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Abstract

The banking sector in Japan experienced a substantial organizational change in the early twentieth century, including an expansion of branch networks. In this paper, we explore the implications of branch banking in regional economies, using unique bank branch office-level data for four rural regions: Fukushima, Tottori, Kumamoto, and Miyazaki Prefectures. We find that branch banking had a positive scale effect on lending. However, compared with branch offices of banks headquartered in the same municipality, branch offices of banks headquartered in other municipalities, especially in other prefectures, tended to have a lower propensity to issue loans. In particular, branch offices of banks headquartered in urban areas, such as Osaka and Tokyo, tended to collect deposits rather than to lend money through their branch networks, which restricted regional finance.

JEL Classification: G2, N2, N9
Keywords: bank, branch banking, bank merger, regional economy, economic history, Japan

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1. Introduction

Although today's banks have a number of branch offices across regions to integrate regional financial markets, this system is relatively new in the history of the banking industry. In the United States, banking markets were segmented across states until the middle of the 1990s (e.g., see Demyanyk et al. 2007; Beck et al. 2010). Banking regulations required banks to operate within states and prohibited them from establishing branch offices across states. The history of banking reveals that, more generally, in the early stages of the banking industry, there were many small banks with no or only a few branch offices, as well as many local banks territorially limited to a specific region. This was the case with the banking industry in Japan until the early 1910s, even though there were no formal branching regulations like those in the United States. After World War I, however, the Japanese banking system experienced a substantial organizational change. A wave of bank mergers increased the number of branch offices and developed bank branch networks across regions.

Following several small bank panics, a serious financial crisis occurred in 1927, known as the Showa Financial Crisis. A panic run on the banks resulted in the closure of 45 banks, which led the government to declare a three-week bank moratorium. One cause of the financial crisis was a large amount of accumulated nonperforming loans. One of the reasons for the nonperforming loans was, close relationships of many numerous small-scale banks with some specific firms. Furthermore, there were several negative macroeconomic shocks during this time that contributed to the financial crisis, such as the collapse of the asset bubble in 1920 and the Great Kanto Earthquake of 1923 (Kato 1957; Okazaki, Sawada and Yokoyama 2005; Okazaki, Sawada and Wang 2007; Okazaki, Okubo and Strobl 2019). The financial authorities' countermeasures against the fragile financial system caused a wave of large-scale bank mergers in the late 1920s (Goto 1985; Shiratori 2006; Okazaki and Sawada 2007). These mergers drastically changed the

structure of the banking industry, particularly through the expansion of branch banking, as they generated large-scale banks that had broad branch networks across villages, counties, and prefectures throughout Japan (Abe 1980, 1981; Yoshizu 1978).

In general, branch banking has several benefits, including economies of scale (Benston 1965; Zardkoohi and Kolari 1994), higher operating efficiency (Sherman and Gold 1985; Rivard and Thomas 1997; Hirtle 2007), better service accessibility (Evanoff 1988), the integration of regional financial markets (Gilje, Loutskina and Strahan 2016) and credit allocation across regions (Cetorelli and Goldberg, 2012).[2]

This paper explores the development of branch banking in Japan in the 1920s and its effects, in particular the impact of the increase in the scale of banks and the expansion of branch networks on bank lending in regional financial markets and regional industries. The implications of our study support the "conventional paradigm" that has been well established in the literature, at least in relation to the US financial market until the early 2000s (Berger and Udell 2002; Berger et al. 2005; Berger, Goulding and Rice 2014; Stein 2002). This conventional paradigm is summarized aptly by Berger et al. (2014) as follows.

> Opaque small businesses would be best served by small, single-market, local banks, while large, multimarket, nonlocal institutions would tend to serve more transparent firms… [Hence,] (t)he large banks, multimarket banks, and nonlocal banks created by consolidation may be disadvantageous in relationships based on soft information and may be more likely to sever relationships or withdraw credit than the small, single-market, and local institutions they replace (Berger et al. 2014, pp. 264–265).

[2] According to Cetorelli and Goldberg (2012), when negative shocks are asymmetric across regions, banks tend to manage credit liquidity across branch offices in different regions. Hoffmann and Okubo (2013) show that country-wide banks in modern-day Japan operate internal capital markets and they investigate the role of credit re-allocation across regions for regional business cycles.

If this situation held in prewar Japan, the changes in the banking industry in the 1920s would have a substantial negative impact on bank lending in regional financial markets. As we will see below, this was indeed a concern of the Japanese government in the 1920s. To our knowledge, this paper represents the first econometric analysis of the role of branch banking in prewar Japan from the viewpoint of the "conventional paradigm." In addition, our paper contributes to the literature by using bank office-level deposit and loan data, obtained from various issues of the *Statistical Yearbook of Prefectures* (*Fuken Tokeisho*). Whereas the existing studies in the literature conduct bank-level analyses using data at the macro, bank, or firm level, in our data we directly observe bank branch office-level behavior.

Turning to the context of Japanese economic history, this paper is closely connected to a view proposed by Takafusa Nakamura in his classic work (Nakamura 1971). Nakamura considered that the prewar Japanese economy experienced a shift of growth patterns in the 1910s. Before World War I, the indigenous and modern industries, those based on Western advanced technologies, achieved "balanced growth." After World War I, however, the indigenous industries stagnated, which led to a "dual structure" of modern large firms and small indigenous firms. From our viewpoint it is notable that he pointed out that one of the major reasons for the emergence of dual structure is that a wave of bank mergers involving branch banking impeded access to finance for small local businesses (Nakamura 1971, pp. 199–200). By exploring the change in bank behavior, in particular, branch banking, our study contributes to a better understanding of the growth patterns of the Japanese regional economy during the 1910s–1930s.

This paper is organized as follows. Section 2 provides an overview of Japanese banking history and discusses the development of branch banking after World War I. Section 3 provides some stylized facts on branch banking and funds allocation using bank office-level data. In Section 4, we conduct an econometric analysis of branch banking.

Section 5 discusses the impact of branch banking on the development of regional industries. Section 6 provides concluding remarks.

2. Overview of the banking system and the development of branch banking in prewar Japan

2-1 Adoption of the modern banking system

The history of the Japanese modern banking system dates back to 1872, when the National Bank Act provided the legal framework for national banks, that is, private banks were permitted to issue bank notes. According to the Act, 153 national banks had been founded by 1879, when the total amount of national bank notes issued by the national banks reached the upper limit prescribed by the Act. In 1882, the Bank of Japan was established as the central bank, and it began to exclusively issue Bank of Japan notes in 1885. Then, the national banks were closed or transformed into private banks that did not possess the privilege of issuing bank notes; a time frame of 20 years from the date when each national bank was licensed was established for this transformation. In 1893, the Bank Act was legislated as the legal framework for private banks. This sharply increased the number of private banks (Figure 1), which reached a peak of 2,334 in 1901, comprising 1,890 ordinary banks and 444 savings banks[3].

Figure 1

These private banks, which had close ties with their affiliated industrial firms, had some distinctive features (Okazaki, Sawada and Yokoyama 2005; Okazaki, Sawada and Wang 2007). First, the banks were small in size. The average amount of paid-up capital

[3] The business of savings banks was similar to that of ordinary banks until the revision of the Savings Bank Act enacted in 1922, which made the business of savings banks more narrowly restricted than that of ordinary banks (Asakura 1988, pp. 141–2). For this reason, we focus on ordinary banks in this paper.

of ordinary banks was 134,000 yen in 1901 (US $264,000) (Goto 1970)[4]. Second, related to the first feature, each bank had few branches. Figure 2 indicates the total number of branches of ordinary banks[5]. As shown, the average number of branches was less than one in the early 1900s. In other words, branch banking was still underdeveloped in this period.

Figure 2

2-2 Development of the banking system, 1900s–1910s

From the early 1900s, the number of banks declined steadily, which reflected a shakeout of banks. As shown in Figure 3, a substantial number of banks exited the market because of dissolutions, bankruptcies, and closures. Many banks were small and concentrated on lending to their affiliated firms, which made the banks vulnerable to several depressions that occurred in this era[6]. As a result, the average size of the remaining banks and their branch networks steadily increased. Figure 2 shows that the total number of branches as well as the number of branches per bank steadily increased.

Figure 3

2-3 Bank mergers and the emergence of branch banking in the 1920s

In the 1920s, especially in the latter part of the decade, there was a dramatic decline in the number of banks (Figure 1). The number of ordinary banks and savings banks declined from 1,987 in 1920 to 872 in 1930[7]. In this period, a number of mergers and

[4] We based our conversion on the average of the highest and lowest exchange rates between the yen and the US dollar in 1901 (Yamazawa and Yamamoto 1979, p. 256).
[5] The data include subbranches (*shucchojo*).
[6] The Japanese economy experienced depressions in 1900–1901, 1908, and 1914 (Oshima 1955).
[7] Savings banks were converted to ordinary banks because of the restriction of their business with the revision of the Savings Bank Act in 1922 (Bureau of Banks, Ministry of Finance 1960, p. 515).

acquisitions of banks occurred, mainly as a result of government policies promoting mergers, such as the enactment of the Bank Law (Okazaki and Sawada 2012), while dissolutions, bankruptcies, and closures were frequent (Figure 3). In the wake of the Showa Financial Crisis, the Bank Law of 1928 enforced a minimum limit on capital assets, under which an ordinary bank was required to have capital assets of no less than one million yen (Asakura 1988, pp. 159–61; Okazaki and Sawada 2007)[8]. When the law was enacted, 807 of the 1,407 ordinary banks failed to meet this criterion. These banks were given five-year exemptions to give them time to meet the criterion. However, as the Ministry of Finance did not allow these small banks to increase their capital by themselves, they were obliged to either merge with other banks or close.

The wave of bank exits through mergers and acquisitions, dissolutions, bankruptcies, and closures fostered branch banking. As shown in Figure 2, the total number of branches began to fall after a jump in 1923, which reflected the transformation of savings bank to ordinary banks (Figure 1), while the number of branches per bank continuously increased. The average number of branches per ordinary bank in 1920 was 2.1 by 1930, it had risen to 8.6. A substantial increase in branch offices per bank was driven by the exit of the small banks that possessed only a few branch offices, as well as by the transformation of the headquarters of acquired banks into branches[9].

2-4 Development and concerns with branch banking around 1930

It is notable that the development of branch banking generated interprefectural branch networks over Japan (Shiratori 2000, pp. 64–65). Our data include ordinary banks,

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The discontinuity of the diagram in Figure 1 reflects this wave of conversions (see footnote 2).

[8] If the headquarters of a bank was located in Tokyo or Osaka, the minimum capital was 2 million yen, whereas it was 500,000 yen if the headquarters was located in a town or village with a population of 10,000 people or less.

