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Bank of Japan's Balance Sheet in 1882–1955: Reassembled Data and Their Developments

Ryoji Koike*

Abstract

This paper overviews the developments of the Bank of Japan's balance sheet from the Meiji era to postwar reconstruction. The paper assesses balance sheet items in terms of both nominal values and ratios to nominal GNP, using semiannual and monthly data reassembled from historical materials. In the semiannual data, the ratio of total assets to GNP remained at 10–15 percent in peacetime but increased to 19– 48 percent in wartime, whereas it was 16 percent at most during financial crises. Meanwhile, banknotes remained stable, at 8–11 percent, except in the Bank's early years and at end of the Pacific War in 1941–45. The monthly data capture short-term changes during financial crises and rapid changes in economic and financial institutions, such as the 1923 earthquake, the return to the gold standard in 1930, and the emergency measures in 1946 that voided old banknotes to reduce money in circulation. These data provide useful information for research in history fields such as the identification of exogenous shocks.

Keywords: from the Meiji era to postwar reconstruction; the Bank of Japan's balance sheet; historical records; semiannual data; monthly data

JEL classification: N25, Y10, E58

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1. Introduction

This paper reassembles the historical balance sheet data of the Bank of Japan (hereafter the BOJ or the Bank), using various and mostly untouched historical records. The data contain both total assets and breakdown items, semiannually in 1882–1955 and monthly in 1897–1955, from the Meiji era to postwar reconstruction.

Earlier studies on the Bank's balance sheet mainly aim at long-term developments, and, to the author's knowledge, use annual data. However, the Bank's balance sheet changed rapidly in one case, and in another case, a change disappeared in less than a year with only a small effect on the annual data. A typical example was the financial crisis from March to May 1927, the so-called Showa financial panic. Semiannual or monthly data more adequately capture the impact of such events than annual data do. However, semiannual and monthly data were not available for a super long period, mainly because historical records usually do not contain such data in a consistent manner.

This paper uses historical materials, such as records at the BOJ Archives and old releases of *Eigyo maishu hokoku* (BOJ weekly business report), thereby reassembling the Bank's historical balance sheet with total assets and items both in semiannual and monthly terms. Semiannual and monthly data are available from 1882–1955 and 1897–1955, respectively. The new data series help to analyze turbulent periods affected by financial crisis or war, and to review changes in the Bank's balance sheet in terms of both nominal values and ratios to GNP.

This paper also divides about 70 years of the Bank's history into nine periods, and then reviews changes in the balance sheet items in each period, with the developments of monetary, economic, social, and political conditions in that period. The review also covers developments in the years before the start of BOJ in 1882, such as the developments of government paper money as well as the government reserve fund, and assesses how these developments changed after the start of BOJ. We also provide the Bank's balance sheet data in a publicly available format.¹

The Bank's balance sheet from 70–140 years ago is not easily comparable with the Bank's current balance sheet, owing to various changes in the Bank's balance sheet, the central banking system, and other economic frameworks, such as the gold standard at the time. From the Meiji era to postwar reconstruction, large changes in economic conditions and social disturbances occurred many times. Such changes include the founding of BOJ, the Sino-Japanese War of 1894–95, the Russo-Japanese War, the return to the gold standard

¹ The data file is available on the webpage containing a summary of this paper.

and the re-departure from it, the financial panic of 1927, the Pacific War of 1941–45, and the postwar reconstruction. Against such backgrounds, there exist qualitative differences between the Bank's balance sheet in 1882–1955 and the balance sheet at present. Still, it would be worth analyzing the Bank's historical balance sheet in studying the past impacts of economic and political events. Also, the semiannual and monthly data newly reassembled in this paper may be helpful for studying the impact of an event at intervals shorter than one year, thereby possibly enabling the discovery and provision of new information.

Section 2 reviews major literature related to the Bank's balance sheet. Section 3 explains the historical records and data used for reassembling the new data set. Section 4 overviews the developments of the Bank's balance sheet and its background over each period from the Meiji era to postwar reconstruction. It then adds the findings throughout the years and the differences between the historical and the modern balance sheet. Section 5 provides a conclusion.

2. Earlier Studies

This section reviews earlier studies on the Bank's balance sheet from three aspects: studies on the Bank's modern balance sheet, studies on the Bank's historical balance sheet, and studies of the Japanese economy in the early Meiji era. In addition, this section introduces English-language studies about Japan's financial history.

(1) Studies on the Bank's modern balance sheet

Among the literature, BOJ Policy Planning Office (2004) comes first. As the organ in charge of policy formulation, the office explains how each balance sheet item will change in response to the Bank's transactions with the private sector (such as receipts of treasury funds, market operations, and loans) and with the government. In addition to these short-term changes, the study also explains changes in the balance sheet over a longer term, in response to the economic and financial conditions and the Bank's policy operations. Next, Shirakawa (2008) points out that monetary policy measures will change the size of the Bank's balance sheet and item compositions, although it may be difficult to specify a causality for these changes from policy measures. Shiratsuka (2010) also compares unconventional monetary policies between the BOJ and the U.S. Federal Reserve. He assesses that the combination of the balance sheet size and the item composition enhances the overall effects of unconventional policy measures.

In addition, BOJ Monetary Affairs Department (2023) describes the Bank's balance sheet and reviews changes over the past 25 years, with an overview of the Bank's basic

thinking on central bank finances and monetary policy conduct.

These studies focus on the Bank's modern balance sheet. It is difficult to objectively split years into the present time and a historical time. For the sake of convenience, we consider 1955 as a break, as it marks the end of the postwar reconstruction as well as the start of high economic growth, and then regard the Bank's balance sheet from 1882 to 1955 as historical and thereafter as modern.²

(2) Studies on the Bank's historical balance sheet

Among major works of history research related to the Bank, BOJ Centennial Committee (1982, 1983a, 1983b, 1984, 1985, 1986a, 1986b) are monographic works that describe the Bank's centennial history in 1882–1982 with volumes 1–6 and an appendix volume. Among them, BOJ Centennial Committee (1986b) provides data on the Bank's total assets and major items in 1882–1982.³ Meanwhile, the body text in volumes 1–6 does not directly use the balance sheet data.

As another important study, Shizume (2001) historically analyzes the Bank's balance sheet to assess the central bank credit to the government, using ratios of total assets and items to GNP in 1886–2000 and the year-on-year contribution of items in 1928–50. He also points out the decline of gold in 1930–1940s containing a period of the return to the gold standard, and the prolonged larger holdings of government bonds under the larger government expenditures in the 1940s. Shizume (2020) also reviews the challenges and instruments for the Bank's policy from the late 19th century to the present time, using the three-period moving average of the year-on-year contributions for the major items. He points out that the Bank increased credit to the government during various wars, thereby sharply increasing total assets, and then the Bank was unable to focus on price stability or economic growth when the government prioritized military buildup. In addition, Fujino and Teranishi (2000) construct a flow-of-funds table containing long-term data back to the Meiji era, on the use of various historical materials. They partly discuss the Bank's balance sheet in 1882–1940, pointing out the increase in the Bank's credit to the private sector in 1885–1900 under an upsurge of industries.

