of data<sup>(9)</sup> on 169 Japanese banks listed as members of the Japanese Bankers Association over the period 1996-2009. We estimate both profit and cost functions to obtain profit efficiency (x-efficiency of profit function) and cost efficiency (x-efficiency of cost function).

## **2. Trends in Efficiency, 1996-2001**

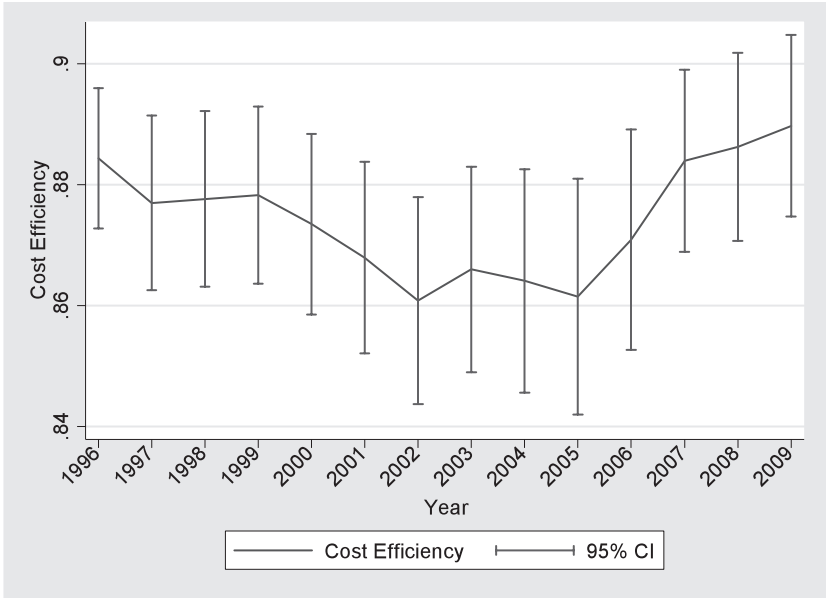
Figures 3 and 4 graph the average cost and profit efficiency of the banking sector over the sample period, respectively. Figure 3 shows that, during the Big Bang, cost efficiency gradually declines, hitting bottom around 2001 with the end of the Big Bang deregulations, after which cost efficiency starts to rise. Thus, by at least one measure the Big Bang might be viewed as a success: it does seem to have spurred higher cost efficiency in Japan's financial sector.

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(8) See Berger and Bonaccorsi di Patti (2006) for further discussion.

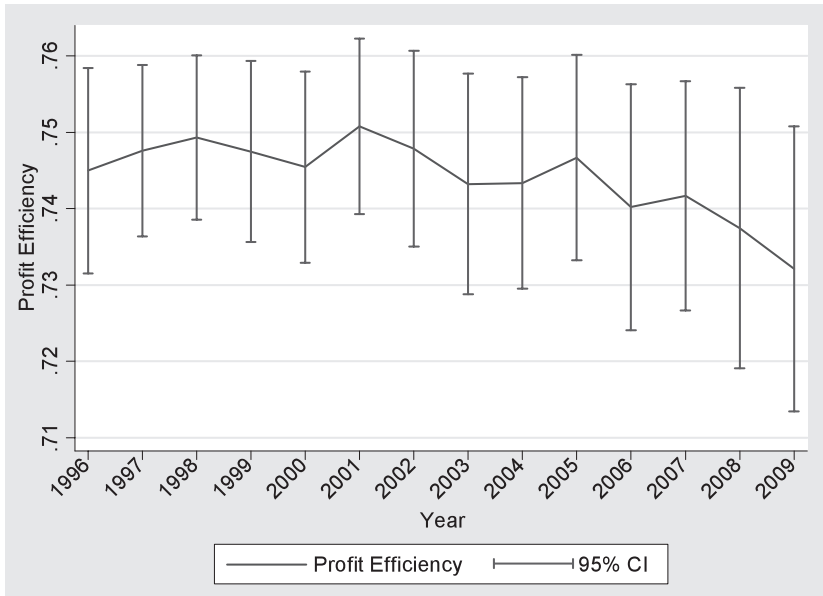
(9) Data was compiled from Bureau Van Dijk's Bankscope data set. Information on bank status were supplemented with publicly available data. Data frequency is annual.

Figure 3: Cost Efficiency of the Japanese Banking Industry, 1996-2009



Cost efficiency, however, only tells one part of the story; how efficiently banks were able to reduce their costs. Next we look at what we consider to be the more important measure of efficiency: profit efficiency. Profit efficiency also takes into account reductions in costs, but evaluates efficiency based on the “bottom line” of revenue minus costs. Figure 4 shows that during the period of the Big Bang, from 1996-2001, profit efficiency appears relatively flat, with perhaps even a slight increase. There is some fluctuation, but the 95% confidence level remains between around 0.73-0.76. After the completion of the Big Bang in 2001, however, profit efficiency begins to fall, showing a steady decline through the last eight years of our sample.

Figure 4: Profit Efficiency of the Japanese Banking Industry, 1996-2009



### 3. Efficiency by Bank Type

Next we look at efficiency by bank type. Estimated efficiency averages for the different bank types are reported in table 3. The superscripts indicate whether the estimated efficiency for each group is statistically significantly higher or lower than the rest of the sample at the 10, 5 or 1 percent level.