[9] In the 1920s and 1930s, despite many mergers and acquisitions, the total number of branches continuously decreased. One of the reasons was the more restrictive regulations that the government imposed on the foundation of new branches from 1923 (Goto 1985, pp. 202–203). Another cause was bank exits for reasons other than mergers and acquisitions.

savings banks, and a small number of special banks. Table 1 classifies branches into the following categories: (A) bank branches with headquarters in the same city or county (*gun*); and (B) bank branches with headquarters outside the city or county, with (B) further decomposed into (B1) bank branches with headquarters in the same prefecture; and (B2) bank branches with headquarters in other prefectures[10]. In 1910, the share of bank branches headquartered in other prefectures was just 8.7%, indicating the highly segmented nature of financial markets across prefectures. However, by 1930, the share had risen to 19%.

Table 1

Table 2 lists the top 20 banks in terms of the number of branches in 1930. Among the top 20 banks, seven were headquartered in the metropolitan prefectures, that is, Tokyo and Osaka, with the other 13 banks located in other prefectures. We find that the features of the branch networks were substantially different between the banks in the metropolitan prefectures and those in the nonmetropolitan prefectures. The former had many branches in prefectures other than their headquartered prefectures, whereas the latter had fewer such branches. The branch networks of the nonmetropolitan banks tended to concentrate on the headquartered prefectures and the neighboring regions with which they had close economic relationships (Abe 1981, p. 103). One of the reasons why large metropolitan banks founded branches in distant prefectures was that they had a strategy of being the treasurers of regional governments and hence, many of their branches were located in the capital cities of prefectures (Asai 1986, pp. 131–135; Yoshizu 1978, p. 36).

[10] The data include a small number of special banks, as well as ordinary and savings banks. Special banks were defined as private banks founded for policy purposes by special laws. Special banks include Yokohama Shokin Ginko (Yokohama Species Bank), Nihon Kogyo Ginko (Industrial Bank of Japan), Nihon Kangyo Ginko (Hypothec Bank of Japan), Hokkaido Takushoku Ginko, Taiwan Ginko (The Bank of Taiwan), Chosen Ginko (Bank of Chosen), and the agricultural and industrial bank in each prefecture.

Table 2

The expansion of branch networks across prefectures functioned to integrate locally segmented financial markets. At the same time, the development of branch banking raised serious concerns that funds in rural areas would severely contract because branches of banks headquartered in metropolitan areas were supposed to transfer funds from rural areas to urban areas. This echoed the debate on the bank merger policy in the 1920s (Shiratori 2000), as seen in the records of the Financial System Research Council (*Kin'yu Seido Chosakai*) established under the Ministry of Finance from 1926 to 1927. Rhuichiro Nagaoka, a council member and Chief of the Social Bureau of the Ministry of Home Affairs, submitted the following memorandum to the council concerning the policy promoting bank mergers:

> If small lots loaned in rural areas tend to decline and they are shifted to large lots loaned to large-sized commercial and industrial firms in urban areas as a result of bank mergers, it is concerning that this trend might dry up regional finance to impoverished agricultural areas. I want to have appropriate measures taken to prevent this problem (Financial System Research Council 1926, p. 162).

Nagaoka was seriously concerned about the negative consequences of bank mergers because the Ministry of Home Affairs was in charge of administering rural regions. Furthermore, his concern was shared by the bureaucrats in the Ministry of Finance, which was in charge of the financial system. In a 1925 press interview, the Chief of the Bank Bureau of the Ministry of Finance, Osamu Matsumoto, noted:

> [T]he merger in which an urban bank merges rural banks to make them branches

will cause a concentration of rural industrial funds in urban areas and dry up local finance. Also, as the urban bank and its rural branches have little information about the rural industries, they will be too cautious about loans and bring about undesirable consequences[11].

3. Branch banking and funds allocation in our sample prefectures: Descriptive analyses and stylized facts

3-1 Development of branch networks in the four prefectures

Branch office-level data on loans and deposits in the 1910s and the 1920s are available from the annual *Statistical Yearbook* (*Fuken Tokeisho*) of each prefecture only in four rural prefectures, Fukushima, Tottori, Kumamoto, and Miyazaki (see Figure 4)[12]. The basic features of the banking industry in the four prefectures are summarized in Panels A–D of Table 3.

Table 3

Figure 4

The regional administration system in prewar Japan was organized as a three-tier structure based on (1) prefecture, (2) city and county, and (3) town and village. Our main focus is on tiers (1) and (2). Hereafter, city and county are referred to as "municipality" for simplicity. In all of the four prefectures, the number of branch offices of banks headquartered in other prefectures ("urban banks" hereafter) increased. Turning to regional banks, the offices (headquarters and branches) of the banks in the same prefectures are classified into (1) those of the banks headquartered in the same

[11] *Osaka Asahi Shinbun*, February 26, 1925.
[12] The exact data availability varies by prefecture as follows: 1912–1928 for Fukushima, 1913–1931 for Tottori, 1912–1929 for Kumamoto, and 1915–1921 for Miyazaki.

municipality (“local banks”) and (2) those of the banks headquartered in other municipalities (“quasi-local banks”). We note that branch office in this paper is defined as branch office other than headquarter, while office is defined as headquarter as well as branch offices.

A noteworthy fact in Table 3 is that the number of offices of banks in other prefectures (i.e., urban banks) and banks in other municipalities (i.e., quasi-local banks) increased, especially relative to the offices of banks in the same municipality (i.e., local banks). These observations reflect the expansion of bank branch networks across municipalities.

Table 4 lists the banks that had branches in these four prefectures. We find that most of the banks in other prefectures were headquartered in Tokyo, Osaka, and neighboring prefectures. Table 4 also indicates that some regional banks had large branch networks within the same prefecture, such as Dai Hyaku-schichi Bank in Fukushima, Yonago Bank in Tottori, Higo Bank in Kumamoto, and Taisho Bank in Miyazaki. Most of their branches were located in different municipalities within their headquarter prefecture. These branch networks were formed through the foundation of new branches as well as through mergers and acquisitions of other banks. Usually, one or two major regional banks had large branch networks in each prefecture, whereas many small banks had only a few branches. Thus, the distribution of the number of branches was highly skewed.

Table 4

Dai Hyaku-shichi Bank was founded in 1878, based on capital raised mainly from wealthy landowners in Fukushima Prefecture. The headquarters were located in Fukushima Town in Shinobu County, which became Fukushima City in 1907 (Dai Hyaku-

shichi Bank 1924, p. 30; Fukushima Prefecture 1971, pp. 813–814). Dai Hyaku-schichi Bank aggressively founded branches in Fukushima Prefecture and, by the end of 1920, had 13 branches that covered most municipalities in the prefecture. Furthermore, it merged three regional banks during the 1920s (Fukushima Branch of Bank of Japan 1969, p. 175).

Yonago Bank was founded in Yonago City in 1894, a center of commerce and industry in Tottori Prefecture. Yonago Bank gradually expanded its branch network and had eight branches by 1926. After merging two regional banks in 1928 and 1929, which had multiple branches (Chiho Kin'yu-shi Kenkyukai 2003, p. 302), the number of branches increased to 19 by adding headquarters and branches of the merged banks.

Higo Bank in Kumamoto was founded as Higo Kyodo Bank in 1925 through the merger of three regional banks, Kumamoto Bank, Ueki Bank, and Akuta Bank (ibid. 2003, p. 410). Following this merger, Higo Kyodo Bank had five branches. In 1927, it received a capital injection from Yasuda Bank, of which it became an affiliated bank, and changed its name to Higo Bank. Consequently, Yasuda Bank transferred its five branches in Kumamoto Prefecture to Higo Bank (ibid. 2003, pp. 411–412).

Finally, Taisho Bank in Miyazaki Prefecture was founded in 1916 through a merger of Taisho Saving Co and Hozan Bank in Fukuoka Prefecture (Miyazaki Bank 1984, p. 58). Taisho Bank increased its branches from six in 1916 to 11 in 1921.

3-2 Different functions of bank branches by bank type

It is noteworthy that the expansion of the branch networks of the large urban and regional banks was associated with a change in the spatial allocation of funds. Panels A–D of Table 5 show the share of deposits by bank office category, that is, local bank, quasi-local bank, and urban bank, as defined above. In all four prefectures, the local banks experienced a decline in the share of deposits and loans. In other words, there was a

tendency for quasi-local banks and urban banks to gradually take over the banking market. In addition, the policies for the allocation of funds appear to vary across the different categories of bank offices. Panels A–D of Table 5 report the ratio of deposits to loans by office category. We find that, on average, the deposit–loan ratios in all four prefectures were substantially lower for the offices of the local banks compared with the branch offices of the quasi-local and urban banks.

Table 5

Some functions varied substantially between regional (local and quasi-local) banks and the branches of urban banks in regional financial markets. Many regional banks had close relationships with regional industries, especially with those located in their headquarter areas. More concretely, the headquarters and branch offices of regional banks engaged in various financial services, such as deposits, loans, and documentary bill services for regional industries. In Fukushima Prefecture, for example, regional industries including sericulture and silk reeling had been developed since the 1870s, and merchants dealing in these products wanted regional financial institutions that would provide a documentary bill service. In response, Dai-roku National Bank and Dai Hyaku-shichi Bank were founded in Fukushima City, the capital city of Fukushima Prefecture (Fukushima Prefecture 1971a, pp. 813–814). Fukushima Prefecture explained that Fukushima City developed as a distribution center for regional products, which was facilitated by the documentary bill services as well as deposit and loan services of regional banks (1971b, p. 420). In Tottori Prefecture, Yonago Bank was founded by the initiative of Heibei Sakaguchi, the President of the Yonago Chamber of Commerce. Yonago Bank originally ran the Sakaguchi family businesses and provided a documentary bill service for local merchants (Chiho Kin'yu-shi Kenkyukai 2003, p. 297). Likewise, many other

regional banks in Tottori Prefecture ran the businesses of the bank founders (Tottori Prefecture 1969, p. 26).

On the other hand, previous studies on the branches of urban banks have noted that a major function of these branches was collecting deposits for their headquarters rather than lending money to regional industries. For example, Chiho Kin'yu-shi Kenkyukai (2003) argued that the focus of the branch business of the urban banks in Fukushima Prefecture was collecting deposits rather than lending money, which was problematic for the development of regional industries (p. 70)[13]. Fukushima Branch of the Bank of Japan (1969) cites the following staff report in 1929:

> Because the branches were under the strict supervision of the headquarters outside Fukushima Prefecture, they were not interested in the collaterals other than national bonds, sound corporate bonds and stocks of the companies in the metropolitan areas. Regional borrowers, whose assets available for collateral were deteriorating, were not taken seriously by them (p. 208).