As studies covering the historical balance sheets of major central banks, Ferguson,

² Miwa and Hara (2007), a work by Japanese economic historians, regard 1945–55 as the postwar reconstruction period and 1955–84 as the high- to stable-growth period. Nishimura (1994), a work by the former head and his staff of the Policy Research Institute, Ministry of Finance, also considers 1945–54 as the reconstruction period and 1955–71 as the high-growth period.

³ Their usage is limited to some items. See BOJ Centennial Committee (1982), pp. 327, 353, 508 (items of credit to the private sector and banknotes), BOJ Centennial Committee (1983a), p. 439 (banknotes), BOJ Centennial Committee (1983b), pp. 179, 207 (credit and banknotes), BOJ Centennial Committee (1984), p. 358 (government bonds), and BOJ Centennial Committee (1985), p. 78 (banknotes).

Schaab, and Schularick (2015) analyze the central bank balance sheets of 12 industrial economies, including Japan, in 1900–2012, with respect to total assets, three items on the asset side, and four items on the liability side.⁴ They point out that the mean and median of ratios of total assets to GDP usually remained at 10–20 percent. Meanwhile, exceptional surges occurred in some cases, such as current account surpluses, wars, financial crises with lending as the last resort, and demand-stabilization policies.

Ferguson, et al. (2023) analyze causality between increases in the size of central bank balance sheets and financial crises after credit bubbles for 17 industrial economies in 1870-2020, with an appropriate treatment of endogeneity. In their analysis, geopolitical emergencies expanded the central bank balance sheet initially, but policy response to financial crises became the key driver over time. They also create an instrumental variable to indicate whether central bank governors in financial crises were hawkish or dovish, using historical materials. According to their empirical analyses, the probability of doves expanding the balance sheet in response to a financial crisis was 36 percent more likely than that of hawks, and an economic recovery after a crisis occurs earlier with balance sheet expansion. At the same time, there is also a trade-off that enhances the probability of another financial crisis occurring within 20 years. Meanwhile, their research aims at common trends across central banks in major economies, and their description about the BOJ is limited. In addition, Nishikawa (1984) reviews the developments and historical backgrounds of major central banks, using four items on the asset side (gold, foreign currencies, credit to the private sector, and credit to the government) and four items on the liability side (banknotes, government deposits, private deposits, and capital).

Earlier studies about the Bank's balance sheet are extensive. However, annual data used in the earlier studies are insufficient to capture changes in the balance sheet, such as changes at intervals of less than one year due to an event, or changes accelerating or decelerating at a semiannual or monthly frequency. To the author's knowledge, no studies review the developments of the Bank's balance sheet from the Meiji era to postwar reconstruction using semiannual or monthly data.

(3) Historical Studies on the Japanese economy during the early Meiji era

Historical studies about the early Meiji era are beneficial for overviewing the balance sheet in the Bank's early years. The currency system and the economic developments between the Meiji Restoration and the Bank's creation in 1882 largely affected the Bank's

⁴ Specifically, the three items on the asset side are foreign currency assets, gold, and government debts, and the four items on the liability side are foreign currency liabilities, banknotes, bank deposits, and other deposits. Some data are not available due to a lack of historical materials.

balance sheet at the initial stage.

As historical materials necessary for overviewing the Bank's balance sheet in the early years, the several *Zaiseishi* (financial history) series by the Ministry of Finance (hereafter MOF) come first. These series describe the achievements of the Ministry across policy fields as well as periods, containing large volumes and providing a vast amount of information. ⁵ They describe fiscal policy, monetary policy, policy of financial administration, and currency policy before the creation of the Bank. Next, *Okurashoshi* (The history of the MOF), in MOF History Office (1998a, 1998b, 1998c), describes the administration system, policy decisions, and the background from the Meiji era to Showa era, based on the *Zaiseishi* series. These works are highly informative about circumstances around the Bank's balance sheet, even though that is not their main focus.

There are other earlier studies, such as Umemura and Nakamura (1983), which assess Japan's economic developments from the late Edo era to the early Meiji era using historical materials.⁶ There are also many historical materials, such as *MOF annual reports* (originally in 1875–97) reprinted in Hayashi (2001a), *A chronology of the reserve fund* (originally in 1890) in MOF (1932a), and *A summary of monetary reform for the gold standard in 1897* in MOF (1932c) originally released in 1899.

(4) English-language studies on Japan's financial history

The Japanese version of this paper mostly uses materials in the Japanese-language, because most materials about the Bank's balance sheet are in Japanese, and materials in English are limited. This English version additionally considers two types of studies in the English-language, despite possible selection basis, to provide a better understanding for non-Japanese readers.

The first type consists of recent English-language studies about Japan's financial history. They include Ericson (2019), Hoshi and Kashyap (2001), Goldsmith (1983), and Patrick

⁵ The volumes of *Meiji zaiseishi* for 1868–1910 placed side-by-side occupy about 0.8 meters in length. The volumes of *Meiji Taisho zaiseishi* for 1868–1926 occupy 1.3 meters, and the volumes of the three sets of *Showa zaiseishi* for 1926–45, 1945–52, and 1952–73 (edited separately) occupy 0.8–0.9 meters. Clearly, these series contain many pages and much valuable information. Among them, we use *Meiji zaiseishi* vol. 1, 3, 9, 11–15 in Meiji zaiseishi hensankai (1904a, 1904b, 1904c, 1905a, 1905b, 1905c, 1905d, 1905e) mainly edited by the then administrative vice-minister of Finance, *Showa zaiseishi* 1926–45 vol. 4 and 11 in MOF History Office (1955, 1957), and *Showa zaiseishi* 1945–52, vol. 19 in MOF History Office (1978).

⁶ Asakura and Nishiyama (1974) construct the series of money supply in 1868–1970, a period of about one hundred years, using a wide range of historical materials. Yamamoto (1994) analyzes the currency system from the late Edo era to the early Meiji era. There are also other recent works, such as Muroyama (2014), positively assessing Matsukata's macroeconomic policy, Adachi (2006), emphasizing the importance of policy regime changes, and Nakamura (2015), reviewing political developments and narratives of key persons behind Japan's economic developments.

(1967), as well as Reischauer and Craig (1978) about Japan's general history. English versions of Japanese studies, such as Tamaki (1995), Nakamura (1994), BOJ Statistics Department (1966a, 1966b), and MOF History Office (2010), are similar.

The second type consists of older studies in the English language. There are works by Japanese authors, such as Matsukata (1899, 1901), Department of Finance (1890, 1906, 1914, 1940), which was the English name for the MOF in the past, and BOJ (1915, 1923, 1941, 1949, 1950). They describe the economic and financial conditions of their time. There are also works by U.S. authorities, such as National Monetary Commission (1911), Bratter (1931) in the U.S. Department of Commerce, and Cohen (1949) in the U.S. forces in occupied Japan. These studies explain Japan's financial conditions and institutions of the time on the basis of overseas recognition.