Table 3: Efficiencies Averaged by Type

	Profit Efficiency	Cost Efficiency	Observations	Number of Banks
City	0.42(---) (0.118)	1.00(+++) (0.001)	82	15
Trust	0.56(---) (0.142)	0.98(+++) (0.097)	88	12
Long-Term Credit	0.59(---) (0.172)	1.00(+++) (0.001)	10	3
Regional	0.68 (0.071)	0.90(+++) (0.071)	887	68
Regional II	0.74(+++) (0.065)	0.81(---) (0.095)	710	70
Other	0.59 (0.010)	0.98 (0.000)	2	1
Full Sample	0.68 (0.106)	0.87 (0.100)	1,779	169

Note: Standard errors in parentheses below each mean estimate.

(+), (++) , (+++) (-), (-) , (---) indicate that the estimate is statistically significantly positive (negative) against the other groups at the 10, 5 and 1 percent level respectively.

An interesting pattern emerges from table 3. Clearly the largest banks, most of which were in the “20” group, are the least profit efficient. City, trust and long-term credit banks are all statistically significantly less efficient than the rest of the sample at even the 1 percent level. Regional banks, on the other hand, seem to be the average and the smallest regional II banks are even *more* profit efficient than their larger regional bank cousins.

The cost efficiency averages reported in column 2, however, paint a very different picture. Here the pattern is reversed. Cost efficiency is highest for the large city, trust and long-term credit banks and in fact statistically significantly higher than the rest of the sample at the 1 percent level. Cost efficiency is also statistically significantly higher for the regional banks (recall that we are comparing each bank group against the rest of the sample, so unlike regressions involving dummy variables it is possible for each group to be statistically significantly different). Cost efficiency is the lowest for the smallest regional II banks.

Although the results on efficiency are more nuanced, again, on the whole, we don't find much empirical evidence that the Big Bang was successful in its stated goal of achieving a more efficient banking sector. Cost efficiency improved, but on the important "bottom line" of profit efficiency, Japan's banking sector is actually performing worse. Driven by trends in the largest banks, overall profit efficiency of the banking sector shows a secular decline in the years since the completion of the Big Bang.

## **V. Conclusions and Directions for Future Research**

Our research illustrates that Japan's "Big Bang" financial deregulation of 1996-2001 resulted in a heavily concentrated banking sector that was less profitable and less efficient than before the deregulation. We suspect that these trends – ever bigger banks, lower profitability and less efficiency – are related. This is suggested by our other finding, that the bigger city, trust and long-term credit banks are statistically significantly less efficient than the smaller regional and regional II banks. Perhaps larger banks are more cost efficient as they are able to take advantage of economies of scale and scope, but less efficient than smaller banks at meeting the "bottom line" of profitability.

If this is the case, then why do we see a general trend in Japan's banking sector to become more and more concentrated? The simplest explanation for so much merger and acquisition activity over the period of our sample is that banks took the objectives of the Big Bang seriously and sought out strategic business mergers combining complementary business lines or geographic representation to take advantage of economies of scale or scope.

Another, more cynical view is that Japanese banks want to merge to become too big to fail. There is in fact some evidence that U.S. banks are willing to pay a premium to become "Too Big To Fail"<sup>(10)</sup> (that means too systemically

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(10) For example, Morgan and Stiroh (2005) find that banks designated as "Too Big To Fail" in the 1980s receive higher bond ratings than other banks and are more attractive to investors. Brewer III and Jagtiani (2009) find that banks are willing to pay an added premium in mergers that make them "Too Big To Fail".

important for bank regulators to allow it to fail, suggesting an implicit safety net in the form of a bailout should the bank run into trouble). Our findings suggest that this more cynical explanation is more likely the force at play in Japan’s banking sector.

Future research might look explicitly at the effect of mergers and acquisitions over this period on profit and cost efficiency to see whether the mergers appear to be strategically motivated business mergers, or desperate attempts to form huge financial groups that are clearly too systemically significant for regulators to allow them to fail.

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## **The Japanese Big Bang: The Effects of “Free, Fair and Global”**

<Summary>

Heather Montgomery

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The “Japanese Big Bang” financial deregulations started in 1996. The objective was to make the Japanese banking sector more “free, fair and global”, spurring competition and resulting in a more profitable and efficient financial sector. The Big Bang brought about a massive consolidation of Japan’s already relatively concentrated banking sector. Japan’s “Top 20” banks have now merged to just three financial conglomerates that are among the largest in the world. Is this a sign of the success? Focusing on the Big Bang’s stated objectives of promoting profitability and efficiency, this study examines the Japanese Big Bang deregulation from its start in 1996 to completion in 2001, and the following eight years.

On profitability, we find that the banking sector as a whole did not become more profitable than the pre-deregulation period. Rather, we see a steady decline in profitability. In addition, the main targets of the deregulation (and the most active in mergers and acquisitions activity during our sample period), the city, trust and long-term credit banks, actually exhibit lower profitability measured in ROA and ROE than the smaller regional banks. The Big Bang did not succeed in promoting a more profitable banking sector.

We next turn to efficiency. We find that in terms of cost reduction, the banking sector did become more efficient after the Big Bang deregulation. However, the real bottom line of performance, profit efficiency, declined.

In addition, we again see a significant difference between the big city, trust, long-term credit banks and the smaller regional banks. The biggest banks are statistically significantly less profit efficient, despite their higher cost efficiency.

Thus, on the whole, the Japanese Big Bang financial deregulation was not successful in achieving its stated objectives. Both profitability and efficiency declines on the whole, and the main targets of the deregulation, the big city, trust and long-term credit banks, exhibit statistically significantly lower profitability and efficiency than their smaller counterparts.