In parallel to Fukushima Prefecture, Higo Bank (1960) in Kumamoto Prefecture reported a similar situation during and after World War I. Many branches of the banks headquartered in Tokyo and Osaka were founded to collect deposits (pp. 46–47). Likewise, Tottori Bank (1994) reported on the banking market in Tottori Prefecture in the late 1920s and characterized the function of urban bank branches as being to channel local funds to urban areas (p. 70). This phenomenon was not specific to our sample prefectures; for instance, see Shiratori (2000, pp. 70–71) for the case of Okayama Prefecture[14]. All of

[13] According to Toho Bank (1992) the branches of urban banks in Fukushima Prefecture came to focus on collecting deposits from the late 1890s to the 1900s (p. 44).
[14] Shiratori (2000) pointed out the function of quasi-local banks in Okayama Prefecture, noting that the large regional bank headquartered in Okayama City, the capital city of the prefecture, collected deposits in counties and loaned money in Okayama City (p. 72).

these facts support the evidence in Table 5.

4. Branch banking and funds allocation: Econometric analyses

4-1 Data

We now conduct econometric analyses of branch banking and funds allocation. Our unique branch-office level data are taken from various issues of the *Statistical Yearbook* (*Fuken Tokeisho*) of each of the four prefectures (Fukushima, Tottori, Kumamoto, and Miyazaki). We used data from these prefectures for the following reasons. Most obviously, our branch-level loan and deposit data are available only for these four prefectures. In addition, these prefectures are largely agricultural regions and are geographically distant from the metropolitan areas (Figure 4).

Table 6

Table 6 describes the basic economic features of the four prefectures. It indicates that the per capita gross domestic products of the four prefectures were substantially lower than the national average and that the ratios of agriculture in the total value added were much higher than average. These features make the prefectures suitable for evaluating the impact of the urban banks expanding their regional branches in rural regions. Indeed, as noted, a serious concern in at least two of the four prefectures was a shortage of local finance as a result of the branch banking of urban banks.

Our data include bank-level capital and office-level deposits and loans. Here, bank offices are categorized by the three types defined above: (1) headquarters and branches of local banks (banks headquartered in the same municipality); (2) branches of quasi-local banks (headquartered in other counties in the same prefecture); and (3) branches of urban banks (banks headquartered in other prefectures).

4-2 Branch banking and spatial fund allocation: Bank office-level analyses

First, we estimate the scale effect of bank offices on lending. We test whether large banks with more capital, those with many branches and large offices, with more deposits, tended to be big lenders. The scale effect is estimated using the following office municipality-level estimation:

$$\text{Loans}_{obmt} = \beta_1 Capital_{bt} + \beta_2 Branch_{bt} + \beta_3 Deposit_{obmt} + \beta_4 Quasilocal\ bank_{obmt} + \beta_5 Urban\ bank_{obmt} + \gamma_b + \mu_m + t + \delta_{mt} + \varepsilon_{obmt}, \quad (1)$$

where o is the index of the bank office, b is the bank, m is municipalities, and t denotes the year. *Loan* and *Deposit* are measured at the bank office level. The *Quasilocal bank* dummy takes a value of one if a branch office belongs to a quasi-local bank and the *Urban bank* dummy takes a value of one if a branch office belongs to an urban bank. μ_m denotes a municipality fixed effect, γ_b denotes a bank fixed effect, t is a year fixed effect and δ_{mt} is time-prefecture fixed effect[15]. We estimate the equation using ordinary least squares with cluster-robust standard errors at bank level. We note that *Capital* is measured at the bank level and is interpreted as bank size, whereas *Deposit* is measured at the office level and is interpreted as office size. *Branch* is the number of bank b's branch offices across Japan, which measures the scale of the branch network of each bank.

Table 7 reports the estimation results. In column 1, the coefficient on *Capital* is significantly positive. The coefficients on the *Quasilocal bank* and *Urban bank* dummies are both significantly negative, and the magnitude of the former is smaller than the latter. Thus, local banks were the most active lenders in the local economy, followed by quasi-local banks and then urban banks were the least active lenders. Column 2 shows the

[15] Some local banks and many urban banks had only one branch in the prefecture (see, e.g., Table 4). Thus, bank fixed effects are identical to branch fixed effects in many samples. Even if we add branch fixed effects, the results remain basically unchanged.

results when we add the deposits of each office as an explanatory variable. In this case, the coefficient on *Capital* is positive, but it is no longer significant, whereas the coefficient on *Deposit* is significantly positive. Larger offices tended to lend more money, which can be interpreted as a scale effect. Column 3 shows the result when we add the branch network variable, *Branch*. The coefficient on *Branch* is significantly positive, indicating that branch networks positively affected lending. The deposits of each office in columns 2 and 3 are strongly significant and positive compared with the bank-level variables. Finally, column 4 shows the propensity to lend as a proportion of deposits by bank type. Here, we add the interaction terms of deposits and the quasi-local bank and urban bank dummies. We find that the coefficients of both interaction terms are negative, and the magnitude is larger for the interaction of deposits with the urban bank dummy than with the quasi-local bank dummy. This indicates that urban banks tended to lend a smaller proportion of their deposits than did local and quasi-local banks, given the office size.

Table 7

4-3 Branch banking and spatial funds allocations: Bank-level analyses

Next, we investigate the spatial funds allocations by aggregating the office-level data to bank level. As discussed above, the branches of an urban bank tended to redirect credit away from regional markets, that is, the branches collected deposits but loaned only a smaller proportion of them within the region; in other words, a credit transfer from rural to urban areas occurred. If this was the case, the sample prefectures that had urban banks with many branches might face lending constraints and a restriction of credit in their regional economies.

We measure the extent of this redirection of credit using the deposit–loan ratio

(deposit/loan). If the ratio is high, it indicates that a bank transfers money to other areas at the expense of credit access in the local economy, that is, the redirection of credit occurs. The following bank prefecture-level equation is estimated as follows:

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \beta_2 Other\ Pref_{bpt} + \beta_3 TokyoOsaka_{bpt} + \gamma_b + \mu_p + t + \delta_{pt} + \varepsilon_{bpt} \quad (2)$$

where *DL* stands for the deposit–loan ratio of bank b. The index p denotes our four prefectures and μ_p is a prefecture dummy. The *TokyoOsaka* dummy takes a value of one if the headquarters of a bank is located in Tokyo or Osaka. The *OtherPref* dummy takes a value of one if a bank is an urban bank with its headquarters located in another prefecture to the urban bank, but not in Tokyo or Osaka.

In addition, we estimate the following equation, replacing *OtherPref* dummy and *TokyoOsaka* dummy with the dummies of the headquartered prefectures:

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \sum \beta\ \ HQ\ Pref_{bpt} + \mu_p + t + \delta_{pt} + \varepsilon_{bpt} \quad (3)$$

where *HQPref* is the set of dummies for the headquartered prefectures. We note that there are 15 prefectures in our samples in which bank headquarters were located. With the exception of Tokyo, Osaka, Nagano, Ehime, and Fukuoka Prefectures, the other 10 prefectures are all adjacent to our four sample prefectures.

Finally, we examine the role of a bank's branch network within a prefecture in terms of the lending of the bank. To do so, we construct a variable *Local Branch Share*, which is the ratio of the number of bank j's branch offices in prefecture p to the total number of bank j's branch offices. A higher (lower) *Local Branch Share* means that bank j geographically concentrates many branch offices in prefecture p (the other prefectures).

In short, local banks and quasi-local banks have higher local branch shares, whereas those of urban banks are lower.

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \beta_2 Local\ Branch\ Share_{bpt} + \gamma_b + \mu_p + t + \varepsilon_{bpt} \qquad (4)$$

Table 8 reports the results. In column 1, the coefficient on *Capital* is significantly small and negative. This indicates that smaller bank size was associated with the redirection of credit. By contrast, the *OtherPref* and *TokyoOsaka* dummies are both significantly positive and large. Urban banks tended to have higher deposit–lending ratios. In particular, urban banks headquartered in Tokyo and Osaka have a larger impact on the deposit–lending ratios. In parallel, as reported in column 2, once urban bank dummies are decomposed by headquarter prefecture dummies, the coefficient on Tokyo is significantly positive and large. The coefficient on Osaka is not significant, but is positive and large. Most of the adjacent prefecture dummies have large coefficients, which may reflect the geographical proximity. By contrast, nonadjacent prefectures, except for Tokyo and Osaka, that is, Nagano, Ehime, and Fukuoka, have negative or small positive coefficients. In summary, the results indicate that urban banks headquartered in Tokyo and Osaka tended to redirect credit away from the local economies, regardless of bank size.

Table 8

Column 3 of Table 8 reports the results on the share of branch office networks. The coefficient of *Local Branch Share* is significantly negative, which indicates that banks tended to supply more credit in those prefectures in which they had denser branch networks. Generally, a regional bank in a rural prefecture had a dense branch network in the headquartered prefecture. In other words, urban banks tended to collect deposits and

transfer money to the urban prefectures through their branch networks, that is, redirect credit upward. This is consistent with our historical evidence, discussed in the previous section.

5. Impact on regional industries

5-1 Overview of regional industries in our sample prefectures

As discussed in the last section, branch banking by urban banks, in particular those headquartered in Tokyo and Osaka, reduced loans in rural regions, as demonstrated by our four sample prefectures. The remaining questions to be addressed are whether regional banks supported regional industries effectively and how regional industrial finance was exploited by the urban bank branches.

As seen in Table 6, the economies of the four prefectures were primarily agricultural, and the proportions of their manufacturing industries in their total value added were smaller than the Japanese average. Table 9 shows the composition of the manufacturing industries in more detail. In all four prefectures, the textile industry was the largest manufacturing industry, with the exception of Miyazaki in 1935[16], and the major textile industry was silk reeling and weaving.

Table 9

Panels A–C of Figure 5 show the production indices of raw silk and cotton and silk fabrics (Year 1914=100), as well as the share of deposits of local banks in all banks' deposits in three of our four prefectures. Miyazaki Prefecture is omitted as there are only a few year samples available. The data cover the economic boom period during World

[16] In Miyazaki Prefecture, a large chemical company was founded in 1929 (Miyazaki Prefecture 2000, pp. 1044–1045). Nihon Chisso Co., one of the emerging *Zaibatsu* business groups, founded Nihon Benberg Silk Co., which produced rayon in Nobeoka Town in Miyazaki Prefecture.

War I, as well as the subsequent long stagnation period. Fukushima and Tottori Prefectures underwent a common trend, whereby industrial production increased sharply in the 1910s, but stagnated in the 1920s. Meanwhile, the deposit share of local banks was stable in the 1910s, but declined in the 1920s.