3. Data and items for reassembly

This section first explains materials for reassembling data semiannually in 1882–1955 and monthly in 1897–1955, and then explains a method to combine items to create time series data covering as long a term as possible.

(1) Semiannual data by the staff of the Bank's Centennial Committee

BOJ Centennial Committee, the author of the Bank's Centennial History, provides the Bank's balance sheet data from December 1882 to March 1983 on an annual frequency in BOJ Centennial Committee (1986b). Most studies use this data, for end-December in 1882–1942, end-September in 1943, and end-March from 1944. At the same time, BOJ Centennial Committee (1986b), p. 307 explains the omission of data ending at the first half year, owing to a page limitation. After repeated searches over the vast records in the BOJ Archives, the author found a record where the staff of the Bank's Centennial Committee compiled the semiannual data of total assets and major items in 1882–1983.⁷ Hereafter, we refer to those staff as the "Centennial staff" and the record as the "Centennial staff record." The Centennial staff record contains data for end-June in 1883–1943, and end-September in 1944–1982 additionally. The semiannual data match the annual data (on calendar year or fiscal year) in BOJ Centennial Committee (1986b).

⁷ "Nihon ginko taishaku taishohyo (the Bank's balance sheet)", in the BOJ Archives "Nihon ginko hyakunenshi fuzoku toukeihyo saishugenko 1" No. 80901 (hereafter, "No." after a title indicates a reference number of the BOJ Archives linked to a folder containing the record). This material was created in 1986, the same year of BOJ Centennial Committee (1986b), although it shows no specific year. There are also other records ("Nihonginko hyakunenshi fuzoku toukeihyo saishugenko 2" No. 80902, "Nihonginko hyakunensi dai 7 kan shiryohen kyuyobi toukeihyo" No. 80878) providing the same data. These folders are available in the reference list of the BOJ archives from 2013.

These semiannual data probably come from the Bank's account settlements reports, like annual data in BOJ Centennial Committee (1986b). The Bank's account settlements⁸ provide more detailed items in some periods than the items of semiannual data by the Centennial staff. For example, the semiannual report at the end of 1910 provides more items (21 on the asset side and 17 on the liability side)⁹ than the items (14 on the asset side and 12 on the liability side) in BOJ Centennial Committee (1986b). Meanwhile, the balance sheet items were less detailed in some periods. For example, the account settlement reports in the Pacific War provide only 7 items on the asset side and 7 on the liability side. Under such circumstances, a simple collection of data from all account settlements from 1882 would make items disconnected over years. If we simply connected these data without combining detailed items into a broader item level, we would have to recalculate data at detailed items in the 1940s using many and various internal ledgers. This would be prohibitively time consuming.¹⁰ Fortunately, the items in BOJ Centennial Committee (1986b) remain stable even in the Pacific War, because the Centennial staff provide data on detailed items using internal sources.¹¹ Accordingly, the number of items available in a longer time frame is larger in the semiannual data by the Centennial staff than the data from account settlement reports in 1882–1955.¹²

To review the developments of semiannual data over a longer period, or to compare the data in different periods, we should adjust the variation of price levels across periods. A simple method plausible for the adjustment is taking the ratio to GNP, that is, the ratio of the balance sheet data divided by nominal GNP at the time. However, a series of historical

⁸ BOJ Research Department (1956a, 1956b, 1957, 1958) reprint the report on account settlements in 1882–1925. BOJ Research Department (1963, 1978) also reprints the settlement of accounts in 1926–45 and in 1945–56, respectively.

⁹ BOJ Research Department (1956b), pp. 222–223.

¹⁰ Hirayama (2021), p. 14 quotes the daily data of the Bank's shareholding, using a ledger of the Bank's head office in the BOJ archives (*"Sokanjo motocho showa 20 nendo 1/2* [The general ledger in 1945 part 1]," No. 21658). However, the data of total assets and breakdown items require huge calculations over all items in the head office and all branches, using many ledgers and other materials. Under a shortage of materials in 1944–45 and after trials, we regard the recompilation of item data from ledgers as prohibitive.

¹¹ For example, the item "Bullion" is not available from the account settlements report in 1942 at BOJ Research Department (1963), p. 877, which uses the item "Cash and bullion." Meanwhile, BOJ Centennial Committee (1986b) shows the items "Gold," "Other bullion" and "Cash" separately, using internal material from the time. It remains unknown how they disaggregated data during the Pacific War. ¹² Semiannual data by the Centennial staff may not be perfect. For example, they keep the detailed level item "Consigned funds for fractional government paper money" on the liability side, but combine the parallel item "Reserve for fractional government paper money" on the asset side with "Others," a broader item. We could modify this, like BOJ Research Department (1956b), pp. 631–692, which displays both items discretely, but we use data by the Centennial staff, considering the small room for data improvement.

nominal GNP from the Meiji era to postwar reconstruction entails two challenges.

One challenge is the annual frequency that is only available in historical GNP series. During World War I in 1914–19 and the 1940s, high inflation occurred, and the Bank's total assets soared semiannually. When comparing these semiannual values, ideally, nominal GNP should be quarterly data of seasonally adjusted annual rates, based on quarterly GNP data with no adjustment. However, quarterly GNP data was not available until April–June 1951, and nominal GNP until 1950 is only available at an annual frequency, either the calendar year or fiscal year. Instead, this paper uses annualized quarterly rates using a simple method of linear interpolation. Although this method fails to adjust for cyclical factors, the adjusted quarterly data do not appear to cause any critical problems in capturing the relative size of the balance sheet for comparison across years. Please see the appendix for details.

The other challenge is the less precise nature of historical GNP estimates than the National Accounts at present. To assess the severity of this challenge, we compare ratios of the Bank's balance sheet to nominal GNP using two series of historical GNP. The two series are mainly from Ohkawa, Takamatsu, and Yamamoto (1974) or Fukao, Nakamura, and Nakabayashi (2017a, 2017b, 2018). In the appendix, we compare the two series and assess that the historical GNP series of Ohkawa, Takamatsu, and Yamamoto (1974) are sufficient to review the variation and trends of the balance sheet. We then use the former series.

(2) Monthly data of "Bank of Japan Accounts" and "Weekly business reports"

Next, this subsection explains the method used to reassemble monthly data of the Bank's balance sheet. Regarding monthly data in 1945–55, total assets and items are available from "Bank of Japan Accounts" directly. The data of these accounts in 1948–55 is contained in the Bank's *Honpo keizai tokei* (Economic Statistics of Japan), and the data in 1945–47 are available at MOF History Office (1978) on the same basis.¹³

As monthly data in 1897–1944, the paper uses the value of a mid-month week (or the week ending on a day between the 11th and 20th of a month) available at "*Eigyo maishu hokoku* (Weekly business report)" of the time. This source, occasionally changing its name slightly to *Eigyo shuho* (Weekly statement of condition) or a similar name, showed total assets and major items every week from 1897 to mid-1945.¹⁴ However, these values are

¹³ Total assets in July and August 1945 are available only in MOF and BOJ (1948), pp. 352–353. The data for the other months in 1945 are available in MOF History Office (1978), pp. 476–477. The data from 1955 are available in the Bank's statistics periodicals (such as *Honpo keizai tokei*, *Keizai toukei nenpo* and *Nihon ginko tokei* that all mean Economic Statistics of Japan).