In Kumamoto Prefecture, although the deposit share of local banks declined in the 1920s, as in Fukushima and Tottori, both silk reeling and weaving production continued to increase. The increased production relied on a unique circumstance in Kumamoto Prefecture from the late 1910s to 1920s. Some large firms in other prefectures founded large textile factories in Kumamoto. For instance, major silk reeling companies such as Katakura (Nagano Prefecture), Demizu (Nagano Prefecture), Gunze (Kyoto Prefecture), and Kanegafuchi Boseki (Tokyo Prefecture) founded large plants in Kumamoto Prefecture (Yonemura 1955, p. 178; Kumamoto Prefecture 1963, p. 326)[17]. The major weaving company Kanegafuchi Boseki equipped its Kumamoto plant with weaving machines in 1926 (Japan Spinners Association 1926, 1927). Importantly, these large firms were all financed by their headquartered prefectures and thus, their plant operations were completely insulated from the regional financial market and banks in Kumamoto Prefecture.

Figure 5

5-2 More general context and additional evidence from other prefectures

It is well established in the literature that regional banks played an essential role in the provision of finance for the development of regional industries in the late nineteenth and early twentieth centuries in Japan (Yamaguchi 1966, 1974; Ishii 1972; Nakabayashi

[17] Kanegafuchi Boseki was one of the three largest cotton spinning firms in Japan. It entered the silk reeling industry after World War I as part of its diversification strategy (Kanebo Co. 1988, pp. 186–187).

2003). However, the long stagnation after World War I changed regional industries and finance in various ways.

On the one hand, it is argued that the decline of regional industries reduced the lending opportunities of regional banks, which were financially distressed and consequently became affiliated with the urban banks. In Gifu Prefecture, which specialized in agriculture and silk reeling, Ogaki Kyoritsu Bank and Juroku Bank faced difficulties in funding applications owing to a decline in the demand for finance from the rice traders, and were finally affiliated to Yasuda Bank and Daiichi Bank, both headquartered in Tokyo (Asai 1976, pp. 62–63, pp. 69–71). In Nagano Prefecture, which also specialized in agriculture and silk reeling, Dai-Juku Bank mainly financed the raw silk industry. However, Dai-Juku Bank's earnings deteriorated with a decline in the silk industry and it was finally merged with another regional bank, Dai-Rokujusan Bank, with the intervention of Mitsubishi Bank and the Bank of Japan (Ito 1975, pp. 6–8, 17). Both cases provide evidence that the erosion of the regional industries resulted in the distress of regional banks.

On the other hand, some studies have noted that the regional banks continued to remain in business or at least managed to continue to supply finance to regional industries. Ito (1975) pointed out that Dai-Juku Bank and Dai-Rokujusan Bank in Nagano Prefecture did not request raw silk producers to repay money, and Dai-Rokujusan Bank made arduous efforts to collect deposits to continue financing raw silk production (p. 17). A similar case is found in Yamagata Prefecture, which specialized in agriculture and weaving. Shiratori (2001) noted that Ryou Bank prioritized supplying credit to the weaving industry over requesting repayments from the industry (p. 73). In other words, there was demand for loans from the regional industries even in the 1920s,and the regional banks continued to perform the role of financing the development of the regional industries .

In this context, the record of an interview with Hitoshi Nakayama, a regional banker in Shizuoka Prefecture, is noteworthy. Nakayama managed several regional banks in Shizuoka Prefecture with his appointment as the executive director of Seiein Bank in 1914 until 1949:

> Urban banks establish branches all over Japan, and engage in large-scale financing. On the other hand, regional banks, which have long been doing business in regions, focus on loans to specific regional industries. Because development and decline of the regional industries are associated with those banks' development and decline, regional banks make efforts to finance regional industries (Chiho Kin'yushi Kenkyu-kai 1970, p. 49).

Nakayama explained the different context and knowledge structures within which headquarters and regional banks operated:

> If the headquarters of a bank and firms applying [for] loans to it are located in the same area, it is possible for the bank to make a swift decision, but if the headquarters is located in a distant area, it may be difficult for it to do that. In addition, sometimes a bank cannot trust an unfamiliar firm in a distant area. On the firm side also, if it knows bank managers well, it can easily choose an appropriate bank (ibid. p. 34).

Nakayama's comments reflect the important fact that regional banks had vital interests in the development of regional industries and thus, had more detailed information on local firms. If this was invariably the case, the shift of deposits from regional banks to urban banks would have had a negative impact on regional industries

because their access to finance would likely be reduced. Indeed, Fukushima Prefecture (1971c) wrote that, after the closure of the two largest banks in Fukushima Prefecture, Dai Hyaku-shichi Bank in 1928 and Koriyama Godo Bank in 1930, regional funds were sent to urban areas and funds for regional businesses contracted, which contributed to the depression becoming more severe (p. 167).

5-3 Econometric analysis

Given this context provided by the literature and descriptive evidence, in this section, the role of finance by the regional banks is econometrically investigated. For this purpose, the office-level data are aggregated to the municipality level and combined with municipality-product-level industrial output data. We also collect output data from the regional industries that were widely diffused in most municipalities in all four prefectures. As well as raw silk and textiles, our estimations use production data for Japanese wine (*sake*), Japanese paper (*washi*), soy sauce, and green tea at municipality (city or county) level. Again, the municipality-level product data are taken from various issues of the *Statistical Yearbook* of each prefecture. In the estimation, the output of each product is regressed by the total amount of bank loans at municipality level. We note that the amount of bank loans at municipality level would be endogenous in demand for industrial finance. To address this problem and identify the impact of lending on industrial output, branch share of urban banks in each prefecture, total amount of deposit banks of urban banks in our sample, and the interaction term of the two variables are used as instrumental variables. Regardless of industrial output in municipalities, we hypothesize that lending is negatively correlated with share of urban banks (in the prefecture) and the total amount of deposit of urban banks.

Table 10 reports the estimation results for each product. Our sample sizes differ slightly across products because the estimations use only samples with positive

production values. That is, missing values are not replaced by zero. The reasons for doing this are as follows: (1) the data are not available or not recorded in certain products, prefectures, and years; and (2) some products could not be produced in some municipalities for technical reasons (e.g., climate, technology, land, soil, and raw material availability) and thus, no amount of bank lending would enable the municipality to produce those products.

Table 10

In the first-stage regressions, the coefficients on the branch share of urban banks and total deposit of urban banks are significantly negative in most products, whereas the interaction terms are significantly negative in most products. The deposits held by urban banks were not fully used for lending within the regional economies, and instead were transferred to urban areas[18].

Next, the second-stage regressions indicate that lending has a significantly positive impact on output for all products except green tea. These results confirm that lending in regional economies could indeed foster the development of regional industries.

It is notable that the magnitudes of the coefficients of lending in the second-stage estimation differ across products. This difference reflects heterogeneous impacts of regional finance across industries. For example, the silk reeling industry has the largest coefficient, which indicates heavy credit dependence. The cost of cocoons was a significant proportion of the total production cost of raw silk[19], with the purchase of cocoons being concentrated within a relatively short period of the year, from May to July. Thus, silk reeling firms required a large amount of working capital. From the late

[18] We note that the F-values in the first stage are sufficiently large and exceed 10 for all products.
[19] One example is Okaya Seishi Gaisha, a leading firm in Nagano Prefecture. Their cost of cocoons was 74–87% of production costs from 1897 to 1907 (Nakabayashi 2003, pp. 196–197), where production costs are defined as cocoon costs, wages, energy costs, and management costs.

nineteenth century, they borrowed this working capital from raw silk traders in Yokohama, urban banks in Yokohama and Tokyo, and regional banks (Bank of Japan 1924, pp. 666–676). Bureau of Agriculture, the Ministry of Agriculture and Forestry (1927) reports that regional banks supplied the largest proportion of the working capital of the silk reeling industry in the early 1920s (p.710). Therefore, lending by regional banks was pivotal in the finances of the silk industry.

Combining our estimation results in Tables 7, 8, and 10 with the stylized facts, we can conclude that local and quasi-local banks sustained the development of the local economy through their local lending, despite a large contraction in the total amount of credit in the local market. By contrast, urban banks, which transferred money from rural to urban areas through their branch networks, did not contribute as much to the development of the regional economies.

6. Concluding remarks

The unstable financial market after World War I dramatically changed the Japanese financial system. A wave of bank mergers led to larger-scale banks, associated with larger branch networks, that is, the development of branch banking. In this paper, we explore the implications of branch banking using unique bank office-level data in four rural prefectures. We find that branch offices that belonged to banks headquartered in other cities, counties, and prefectures tended to have a lower propensity to loan in regional financial markets compared with the offices of banks headquartered in the same cities and counties. Regional banks, which had close relationships with regional industries from the late nineteenth century, continued to finance regional industries even during the long stagnation after World War I. Given this, reflecting the prior concerns of the financial authorities, there was a shift of deposits from regional banks to urban banks as a result of the bank mergers and expansion of branch networks. This implies that there was a

concentration of funds in metropolitan areas. Rather than the urban banks, it was the regional (local and quasi-local) banks that financed the regional industries to sustain the development of the regional economies. A substantial contraction in total local credit because of urban banks sequestering funds for urban areas led to economic and financial distress for the regional banks and regional economies.

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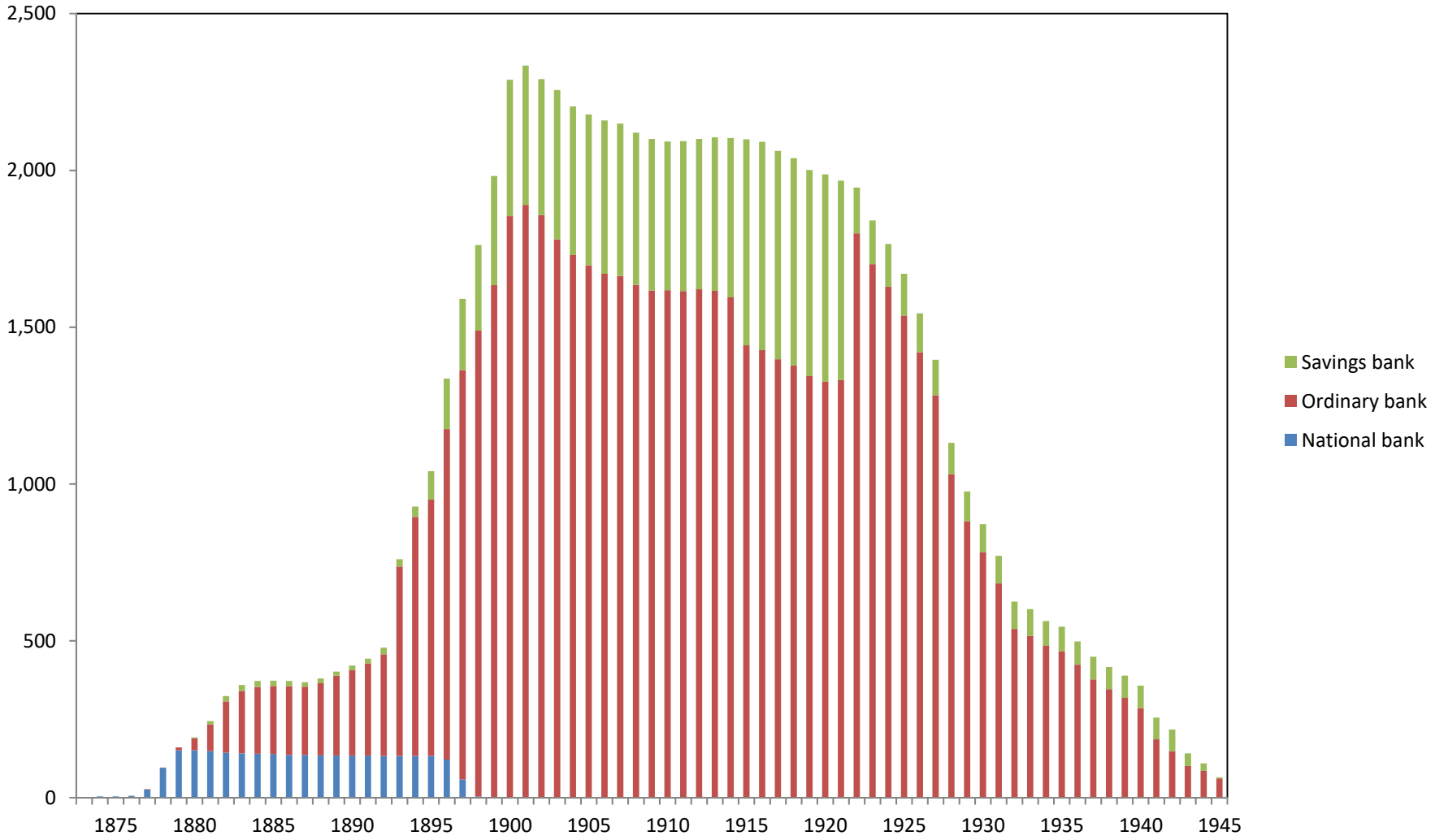
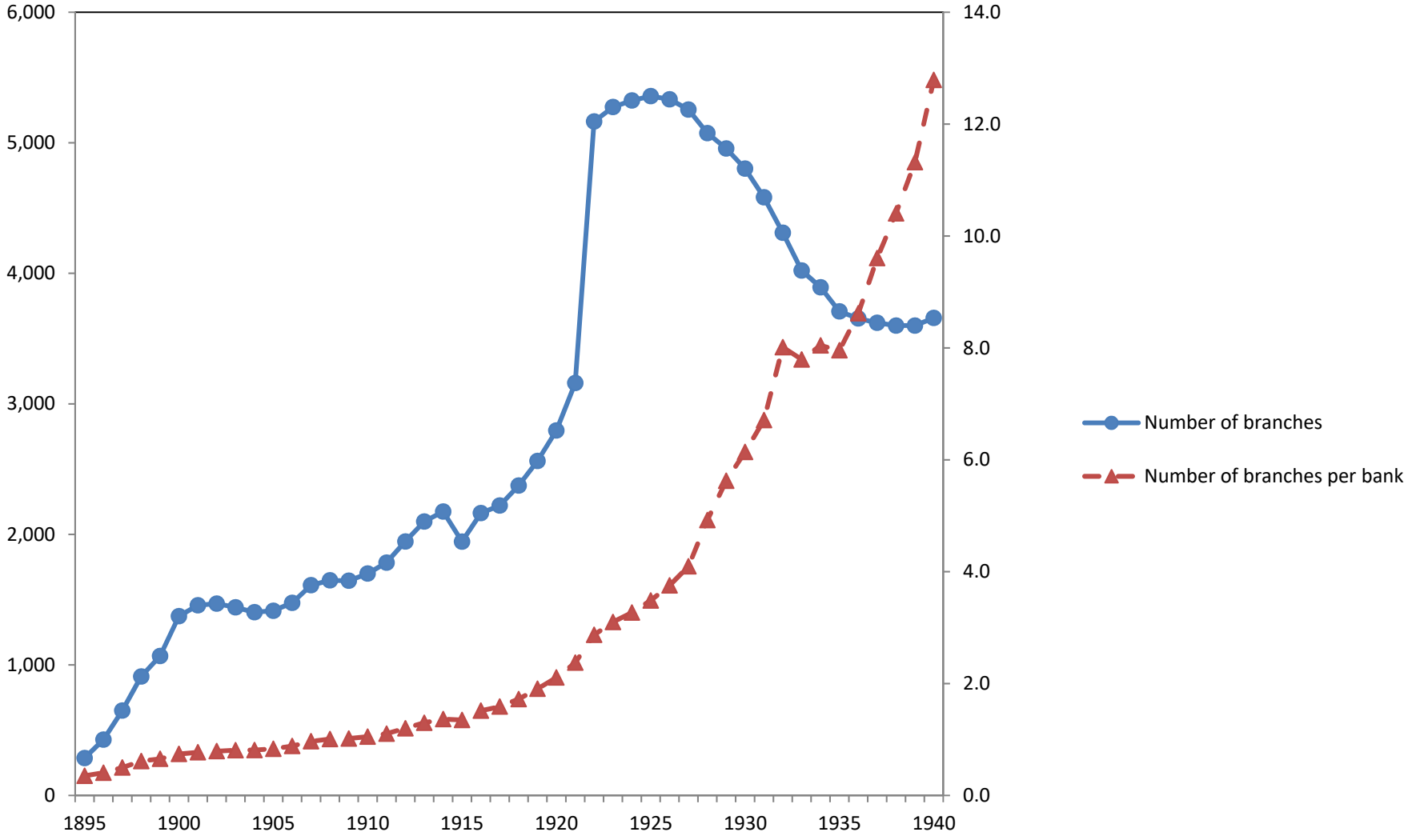
Figure 1 Number of Banks in Japan



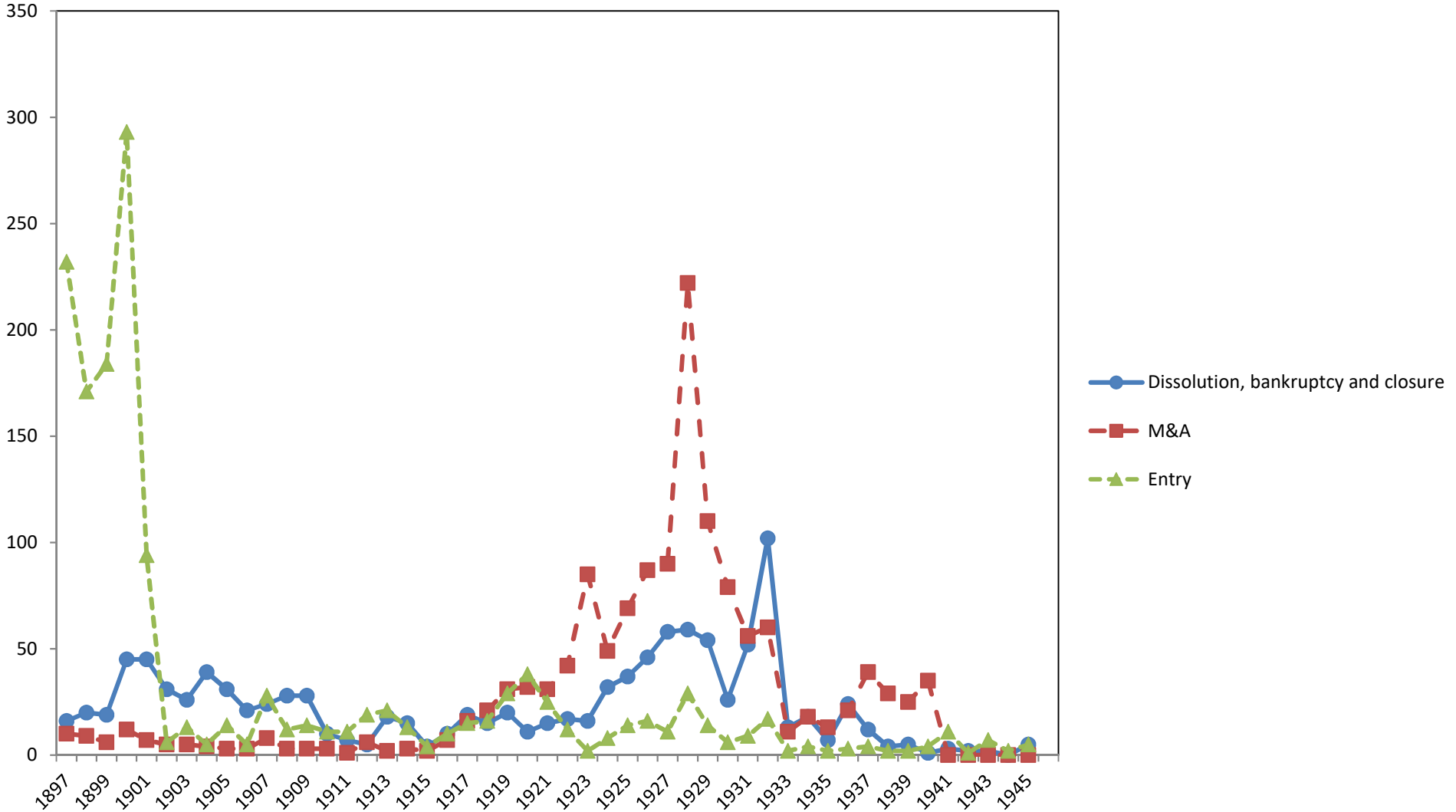
Source: Goto (1970).

Figure 2 Development of branch network of ordinary banks



Source: Goto(1970); Yearbook of Bank Bureau, Ministry of Finance, various issues .