¹⁴ "Weekly business report" releases data on the Bank's total assets and items from January 9, 1897, to July 21, 1945. For July and August 1945, "Monthly business report" releases the end-month values.

on an end-of-week basis and are not identical to values at the end of the month. Among the 4–5 weeks in a month, it is not obvious which week is the best proxy for the month. In this regard, the contemporary publication of statistics, "*Toyo keizai nenkan* (Toyo keizai economic annual)" issued in 1918–44 chooses a mid-week value ending on a month's 11–20th day as the monthly reference data in the previous year. Following this manner, we consider the mid-month weekly value as the monthly representative.¹⁵ As the source of data ending at a mid-month week, we use Toyo keizai (1918–44) for data in 1917–43, and the issues of *Toyo keizai* weekly magazine in 1897–1916 and 1944 when these economic annuals were not available.¹⁶

In addition, we also check other historical materials that possibly contain monthly data, such as the Bank's *Honpo keizai tokei* (Economic Statistics of Japan) before 1945 and *Nihon kinyushi shiryo showa hen* (Materials on Japanese financial history 1926–45). "Bank of Japan's Account" in these materials did not provide total assets up to 1944.¹⁷ Despite the author's repeated search in the BOJ Archives, the author was unable to find records containing a historical monthly series of the Bank's total assets.¹⁸

From September 10, 1945, "Bank of Japan Account (Every ten days)" releases values of total assets and major items of the Bank's balance sheet three times a month, on an end-of-ten-days basis.

¹⁵ In comparison to values in "Bank of Japan account" on an end-of-month basis, a value of the lateweek ending between the 21st and 31st day of a month might be closer to the end-of-month value. But we consider the consistency with the contemporary "*Toyo keizai*" publication to be more important.

¹⁶ "*Toyo keizai shinpo*" issues 2109–2159 (from February 12, 1944 to February 10, 1945) are the source for data in 1944, and issues 43–766 (from January 25, 1897 to January 15, 1917) for data in 1897–1916. They show total assets and items on an end-of-week basis. When "*Toyo keizai shinpo*" is insufficient (such as issue 502 from mid-October, 1909), other magazines from the same period are the sources. For example, "*Tokyo keizai zasshi* (Tokyo economic magazine)" by Keizai zasshisha, issue 1513 from mid-October 1909, and "*Ginko tsushinroku* (The bankers' magazine)" by Tokyo ginko shukaijo, issue 289 from November 15, 1909, are available. In addition, the author compares the sum of items on the asset side or the liability side with total assets and corrected any obvious errors due to misprints.

¹⁷ Up to 1944, the series of "Materials on Japanese financial history 1926–45" provides various statistics over all 35 volumes, issued by BOJ Research Department. BOJ Research Department (1974) provides an index for these statistics, such as the name, period, volume, and page of the data concerning the Bank's account over the volumes, but the author is unable to find data on total assets. For example, BOJ Research Department (1964), containing the Bank's Monthly bulletin, provides major items from October 1926 to November 1945, but does not provide total assets or complete items on both sides that would enable the calculation of total assets.

¹⁸ For example, the record at BOJ archives "*Kinyu yoryaku* 77 (financial summary in the second half 1944)" No. 14322, does not contain data on the Bank's balance sheet every month, even though it widely contains major financial indicators. Also, the record at BOJ archives "*Sokanjo tsukibetu heikin zandaka ichiranhyo* (A summary table of monthly data in the balance sheet items)" No. 49162 contains data of major items but does not provide total assets or complete items that would enable the calculation of total assets.

(3) Reassembling semiannual and monthly data across items

Both semiannual and monthly data have advantages. Semiannual data are based on account settlements, certified by auditors, and arranged consecutively at item level.¹⁹ Monthly data are based on official releases and capture variations over the course of a month, but may not be consecutive at item level in some periods. In this regard, we reassemble data on item level following a method explained later, so that monthly data become consecutive for a longer period and we are able to analyze both semiannual and monthly data simultaneously.

The numbers of semiannual data items in 1882–1955 are 14 on the asset side and 12 on the liability side (Table 1, left column of each side). Meanwhile, monthly items in 1897–1955 (Table 2, left column) are less consecutive and cover a shorter period than semiannual items. Table 2 displays items and years, where each item (left column) of monthly data emerges, persists, disappears, or joins another item, using horizontal lines and arrows. For example, by horizontally browsing "Gold coin and bullion" on the asset side (Table 2, left column, the third row from the top), we find lines and arrows in 1929–41 and 1949–55 indicating the availability of items in these years (and no availability in the other years shown without lines or arrows). As another example, by browsing the column for 1897 vertically, we find non-blank cells indicating the availability of 10 items on the asset side and 6 items on the liability side in 1897 (while blank cells indicating no availability).

To obtain more monthly items for as long a time as possible, we should combine several items, instead of using the items shown in the materials. Table 2 shows that a large discontinuity occurs mainly in 1944–46. This indicates that if we combine detailed items into a broader (less detailed) item using this period as a base, we can obtain more consecutive data with a wider variety of items in other periods. We consider such combinations as a broader item level. The column for 1944–46 in Table 2 indicates that in 1944–46 there are seven monthly items available on the asset side (cash and bullion, agency account,²⁰ advances to the government, government and other bonds, advances in general, unpaid capital, ²¹ other assets) and five on the liability side (banknotes, government deposits, other deposits, other liabilities, capital subscribed). Among these

¹⁹ For historical materials explaining these items, see Tsuchiya (1956a) for 1882–1900, Tsuchiya (1956b) for 1901–1925, Tsuchiya (1963) for 1926–45, and Tsuchiya (1978) for 1945–1955.

²⁰ "Agency account" contains domestic agencies as well, but until 1946, the account mainly consists of foreign-currency denominated assets held by Yokohama Specie Bank as the government's overseas agency, and we combine the account with "foreign exchange asset." From 1947, we combine it into the item "assets to the government" after the closure of Yokohama Specie Bank.

²¹ When a subscriber paid a partial amount of capital, a firm's account section booked the unpaid amount to asset "unpaid capital," while the account section fully registered the gross amount of nominal capital to "capital subscribed" on the liability side.

items, we combine two items ("advances to the government" and "government and other bonds") into "assets to the government," similar to the composition in Nishikawa (1984). Then, we add items, "foreign exchange liabilities" (Table 2, the column on the right) and items at the Bank's early stage (redemption account for paper money²²) discretely. Consequently, there are seven items available on the asset side (cash and bullion, assets to the government, assets to the private sector, foreign exchange assets, bank premises etc., others, redemption account for paper money) and seven on the liability side (banknotes, liabilities to the government, liabilities to the private sector, foreign exchange liabilities, others, net worth, redemption account for paper money). Table 1 displays how we combine detailed items into a broader item level.²³

Both semiannual and monthly data are from the Bank's balance sheet and should be very similar. But both types of data on the same month of the same year are not necessarily identical, owing to the timing of each data series and the use of various materials.²⁴ Specifically, data until 1944 have different timings (timing at the end of a mid-month week or the end of a month) and possibly differ in terms of data quality (semiannual data from the account settlements or monthly data prior to account settlement).²⁵

4. The Bank's balance sheet in 1882–1955 and backgrounds

This section overviews the developments of the Bank's balance sheet, using semiannual data and monthly data that are reassembled using the method described above. First, we

²² "Redemption account for paper money" is the item for redeeming government paper money and paper money issued by national banks (see footnote 30 later).