Figure 3 Entry and exit of ordinary banks (excluding those through category change)

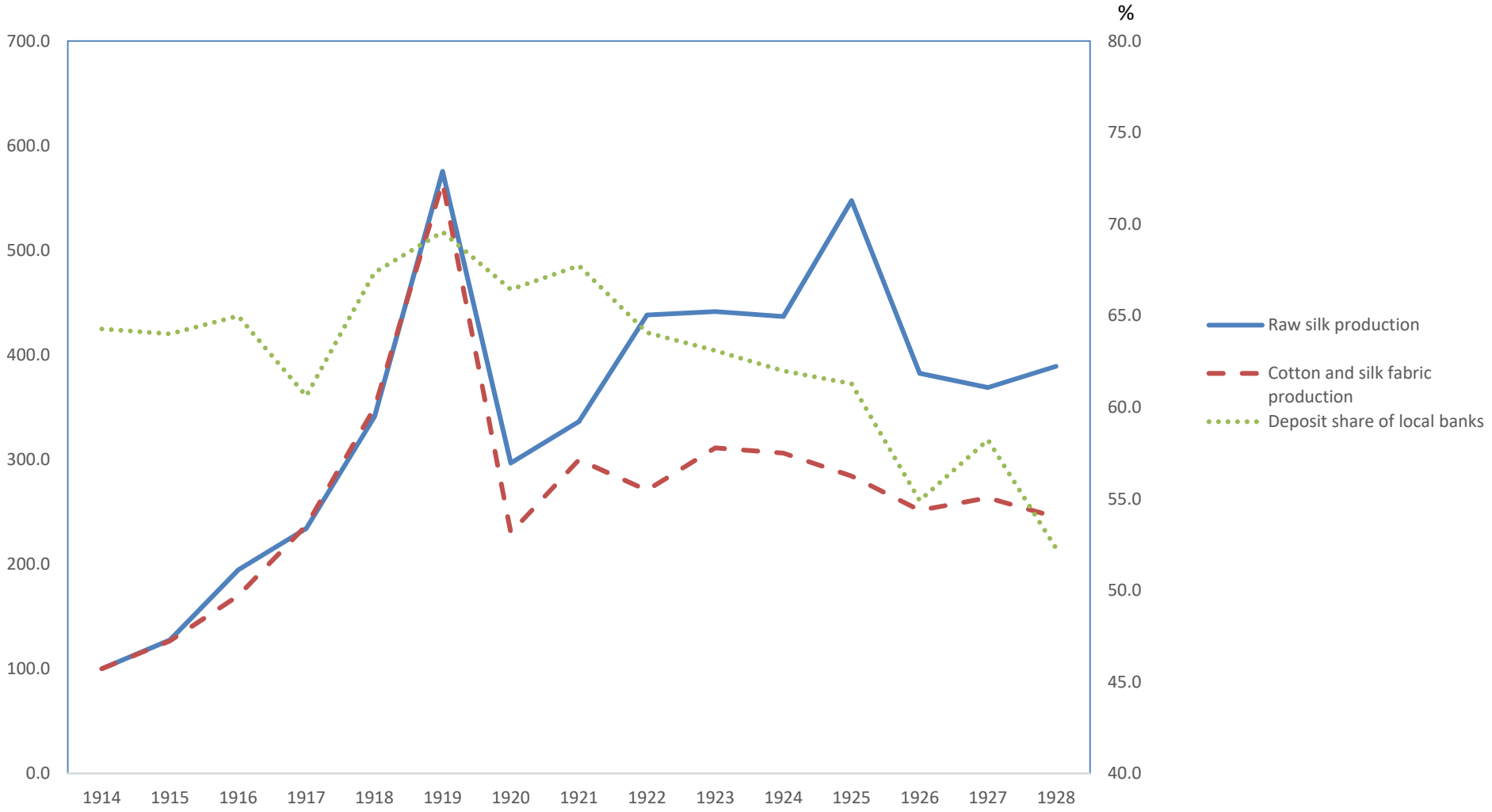


Source: Goto(1970).

Figure 4 Map of Japan

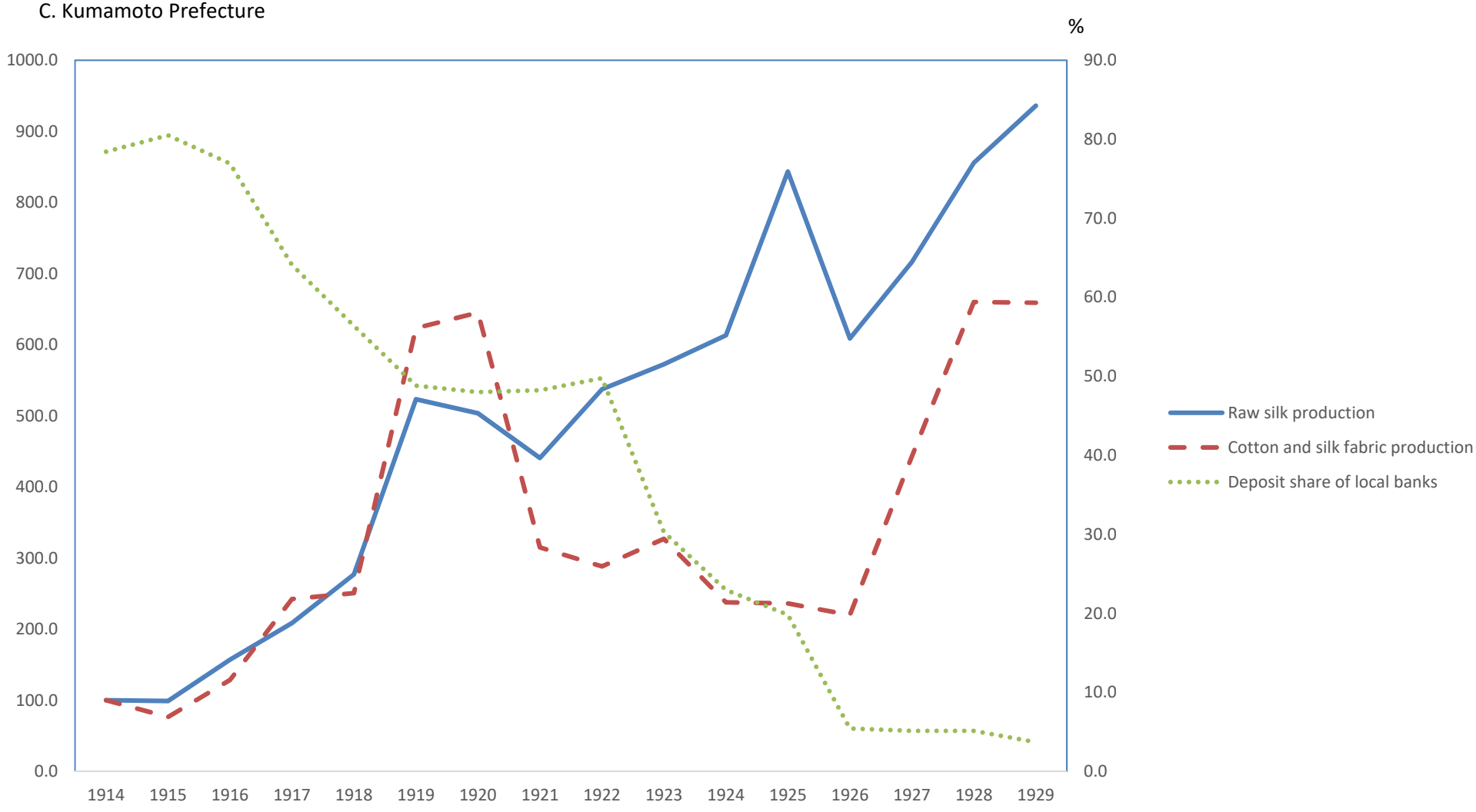
Figure 5 Regional finance and production of regional industries

A. Fukushima Prefecture




B. Tottori Prefecture
%
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
Raw silk production
Cotton and silk fabric production
Deposit share of local banks

C. Kumamoto Prefecture



Source: Various issues of Statistical Yearbook of Fukushima, Tottori and Kumamoto Prefectures.

Table 1 Expantion of branch network across prefectures

	A Headquarters	B. Branches		
		B1 Banks in the same prefecture	B2 Banks in the other prefectures	B2/(A+B1+B2) (%)
1910	2,141	2,324	427	8.7
1920	2,040	4,008	1,005	14.2
1930	891	4,158	1,188	19.0

Note: The data include special banks as well as ordinary banks and savings banks.
Source: Bureau of Banks, Ministry of Finance eds. Ginko Soran (Handbook of Banks), various issues.

Table 2 Banks with large branch networks in 1930

Order	Bank name	Prefecture	Number of branches			Paid-in capital	Deposit	Loan
				Same prefecture	Other prefectures	(1,000 yen)	(1,000 yen)	(1,000 yen)
1	Yasuda Bank	Tokyo	141	24	117	92,750	578,822	480,179
2	Kawasaki Daihyaku Bank	Tokyo	79	42	37	23,072	310,899	211,148
3	Yamaguchi Bank	Osaka	71	30	41	27,500	354,010	208,453
4	Sumitomo Bank	Osaka	65	18	47	50,000	675,892	444,647
5	Sanjuyon Bank	Osaka	63	25	38	39,700	413,232	276,678
6	Chugoku Bank	Okayama	62	43	19	6,703	92,001	75,464
7	Geibi Bank	Hiroshima	61	49	12	5,514	86,753	45,538
8	Daiichi Bank	Tokyo	57	20	37	57,500	602,146	398,210
9	Shinano Bank	Nagano	55	51	4	7,000	28,645	41,610
10	Showa Bank	Tokyo	53	27	26	2,500	78,255	79,843
11	Joban Bannk	Ibaraki	52	40	12	6,056	32,509	30,729
12	Suruga Bank	Shizuoka	51	33	18	4,287	34,087	30,532
13	Meiji Bank	Aichi	49	25	24	12,030	106,758	77,426
14	Nagoya Bank	Aichi	46	26	20	13,950	123,073	64,982
15	Unyo Jitsugyo Bank	Shimane	44	18	26	2,971	26,422	20,067
16	Aichi Bank	Aichi	42	21	21	11,800	163,273	83,116
17	Chiba Godo Bank	Chiba	41	38	3	2,486	30,709	22,857
18	Iwate Bank	Iwate	40	38	2	4,405	20,561	20,854
19	Morioka Bank	Iwate	38	26	12	4,453	35,439	28,769
20	Matsue Bank	Shimane	38	33	5	4,609	35,462	26,883

Source: Bank Bureau of the Ministry of Finance, Ginko-kyoku Nenpo (Yearbook of the Bank Bureau), 1930 issue;
Bank Bureau of the Ministry of Finance, Ginko Soran (Handbook of Banks), 1930 issue.

Table 3 Number of banks and bank offices by category of bank office

A. Fukushima Prefecture

	Number of banks		Number of offices		
	Banks in Fukushima	Banks in other prefectures (urban banks)	Banks in the same county (local banks)	Banks in other counties in Fukushima (quasi-local banks)	Banks in other prefectures (urban banks)
1912	30	1	30	12	4
1914	31	1	33	20	10
1915	31	1	33	21	9
1916	32	1	34	20	9
1917	28	1	30	29	10
1918	37	2	47	38	10
1919	38	8	45	38	17
1920	42	8	52	42	18
1921	42	8	54	49	18
1922	43	7	55	55	18
1923	38	9	56	62	18
1924	40	9	59	61	15
1925	41	8	59	62	14
1926	40	9	49	74	15
1927	37	8	53	61	14
1928	27	8	38	47	13

Source: *Statistical Yearbook of Fukushima Prefecture*, various issues.