²³ These items mainly coincide with the items in Nishikawa (1984), p.4 with additions. Specifically, they are 4 assets (gold, foreign currency, bills, and government bonds) and 4 liability items (banknotes, government deposits, private deposits, and net worth) with an additional 3 assets (premises etc., redemption account, and others) and 3 liability items (foreign exchange, redemption account, and others).

²⁴ For example, total assets in 1905–10 surged after the Bank received foreign currency funds from the government and deposited them at Yokohama Specie bank. The semiannual data booked this surge on the asset side to the item "foreign agency account" (or "foreign exchange asset" at a broader item level). But monthly data from June 1905 to April 1909 lack this item, and item "advances" (or "assets to the private sector") surged instead. To adjust this, we combine the monthly item "advances" from June 1905 to April 1909 with the item "foreign exchange assets" (and from May 1909 we combine "advances" with "assets to the private sector" again). See also Table 2.

²⁵ For example, let us consider the data of "banknotes" in December 1925. The value at the end of the second half of 1925, or the end of December 1925, is 1.63 billion yen. The value on December 12, the last day of a mid-December week, is 1.21 billion yen. The value on December 26, the last day of the late-December week is 1.50 billion yen. The value on the last day of the late-month week is close to the value on the last day of the month, as in footnote 15. But the values are not necessarily equal. Considering consistency with the records at the time, we consider the value of a mid-month week as a better proxy for monthly data than the value of the late-month week.

review the balance sheet relative to nominal GNP for about 70 years. Next, we assess the developments of the semiannual and monthly balance sheets across nine periods discretely. Lastly, we look for common characteristics over the periods and consider the gaps between the historical balance sheet and the current one.

(1) The Bank's balance sheet over all periods (to nominal GNP semiannually)

Figure 1 shows the Bank's balance sheet (total assets and items) relative to GNP semiannually, with the periods of the Bank's Centennial History (Figure 1, a–i).²⁶ For the nominal GNP series as a denominator, we mainly use Ohkawa, Takamatsu, and Yamamoto (1974) following major statistics publications, such as Statistics Bureau (1988) and Japan Statistical Association and Statistics Bureau (2007).

Among the developments in 1882–1955 (Figure 1), total assets remained in the 0–5 percent range at the founding of the Bank in 1882–84, then increased rapidly after the banknote issuance from 1885, and was at the 10 percent level in the early 1890s. Then, total assets generally remained in a seemingly settled range except at the end of the Pacific War and at the peak of the postwar reconstruction. Among the period extending about 70 years, total assets remained in approximately the 10–15 percent range for about 40 years (in 1886–95, 1898–1904, 1912–14, 1925–26, 1929, 1932–40, and 1948–55). We could consider the 10–15 percent level as the peacetime level of total assets.

The increase in 1896–97 reflects the receipt of indemnity after the Sino-Japanese War (August 1894–April 1895) and the withdrawal by the government. The rise in 1905–10 is owed to the issuance and refinancing of foreign debt during and after the Russo-Japanese War (February 1904–September 1905). The high level in 1942–48 is owed to the Pacific War and the postwar reconstruction, including the peak of 48 percent in September 1945, although an estimate of nominal GNP in 1945 may be debatable (see the appendix). Total assets in 1918–24 were also relatively high, at 18–19 percent, reflecting the surge in external demand during World War I. Meanwhile, total assets during the Showa financial panic in 1927 increased mildly, rather than sharply.

The following is the development of each item. On the asset side, "cash and bullion" moves at 4–8 percent in 1887–1930, declining to 2–4 percent in 1931 under the return to

²⁶ "The Banks' Centennial History" splits years in 1882–1982 into the following 12 periods (lower case letters added for convenience): a. until 1882 (before the Bank's founding), b. 1882–96 (the early period), c. 1897–1913 (adoption of gold standard), d. 1914–19 (World War I), e. 1920–28 (the economy after World War I seeking for the return to gold standard), f. 1928–31 (the return to gold standard under the global depression), g. 1932–36 (toward a managed float), h. 1936–45 (from Feb. 26 incident to the Pacific War), i. 1945–52 (the postwar reconstruction), j. 1953–59 (return to ordinary monetary policy), k. 1960–70 (monetary policy in a high growth era), and l. 1971–82 (monetary policy under a free float). This paper covers the periods in a–i.

the gold standard, then diminishing toward the end of the Pacific War in 1945. "Foreign exchange assets" were at a low level in some years (roughly 1–3 percent in 1885–1904, and 1925–42) and at a high level in other years (in 1905–10, 1916–22, and 1944–46), with a 15 percent level at the peak. The high levels occurred due to foreign debt issuance, an accumulative trade surplus, and the temporary financing of wartime expenses in the overseas territories and occupation areas.²⁷ "Assets to the government," including government bonds, were at a higher level of 5–10 percent in the Meiji era, then at a lower level of 2–4 percent in 1914–31, and surged in wartime. This item was at a level of 10–14 percent in 1941–49 from the Pacific War to the postwar reconstruction, and at a level of 10 percent or higher in 1896–97 after the Sino-Japanese War. "Assets to the private sector," mainly "bills discounted" in peacetime, were at a lower level of 1–3 percent. But reflecting various policy responses, it increased to a higher level of 5 percent in 1927–32, and a level of 5–20 percent range in 1944–47.

On the liability side, "banknotes" are generally stable, in the 8–12 percent range, except when they were at a low level at the Bank's founding and a high level up to about 30 percent near the end of the Pacific War. "Liabilities to the government," including government deposits, generally remained at a low level close to zero percent, but occasionally increased to 7–15 percent, reflecting the higher total assets in wartime and larger external demands.²⁸ Other liability items remain small both in terms of level and variation.

Meanwhile, we assess the precision of the ratios to GNP in the balance sheet, by checking their sensitivity. First, Figure 2(1) shows two ratios of the same total assets to different nominal GNPs. The ratio using Ohkawa, Takamatsu, and Yamamoto (1974) is 1 percentage point higher on average than the ratio using Fukao, Nakamura, and Nakabayashi (2017a), and 2–3 percentage points higher in some years (in 1886–91, 1906–07, 1932–35).²⁹ Figure 3 depicts two GNP series for comparison, where the series in

²⁷ During the Pacific War, the Bank temporarily financed government expenditures in overseas territories and occupation areas that should have been solely financed by the government. See footnote 69 for details.