B. Tottori Prefecture

	Number of banks		Number of offices		
	Banks in Tottori	Banks in other prefectures (urban banks)	Banks in the same county (local banks)	Banks in other counties in Tottori (quasi-local banks)	Banks in other prefectures (urban banks)
1913	9	7	13	15	13
1914	10	8	14	16	13
1915	11	7	15	20	11
1916	11	7	15	20	11
1917	11	7	17	22	11
1918	12	5	20	24	8
1919	12	4	22	30	7
1920	12	4	27	42	7
1921	12	4	29	47	8
1922	13	7	32	50	12
1923	13	7	34	50	13
1924	13	7	34	52	13
1925	13	8	35	52	14
1926	11	8	31	38	31
1928	9	7	22	21	44
1930	8	6	16	21	37
1931	7	5	15	21	27

Source: *Statistical Yearbook of Tottori Prefecture*, various issues.

C. Kumamoto Prefecture

	Number of banks		Number of offices		
	Banks in Kumamoto	Banks in other prefectures (urban banks)	Banks in the same county (local banks)	Banks in other counties in Kumamoto (quasi-local banks)	Banks in other prefectures (urban banks)
1912	15	3	21	5	5
1913	16	4	23	6	6
1914	16	4	23	8	6
1915	17	7	25	8	9
1916	18	8	26	9	10
1917	19	9	28	11	12
1918	19	10	28	8	13
1920	19	10	39	23	17
1921	19	11	40	28	18
1922	19	10	46	27	14
1923	16	14	45	20	29
1924	16	14	46	19	28
1925	14	15	41	17	30
1926	7	14	25	7	29
1927	7	11	23	8	23
1928	6	10	18	14	17
1929	6	9	18	14	16

Source: *Statistical Yearbook of Kumamoto Prefecture*, various issues.

D. Miyazaki Prefecture

	Number of banks		Number of offices		
	Banks in Miyazaki	Banks in other prefectures (urban banks)	Banks in the same county (local banks)	Banks in other counties in Miyazaki (quasi-local banks)	Banks in other prefectures (urban banks)
1915	6	3	12	9	6
1916	7	3	17	12	6
1917	7	3	17	14	6
1918	7	3	17	14	6
1919	9	3	22	16	8
1920	10	6	25	16	11
1921	11	6	28	22	12

Source: *Statistical Yearbook of Miyazaki Prefecture*, various issues.

Table 4 Branch network by bank

Prefecture (year)		Bank name	Prefecture	Nnumber of branches
Fukusima (1928)	Banks in Fukushima	Dai Hyaku-shichi		17
		Nihonmatsu		7
		Koriyama Godo		7
		Sugagawa		4
		Adachi Jiitsugyo		3
		Shirakawa Jitsugyo		3
		Koriyama Shogyo		3
		Aizu		2
		Yamahachi		2
		Tajima		2
		Shirakawa Shogyo		2
		Iwase Kogyo		1
		Kawamata		1
		Yabuki		1
		Dai Hyaku-ichi		1
	Other prefectures	Yasuda	Tokyo	4
		Tokyo Shiny	Tokyo	2
		Shichiju-sho	Miyagi	2
		Goju	Miyagi	1
		Gojo	Ibaraki	1
		Yaita	Tochigi	1
		Dai Yon	Niigata	1
		Fujimoto Bil	Tokyo	1
Tottori (1928)	Totori Prefecture	Yonago		12
		Shokei		11
		Yato		6
		Kyoritsu		5
	Other prefectures	Unyo Jitsug	Shimane	32
		Matsue	Shimane	4
		Yasuda	Tokyo	3
		Nihon Sangy	Osaka	2
		Kyoritsu Sh	Hyogo	1
		Kawasaki Da	Tokyo	1
		Nihon Kangy	Tokyo	1
Kumamoto (1928)	Kumamoto Prefectu	Higo		12
		Amakusa Kyoritsu		8
		Masugi		3
		Ashikita		1
	Other prefectures	Yasuda	Tokyo	6
		Juhachi	Nagasaki	2
		Miike	Fukuoka	1
		Sumitomo	Osaka	1
		Jugo	Tokyo	1
		Oichi	Fukuoka	1
		Tashumaru	Fukuoka	1
		Daiichi	Tokyo	1
		Hishu	Nagasakli	1
Miyazaki (1921)	Miyazaki Prefecture	Taisho		11
		Sadohara		6
		Hyuga		6
		Nisshu		6
		Miyazaki		4
		Nobeoka		2
		Hisa		2
		Sadohara Chochiku		1
		Miyakonojo		1
	Other prefectures	Hyaku-yonju	Kagoshima	5
		Oita	Oita	2
		Asaya	Ehime	2
		Usuki	Oita	2
		Seinan	Ehime	1

Source: Statistical Yearbook of each prefecture.

Table 5 Deposits and loans by category of bank office

A. Fukushima Prefecture

	Deposit share (%)			Loan share (%)			Depoist/loan (%)		
	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks
1912	71.0	10.0	19.0	79.0	11.4	9.6	132.3	130.1	291.0
1914	64.3	11.3	24.4	75.2	13.0	11.8	131.1	133.4	318.6
1915	64.0	14.2	21.8	75.8	14.4	9.7	150.4	175.0	400.1
1916	65.4	15.4	19.2	77.3	10.8	12.0	108.8	184.3	206.8
1917	60.7	19.9	19.4	70.8	15.5	13.6	81.2	121.2	134.3
1918	67.5	18.1	14.5	71.6	15.9	12.5	86.6	104.5	106.1
1919	69.5	14.7	15.8	68.5	14.9	16.6	79.5	77.6	74.5
1920	66.6	14.4	19.1	70.2	13.7	16.1	72.3	80.0	90.4
1921	67.8	14.4	17.8	72.6	12.6	14.8	77.5	94.4	99.8
1922	64.2	18.4	17.4	70.9	14.9	14.1	76.6	104.6	104.2
1923	55.2	28.3	16.5	61.4	24.0	14.7	71.8	94.4	89.7
1924	55.2	31.5	13.3	62.9	22.4	14.7	69.5	111.4	71.7
1925	61.6	26.1	12.3	69.6	15.0	15.4	69.9	136.9	63.1
1926	54.9	32.3	12.8	65.8	20.2	14.0	69.0	132.2	75.7
1927	57.6	25.3	17.1	73.2	15.3	11.5	66.3	139.4	125.5
1928	51.9	20.3	27.8	67.7	16.2	16.1	70.5	112.4	165.2
Avera	62.3	19.7	18.0	70.8	15.6	13.6	82.6	114.1	111.8

Source: *Statistical Yearbook of Fukushima Prefecture*, various issues.

B. Tottori Prefecture

	Deposit share (%)			Loan share (%)			Depoist/loan (%)		
	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks
1913	41.4	8.7	49.9	31.7	24.9	43.4	194.3	52.1	171.1
1914	41.5	9.8	48.8	50.6	9.6	39.9	110.1	136.9	164.1
1915	46.2	11.8	42.0	53.8	11.2	35.0	121.3	148.9	169.5
1916	45.3	17.2	37.5	51.7	15.0	33.2	95.8	125.0	123.6
1917	47.8	19.2	33.1	53.5	17.2	29.3	130.2	162.4	164.2
1918	47.5	21.3	31.2	55.2	19.6	25.3	125.7	158.6	180.1
1919	48.7	25.4	25.9	58.5	23.5	18.0	111.0	144.4	192.2
1920	57.9	27.2	14.9	56.5	27.2	16.2	107.0	104.2	96.0
1921	45.5	29.5	25.0	57.1	27.0	15.9	94.6	129.9	187.4
1922	43.2	28.6	28.2	46.1	27.2	26.8	88.5	99.6	99.5
1923	44.3	29.6	26.2	43.7	33.0	23.3	87.5	77.3	96.8
1924	43.4	28.6	27.9	32.8	43.9	23.3	117.7	57.9	106.5
1925	42.1	27.9	30.1	32.1	30.4	37.5	123.9	86.6	75.7
1926	35.8	21.2	43.0	47.7	17.6	34.7	83.3	132.9	137.4
1927	33.8	22.4	43.8	43.0	18.6	38.4	85.4	130.7	123.9
1928	23.9	14.6	61.6	32.5	7.9	59.6	87.2	218.2	122.5
1929	35.9	14.3	49.8	34.2	11.1	54.8	150.6	185.2	130.2
1930	21.2	16.4	62.4	28.4	10.5	61.1	95.9	200.1	131.2
1931	18.8	12.9	68.2	28.0	10.7	61.3	89.0	160.1	147.5
Avera	40.2	20.3	39.4	44.1	20.3	35.6	105.4	114.4	129.2

Source: *Statistical Yearbook of Tottori Prefecture*, various issues.

C. Kumamoto Prefecture

	Deposit share (%)			Loan share (%)			Depoist/loan (%)		
	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks
1912	78.7	12.6	8.7	83.7	7.2	9.1	133.8	250.5	135.5
1913	81.7	9.8	8.5	84.4	7.7	7.9	117.2	155.1	129.4
1914	78.4	12.0	9.6	81.1	9.5	9.4	98.1	127.2	104.1
1915	80.5	9.8	9.7	81.5	8.5	10.0	88.4	103.4	86.8
1916	76.9	11.5	11.6	78.9	8.1	13.0	109.5	159.1	100.6
1917	64.1	14.2	21.7	70.2	9.0	20.8	88.8	154.3	101.6
1918	56.4	11.8	31.8	66.5	8.2	25.4	102.2	173.6	150.9
1919	48.8	16.4	34.8	67.0	10.4	22.6	78.2	169.2	165.6
1920	48.0	17.7	34.3	62.7	9.9	27.4	82.7	193.6	131.9
1921	48.2	19.3	32.5	62.7	12.8	24.5	83.7	163.9	141.6
1922	49.7	18.1	32.2	64.0	14.3	21.6	71.6	116.4	131.2
1923	30.3	3.9	65.8	36.6	5.8	57.6	71.6	58.7	98.0
1924	23.0	5.4	71.7	29.9	3.7	66.4	76.9	144.0	108.2
1925	19.8	4.0	76.2	26.8	4.5	68.7	82.6	99.4	122.6
1926	5.4	2.4	92.2	7.6	4.6	87.9	89.6	65.5	130.4
1927	5.1	4.3	90.6	8.5	6.5	85.0	78.1	87.0	138.9
1928	5.1	11.3	83.6	6.0	10.0	84.0	103.9	136.2	120.1
1929	3.7	9.3	87.0	5.2	9.6	85.2	91.1	124.0	130.7
Avera	44.7	10.8	44.6	51.3	8.3	40.4	89.1	121.2	120.5

Source: *Statistical Yearbook of Kumamoto Prefecture*, various issues.