²⁸ Among the rises on the liability side, the rise in 1896–97 was due to the indemnity after the Sino-Japanese War, and the rise in 1905–10 was due to receipts of foreign debt from the Russo-Japanese War. The rise in 1918–24 was due to the government's accumulation of foreign currency (booked as foreign exchange assets and government liabilities on the other side) during World War I. The rise in 1945–46 was due to the government deposits associated with wartime expenses. See Tsuchiya (1956a), pp. 73–76, and Tsuchiya (1956b), pp. 55–58.

²⁹ The discrepancy of 3–5 percentage points between the two ratios in 1946–47 was mainly due to the linear interpolation of quarterly values from different annual data, either data of fiscal year from Ohkawa, Takamatsu, and Yamamoto (1974) or calendar year from Fukao, Nakamura, and Nakabayashi (2018), p. 282. However, both use the national accounts, the former using *Kokumin shotoku hakusho*

Fukao, Nakamura, and Nakabayashi (2017a) is always high. At the same time, the difference between the two series in Figure 2(1) may be sufficiently small for assessing the trends and sizes of the series. Therefore, the paper mainly uses Okawa, Takamatsu, and Yamamoto (1974) for analysis.

Next, we compare solid semiannual data with speedy monthly data prior to account settlements. Figure 2(2) depicts the ratios of total assets to nominal GNP at monthly and semiannual frequencies, indicating that the monthly ratio is lower, at 1 percentage point, on average than the semiannual ratio, and at 2 percentage points in some years (in 1925–26, 1935–37). This bias may come from the composition of monthly data. The mid-month weekly data as a proxy for monthly data until 1944 may fail to capture a month-end increase in banknotes. But the difference between monthly and semiannual ratios to GNP is small. We assess that both series are sufficient to describe the developments of the Bank's balance sheet.

(2) The Bank's balance sheet in each period

In the following subsections, we review each period, divided in line with the Bank's Centennial History. Considering the economic and financial framework in the early Meiji era and its effect on the Bank, we also review data before the Bank's founding, such as government paper money and national bank notes.

a. Until 1882 (before the Bank's founding)

In 1873–82, government paper money was the primary currency. There were also silver coins for settling international trade and gold coins legally backing government paper money. But these specie coins accounted for only about 20 percent of total money issuance including government paper money. The issuance of national bank notes³⁰ was also small before the amendment of the National Bank Act (August 1876), which made national bank notes inconvertible to specie in reality (Figure 4).³¹

⁽A white paper on national income), Economic Planning Agency, 1962, and the latter using *Nihon keizai* to kokumin shotoku (Japanese economy and national income), Economic Council Agency, 1954.

³⁰ The formal name in Japanese, "*kokuritsu ginko shihei*," literally means "national banks' paper money," but the author mainly uses "national bank notes" as it is a plainer term. At the same time, the author mainly uses the term "government paper money" after Patrick (1967), pp. 252–257, because "paper money" is easier to understand than "notes," a term which has multiple meanings.

³¹ Specifically, there were government paper money (78 million yen), specie (47 million yen), subsidiary coins (13 million yen), domain notes (19 million yen), and national bank notes (1 million yen) in circulation at the end-1873 (Umemura and Nakamura (1983), p. 32). Before the amendment of the National Bank Act, national banks were obliged to exchange issued banknotes with specie and to reserve specie equivalent to two-thirds of issued banknotes. After the amendment, their obligation to reserve specie was removed, and they became obliged to reserve government paper money equivalent to 25 percent of issued national bank notes (BOJ Centennial Committee (1982), pp. 16–31, 56–62).

Government paper money was inconvertible in reality and was fiat money based on government credibility. The first government paper money (*dajokan satsu* by the Cabinet) was aimed at loans to promote industries. But half of the issuance was used to finance budget deficits in reality, depreciating the value of paper money to less than the value of specie (Yamamoto (1994), pp.15–17). Other government paper money was also fiat money, with a few exceptions.³² There was "the reserve fund³³" (a kind of special account) with the main purpose of making government paper money convertible. However, the reserve fund did not fully back the convertibility, because the fund had other purposes, such as buying back government bonds, producing munitions, and promoting industries.

Figures 4 and 5 show the developments of government paper money and national bank notes, and the reserve fund for backing the paper money, respectively. The issuance of government paper money was for two purposes, money for circulation and money for temporary financing. The latter purpose was to fulfill a temporary shortage of government revenue. The government was supposed to soon redeem such paper money from circulation, but some of it remained in circulation. In 1873–77, the amount of government paper money for circulation was 65–90 million yen, and the amount for temporary finance was 0–10 million yen. Meanwhile, the reserve fund amounted to 20–40 million yen, and the amount of specie, including gold coins in the reserve funds, was 15–20 million yen, smaller than the amount of government paper money. The tax system was under reform,³⁴ and policy measures were too immature to separate between the monetary front and fiscal front.³⁵ The government issued different types of paper money repeatedly and the reliance on fiat money for revenue persisted (Umemura and Nakamura (1983), p. 14).

Nevertheless, in 1873–76, one-yen notes of government paper money in circulation were generally exchanged for 1-yen silver coins at parity (Figure 6). Against this background,

 $^{^{32}}$ Two exceptions were the treasury notes and the notes of the Hokkaido cultivation commission, both of which were convertible with gold. But their issuance was small, peaking at 9.3 million yen (14 % of government paper money) in 1872 and then declining to zero in 1875.

³³ The reserve fund began to be accrued in 1869. The initial source was an arbitrage profit. Kaoru Inoue (then working at the Department of Finance) recalled the situation when *nibu* gold coins worth 100 yen in nominal evaluation were once worth 107 yen as gold bullion overseas, and the holders of *nibu* gold coins in rural areas felt that government paper money was credible. The government took this opportunity (Sawada (1995) pp. 298–304, 334–340, originally published in 1921).

³⁴ The land tax, which replaced the tribute tax of the former feudal government, was administered differently in each region, and the completion of the new land tax reform (in 1873–81) took time (MOF History Office (1998a), pp. 85–94).

³⁵ The chapters about "government paper money" in the MOF's annual reports were reprinted in Hayashi (2001b, 2001c). They contain explanations of that time, such that "paper money" comprises a large part of government bonds in Hayashi (2001b), p. 24 (covering fiscal 1875–76). The chapter about government bonds also describes government paper money in Hayashi (2001c), pp. 34–36 (covering fiscal 1877–78).

tax was becoming the primary revenue source and generally covered government expenses from around 1875. These conditions were unlike those in 1868–69, when the issuance of government paper money was a primary revenue source. The development of the general government's revenue and expenditure shows that expenditure increased in 1872–75 because of the succession of the burden on the feudal government, such as stipends for the former samurai class (Figure 7).³⁶ The expenditure then declined in 1876–77 because the government abolished the consecutive payment of stipends and compensated for it with a lump-sum payment of government bonds.³⁷ Among the revenues in 1868–72, tax revenue was insufficient to cover expenditure, and the revenue from paper money issuance, government bonds, and government borrowing was also necessary. However, in 1873–75, the level of tax revenue was becoming the same as that of expenditures, reflecting the progress of the new land tax reform.³⁸ In short, the government achieved a balanced budget by about 1875, as Omori (2001) argues.

However, extraordinary expenditures for suppressing the south-western rebellion surged (March–September 1877), then overall government expenditure exceeded tax revenues, and revenue from paper money issuance surged again (Figure 4). Accordingly, the trading rate (for domestic transactions) of one yen in paper money for one yen in silver coin remained stronger for more than three years after the war (Figure 6), as silver appreciated and paper money depreciated. Domestic prices also surged in 1878–81, as shown by a doubling of the rice price and a 10–30 percent increase in wholesale prices. The economy grew under the policy of promoting industries, but a trade deficit caused paper money to depreciate and silver coin to appreciate (Figures 6 and 8).

On the monetary front, in 1878–81, the amount of government paper money increased in early 1878 from about 100 million to 140 million,³⁹ and then slightly decreased to 120

³⁶ Omori (2001) shows developments of the primary balance (expenditures excluding government bond expenditures - taxes and other ordinary revenues) in addition to the fiscal balance (expenditures - taxes and other ordinary revenues) in the early Meiji era, and then reviews the reforms of the time, such as the commutation of feudal stipends.

³⁷ Government expenditures decreased in 1869 after a complete victory over eastern feudal remnants, but then largely increased in 1872, mainly due to a start of the hereditary pension stipend for the samurai and noble classes, as well as debt consolidations for feudal lords and military buildups. To reduce this burden, the government first asked volunteers to exchange their stipends for voluntarily capitalized pension bonds in 1874. Then it terminated the remaining stipends as a feudal system and instead gave all recipients hereditary pension bonds in 1876–77, thereby reducing expenditures instead of allowing a surge in government debts. General expenditures declined in both 1875–76 and 1877–78, except for extraordinary expenditures for suppressing the south-western rebellion. But in later years general expenditures increased again.

³⁸ Muroyama (2004), p. 49 points out that a higher rice price at that time (Figure 6) reduced the tax burden on farmers, thereby helping them to agree to the new land tax reform.

³⁹ To finance wartime expenses of 42 million yen for suppressing the south-western rebellion, the

million yen in 1879–81 (Figure 4). The reserve fund increased to 50 million yen in mid-1878, but the level of specie in the fund remained at around 15 million yen, about 10 percent of the 140 million yen in government paper money (Figure 5). As a backdrop, the government in 1878–81 was under the strong influence of Shigenobu Okuma,⁴⁰ who had served for a long time as finance minister. He tried to reduce government paper money in circulation (by reducing issuance and increasing withdrawal) to tame inflation under the weak paper money and strong silver coin.⁴¹ But, under the south-western rebellion and excess imports with solid economic growth, the inflation and weaker paper money persisted under declining specie. Under such circumstances, the government established the Bank of Japan in 1882. The Bank was to conduct treasury services, such as receipt of national revenues (entrustment of the treasury business), to facilitate monetary circulation throughout the nation (discount bills and opening correspondence networks), and to fortify conditions for issuing convertible banknotes after specie accumulation and import reduction (BOJ Centennial Committee (1983a), pp. 119–140, MOF History Office (1998a), pp. 183–188, Ericson (2019), pp. 88–111).

b. 1882–96 (the early period)

In 1882–96, the Bank's balance sheet shows different trends between ratios to GNP and nominal values, such as ratios to GNP levelling off around 1889 and nominal values increasing owing to inflation (Figure 9). Under such circumstances, ratios to GNP are better indicators of the balance sheet size. Considering its developments, we divide ratios to GNP into three subperiods: 1882–84 before banknote issuance, 1885–89 after the issuance and growing total assets, and 1890–96 with stability. The details of subperiods are as follows.

b-1. 1882-84

Masayoshi Matsukata became the new finance minister after the political upheaval on October 1881 (the Crisis of 1881).⁴² In 1882–84, he adopted policies to improve fiscal

government increased paper money issuance and borrowed from the Fifteenth National Bank, which issued 15 million yen of national bank notes for the loan (BOJ Centennial Committee (1983a), p. 56).

⁴⁰ Shigenobu Okuma worked as the finance minister from October 1873 to February 1880. He remained as a senior counselor for finance until October 1881, proposing foreign loans for increasing specie. But the political crisis of 1881 in October ousted him from the government (Muroyama (2005), pp. 142–159, MOF History Office (1998b), p.451).

⁴¹ The specie at the time was mainly silver, and yen currency was de-facto convertible to silver. From 1878, the exchange rate of paper money to silver became volatile, under speculative trades for the weaker paper money and stronger silver (MOF History Office (1998a), p.132).

⁴² Okuma proposed a policy to enhance specie reserves by foreign loan issuance in May 1880. However, other political issues (preparation for the constitution, movement for the parliament, and fire sale of government properties in Hokkaido, a northern district) sharpened the disagreement within the

balance (such as tax increases and military expenditure reduction⁴³) and trade balance (export promotions of silk, tea, and surplus rice for emergencies as well as import restraints), for accumulating specie reserves using foreign bills of exchanges in exports.⁴⁴ Despite improvements of trade balances and a slowdown of high inflation, government paper money remained weak against silver coin, and the government was unable to issue convertible banknotes (Figures 6 and 8). The government then recognized that if the Bank were to issue convertible banknotes at this timing, banknotes would never be in circulation because people would rapidly exchange these banknotes for either silver coin for hoarding or for government money for payment.

The Bank's balance sheet, before the banknotes issuance, had limited amounts of credit to the government and private sector (such as bond purchases and discount bills), and the ratio of total assets to GNP was less than 5 percent. Among the items, the redemption account for paper money was large, reflecting the government's entrustment of redeeming national bank notes to the Bank from 1883. Specifically, the Bank received the funds in government paper money and national bank notes from the national banks, and it booked them to the liability item (redemption account). Then, using the funds, the Bank purchased government bonds and booked them to the asset item (redemption account), to redeem them gradually with the bond interests and the contributions from national banks.⁴⁵ However, compared to the amount of about 30 million yen in 1885 as the issuance of national bank notes, the size of the redemption account was just 8 million yen, indicating a slow pace of redemption at about 0.4 million yen semiannual and 8 million yen for ten years (Figure 10).⁴⁶

government and caused the Crisis of 1881. Other leaders dismissed Okuma from the government. Matsukata then rejected Okuma's plan for foreign debt issuance, preferring independence from foreign capital.

⁴³ As a friend of military leaders from the same province (*Satsuma*) as himself, Matsukata considered the importance of enhancing armaments. Meanwhile, he also partly restrained military expenditures and promoted retrenchments for redeeming government paper money, considering that an imperfect redemption would make the military enhancement unsustainable (Muroyama (2005), pp. 161–220).

⁴⁴ In the framework using foreign bills of exchange, exporters were to receive loans from the government funds in paper money and to repay in specie. MOF History Office (1998a), pp. 175–178.