D. Miyazaki Prefecture

	Deposit share (%)			Loan share (%)			Depoist/loan (%)		
	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks	Local banks	Quasi-local banks	Urban banks
1915	39.1	27.3	33.7	48.4	25.5	26.1	51.9	68.8	82.9
1916	34.9	30.4	34.7	49.6	24.8	25.6	57.4	100.4	110.5
1917	37.2	35.5	27.3	49.4	26.6	24.0	77.1	136.5	116.1
1918	35.4	37.6	27.0	50.0	27.2	22.9	70.2	136.9	117.0
1919	35.3	33.9	30.7	45.9	28.2	25.9	76.1	118.8	117.2
1920	40.1	31.0	28.9	50.5	25.2	24.3	66.5	102.6	99.5
1921	32.0	24.2	43.9	49.7	24.4	26.0	64.1	98.6	168.2
Avera	36.3	31.4	32.3	49.0	26.0	25.0	65.0	103.8	111.5

Source: *Statistical Yearbook of Miyazaki Prefecture*, various issues.

Table 6 General features of the economies of the four prefectures

	Prefecture	1909	1925	1935
Total value added (million yen)	Fukushima	85,442	336,182	273,285
	Tottori	25,796	107,029	85,603
	Kumamoto	75,982	335,909	280,095
	Miyazaki	36,084	162,371	169,453
	Total of Japan	4,028,122	18,154,468	19,238,524
Per capita value added (yen)	Fukushima	69.4	232.8	172.5
	Tottori	60.2	225.9	175.1
	Kumamoto	66.2	258.3	202.7
	Miyazaki	65.6	233.9	205.8
	Average of Japan	82.3	302.6	276.9
Percentage of primary industry	Fukushima	51.3	48.6	32.5
	Tottori	52.0	44.8	35.3
	Kumamoto	52.1	38.4	31.7
	Miyazaki	59.2	49.7	28.6
	Average of Japan	33.6	26.6	16.4
Percentage of secondary industry	Fukushima	14.4	13.9	19.4
	Tottori	11.7	13.0	17.0
	Kumamoto	10.2	11.4	16.3
	Miyazaki	11.5	9.6	25.6
	Average of Japan	20.7	22.6	30.8
Percentage of tirtery industry	Fukushima	34.8	38.1	48.8
	Tottori	37.7	44.2	48.7
	Kumamoto	39.7	52.0	53.8
	Miyazaki	30.5	41.9	47.1
	Average of Japan	47.3	52.3	53.9

Source: Settsu et al. (2016).

Table 7 Determinants of lending: Office-level estimation

Dependent variable: Loan								
	(1)		(2)		(3)		(4)	
Capital	0.164	(2.24) **	0.080	(1.53)	0.060	(0.96)	0.054	(0.86)
Deposit			0.853	(18.50) ***	0.875	(20.67) ***	0.919	(23.05) ***
Quasi-local bank dummy	−0.752	(−6.70) ***	−0.134	(−1.75) *	−0.131	(−1.74) *		
Urban bank dummy	−3.113	(−7.46) ***	−1.744	(−4.23) ***	−1.545	(−3.50) ***		
Branch					0.002	(2.47) **	0.004	(3.16) ***
Deposit X Quasi-local dummy							−0.006	(−1.05)
Deposit X Urban dummy							−0.262	(−2.67) ***
Bank fixed effects	Yes		Yes		Yes		Yes	
County fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Year-prefecture fixed effec	Yes		Yes		Yes		Yes	
Nob.	4,084		4,074		3,861		3,861	
R-sq.	0.47		0.706		0.7122		0.7226	

Note: *** statistically significant at 1% level.
** statistically significant at 5% level.
* statistically significant at 10% level.
Robust t-values in parentheses.

This is office level estimations.

$$\text{Loans}_{obmt} = \beta_1 Capital_{bt} + \beta_2 Branch_{bt} + \beta_3 Deposit_{obmt} + \beta_4 Quasilocal\ \ bank_{obmt} + \beta_5 Urban\ \ bank_{obmt} + \gamma_b + \mu_m + \ \ t + \delta_{mt} + \varepsilon_{obmt},$$

We estimate OLS with cluster standard error at bank level
Bank branch data is not available from 1909 to 1911. It is also not available in savings banks for all years.

Table 8 "Pump-up" of credit: Bank-level estimation

Dependent variable: Deposit-loan ratio	(1)		(2)		(3)	
Capital	−0.094	(−2.87) ***	−0.021	(−0.99)	−0.092	(−3.21) ***
Urban bank (Other pref)	3.547	(23.44) ***				
Urban bank (Tokyo-Osaka)	3.153	(19.76) ***				
Miyagi			0.191	(1.43)		
Ibaraki			−0.094	(−1.71) *		
Tochigi			0.409	(11.48) ***		
Tokyo			0.366	(3.05) ***		
Niigata			0.187	(2.42) **		
Nagano			−0.052	(−0.11)		
Osaka			0.406	(1.21)		
Hyogo			−0.118	(−1.26)		
Shimane			−0.108	(−1.24)		
Ehime			0.055	(0.3)		
Fukuoka			−0.165	(−0.71)		
Nagasaki			0.580	(1.26)		
Oita			0.407	(4.49) ***		
Miyazaki			1.156	(13.38) ***		
Kagoshima			0.304	(3.33) ***		
Branch Share					−0.314	(−1.85) *
Prefecture fixed effects	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Bank fixed effect	Yes		No		Yes	
Prefecture year fixed effects	Yes		Yes		No	
Nob	1,495		1,495		1,360	
R-sq	0.6507		0.2105		0.6739	

Note: *** statistically significant at 1% level.
** statistically significant at 5% level.
* statistically significant at 10% level.

This is bank level estimations.

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \beta_2 Other\ \ Pref_{bpt} + \beta_3 TokyoOsaka_{bpt} + \gamma_b + \mu_p + t + \delta_{pt} + \varepsilon_{bpt}$$

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \sum \beta\ \ HQ\ \ Pref_{bpt} + \mu_p + t + \delta_{pt} + \varepsilon_{bpt}$$

$$\mathrm{DL}_{bpt} = \beta_1 Capital_{bt} + \beta_2 Local\ \ Branch\ \ Share_{bpt} + \gamma_b + \mu_p + year_t + \varepsilon_{bpt}$$

We estimate OLS with cluster standard error at bank level

Bank branch data is not available from 1909 to 1911. It is also not available in savings banks for all years.

Table 9 Composition of manufacturing industries

		Factory workers (persons)			Percentage		
		1909	1925	1935	1909	1925	1935
Fukushima	Total	7,364	20,583	22,178	100.0	100.0	100.0
	Food	832	614	525	11.3	3.0	2.4
	Textile	5,274	16,869	15,577	71.6	82.0	70.2
	Silk reeling	2,935	11,551	8,906	39.9	56.1	40.2
	Weaving	1,771	1,520	2,514	24.0	7.4	11.3
	Chemical	693	1,685	3,960	9.4	8.2	17.9
	Metal and machinery	199	480	1,172	2.7	2.3	5.3
	Others	366	935	944	5.0	4.5	4.3
Tottori	Total	4,838	7,479	8,134	100.0	100.0	100.0
	Food	486	327	392	10.0	4.4	4.8
	Textile	3,382	5,689	5,463	69.9	76.1	67.2
	Silk reeling	2,751	4,726	4,886	56.9	63.2	60.1
	Weaving	438	19	48	9.1	0.3	0.6
	Chemical	194	372	548	4.0	5.0	6.7
	Metal and machinery	214	431	558	4.4	5.8	6.9
	Others	562	660	1,173	11.6	8.8	14.4
Kumamoto	Total	5,794	14,702	15,003	100.0	100.0	100.0
	Food	697	1,852	1,790	12.0	12.6	11.9
	Textile	2,160	6,339	7,161	37.3	43.1	47.7
	Silk reeling	1,178	5,313	6,416	20.3	36.1	42.8
	Weaving	501	381	232	8.6	2.6	1.5
	Chemical	1,470	4,531	3,155	25.4	30.8	21.0
	Metal and machinery	316	427	771	5.5	2.9	5.1
	Others	1,151	1,553	2,126	19.9	10.6	14.2
Miyazaki	Total	1,361	6,101	21,346	100.0	100.0	100.0
	Food	29	197	490	2.1	3.2	2.3
	Textile	1,132	4,704	4,129	83.2	77.1	19.3
	Silk reeling	1,132	4,656	4,013	83.2	76.3	18.8
	Weaving	0	48	104	0.0	0.8	0.5
	Chemical	0	437	14,557	0.0	7.2	68.2
	Metal and machinery	7	53	185	0.5	0.9	0.9
	Others	193	710	1,985	14.2	11.6	9.3
Total of Japan	Total	800,637	1,808,381	2,369,277	100.0	100.0	100.0
	Food	88,740	170,648	158,125	11.1	9.4	6.7
	Textile	486,508	972,631	1,006,703	60.8	53.8	42.5
	Silk reeling	191,561	343,654	277,161	23.9	19.0	11.7
	Weaving	155,246	291,189	354,267	19.4	16.1	15.0
	Chemical	77,883	169,407	321,336	9.7	9.4	13.6
	Metal and machinery	63,821	317,306	584,875	8.0	17.5	24.7
	Others	83,685	178,389	298,238	10.5	9.9	12.6

Source: Ministry of Agriculture and Commerce and Ministry of Commerce and Industry eds. *Kojo Tokei Hyo (Census of Manufacture)*, various issues.

Table 10 Impact of bank lending on development of local industries

Dependent variable	Sake production		Soy sauce production		Japanese paper production		Raw silk production		Fabric production		Green tea production	
Lending	0.144	(3.37) ***	0.507	(12.24) ***	0.352	(3.58) ***	1.294	(9.51) ***	0.723	(4.29) ***	−0.186	(−1.4)
NoB.	355		352		274		184		121		157	
R-sq.	0.044		0.264		0.026		0.229		0.176		0.008	

First stage estimations

Dependent variable	Lending		Lending		Lending		Lending		Lending		Lending	
TotalUrbanDepXShUrban	1.472	(2.95) ***	1.443	(2.90) ***	0.639	(1.12)	−1.370	(−2.50) **	1.407	(2.32) **	1.424	(2.08) **
ShUrban	−26.615	(−3.02) ***	−26.115	(−2.97) ***	−11.859	(−1.18)	23.373	(2.42) **	−25.120	(−2.36) **	−25.956	(−2.15) **
Total_Urbandep	−0.718	(−2.72) ***	−0.713	(−2.70) ***	−0.108	(−0.41)	0.978	(3.09) ***	−0.936	(−2.75) ***	−0.776	(−2.02) **
County fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
R-sq	0.768		0.768		0.8546		0.824		0.8121		0.7462	
F-stat of excluded inst	158.36		155.89		2068.20		414.76		150.30		177.84	

The data sample is limited from 1920 to 1931.
Estimations are county level.

The first stage estimation is
Lending = TotalUrbanDep + ShUrban + ShUrban*TotalUrbanDep + ε

The second stage is
Industrial output = Lending + ε