⁴⁵ The government revised the National Bank Act in May 1883, allowing national banks to continue their banking business on the expiration of charters (twenty years) as joint-stock ordinary banks without note-issue privileges, and deciding to redeem all national bank notes by their expiration. This revision derived functions of issuing bank notes to solely concentrate on the Bank of Japan (BOJ Centennial Committee (1983a), p.295).

⁴⁶ Regarding the redemption of national bank notes by the Bank of Japan, see BOJ Centennial Committee (1983a), pp. 295–304, BOJ Centennial Committee (1983b), pp. 11–14, Tsuchiya (1956a), pp. 33–34, Meiji zaiseishi hensankai (1905c), pp. 502–517. Meiji zaiseishi hensankai (1904a, 1904c, 1905a, 1905b, 1905c, 1905d, 1905e) also describe details about the redemption of government paper money and national bank notes.

b-2. 1885–89

In 1885, trade deficits disappeared, specie reserve increased, and a decrease of government paper money in circulation helped to bring its value to be on par with silver, thereby improving the situation for the Bank to issue convertible banknotes. The Bank started to issue Bank of Japan notes in May 1885 and then exchanged government paper money for silver coins from January 1886. Among the requests to the Bank for exchanging government paper money, fortunately, only 10 percent of the requests demanded silver coins, and 90 percent accepted an exchange with Bank of Japan notes, which were both handy and silver convertible.⁴⁷ The Bank exchanged government paper money for silver coins (in the reserve fund) accumulated by the government.⁴⁸ The Bank kept silver coins as the specie reserve, and the government erased the withdrawn paper money (MOF History Office (1998b), pp. 179–180). In 1885–89, both the redemption of government paper money and issuance of Bank of Japan notes progressed steadily (Figure 4).

Under such circumstances, on the liability side, the ratio of banknotes to GNP increased to 7 percent by December 1888, and liabilities to the government (treasury funds) also increased due to the entrustment of treasury transactions (Figure 9).⁴⁹ On the asset side, cash and bullion (government paper money, specie), assets to the government (bonds), and assets to the private sector (discount bills) increased.

b-3. 1890-96

The government paper money issued was about 50 million yen in March 1889, significantly decreasing from the peak but considerably higher than the 16 million yen of the specie reserve (Figures 4 and 5). Then, in 1890, the government established the Special Account for the entire redemption of paper money, thereby merging the reserve funds with this account. The government received 22 million yen in a no-interest loan for paper money redemption, and in return, the government permitted the Bank to issue convertible bank notes within a limit of 85 million yen (MOF History Office (1998a), p. 180, BOJ

⁴⁷ As the background to smooth exchange, MOF History Office (1998a), p. 179 indicates three points: the rate of paper money on par with silver coin, the handy usage of paper currency accepted by the public, and the government credibility restored.

⁴⁸ To receive the collected government paper money for exchange, the government gave the Bank mostly government bonds in fiscal 1884, half silver coins and half government bonds in fiscal 1885, and mostly silver coins in fiscal 1886, according to the MOF annual reports printed in Hayashi (2001d), p. 71, and Hayashi (2001e), p. 89. From 1894, the government gave Bank of Japan notes to the Bank, in exchange for the collected government paper money (Hayashi (2001f), pp. 140–144).

⁴⁹ In 1886–90, as the entrusted agent of the treasury, the Bank receive treasury funds and recorded them as government deposits on the liability side. Later in 1890–1922, the treasury funds were separated from the Bank's balance sheet, reflecting the alteration of the framework, such that the Bank managed the treasury funds under a separate account. BOJ Centennial Committee (1982), pp. 269–272, BOJ Centennial Committee (1986b), p. 275.

Centennial Committee (1982), pp. 316–324).

As a result, the withdrawal of government paper money in exchange for Bank of Japan notes progressed further. Both the amount of specie reserve and its ratio to the total of paper money were on an uptrend (Figure 10), reflecting this withdrawal and exchange. Meanwhile, the time was not ripe for stopping the use of government paper money quickly, in light of the specie reserve in 1890–94. An acceleration of the withdrawal of government paper money would have possibly caused a rapid decline in specie reserve, thereby limiting banknote issuance.⁵⁰ In 1895, however, the government was to receive the Chinese indemnity after the Sino-Japanese War. This helped the government to prepare for the gold standard (effective from January 1897). Accordingly, with the new law promulgated in June 1898, the government was able to cease the entire circulation of government paper money by the end of 1899 (BOJ Centennial Committee (1983a), p. 13). Meanwhile, the redemption of national bank notes was at a slower pace, and the remaining issuance was 26 million yen at the beginning of 1890 and 16 million yen at the end of 1896, at the initial deadline of the business term with the privilege of banknote issuance (Figure 10). Then, after the law of the settlement of national banks on the expiration of their business term was promulgated in March 1896, the government was able to ask the Bank to provide noninterest-bearing loans to national banks that had fallen behind in redeeming their notes. Under the law, the task of redeeming national bank notes ended in 1899 (BOJ Centennial Committee (1983a), pp. 11–14).⁵¹

In this period, on the liability side, the ratio of banknotes to GNP increased from 7 to 10 percent or higher, and liabilities to the government decreased due to a change in the treasury system. On the asset side, assets to the government increased and cash and bullion decreased (by withdrawal of government paper money).

In 1896, temporary but significant developments occurred. The reception of indemnity after the Sino-Japanese War sharply increased the ratio of total assets to GNP to 27 percent or 450 million yen in nominal values. Among the items, cash and bullion and assets to the government mainly increased on the asset side, and liabilities to the government increased on the liability side. Assets to the government consisted of deposits of government funds at the Yokohama Specie Bank (Tsuchiya (1956a), p. 54). Meanwhile, the redemption

⁵⁰ Specifically, compared to the amount of specie reserve in 1893 (100 million yen, Figure 10), the sum of government paper money and national bank notes was considerable (40 million yen), where national bank notes were convertible to government paper money after the revised national bank regulation. It appears that the government avoided the risk of a sharp increase for requesting specie by hurrying to withdraw the remaining government paper money and national bank notes in circulation.

⁵¹ The balance of redemption account became zero after the Bank's loans to national banks were entirely repaid in 1905.

account largely declined in 1896–97 as the redemption of national bank notes proceeded.

c. 1897–1913 (from the gold standard to before World War I)

Monthly data become available from 1897, and we should assess the Bank's balance sheet with both semiannual and monthly data (Figure 11). Considering the developments of total assets, we split the period into two subperiods, 1897–1904 and 1905–13.

c-1. 1897-1904

After the aforementioned increase in 1896, the ratio of total assets to GNP in 1901 declined to 11 percent or 260 million yen in nominal values, reflecting the government's withdrawal of funds for military buildups and industrial promotions (MOF History Office (1998a), pp. 317–321). Among the items, the ratio of banknotes to GNP declined from 11 percent to 8 percent while the nominal GNP was increasing with inflation. Cash and bullion also declined from a peak in 1897.⁵² Meanwhile, assets to the private sector (mainly discount bills) remained at a high level in 1900 (3–4 percent ratio to GNP or 70–100 million yen), but started to decline in 1901 and remained low after that.

Next, monthly data show the developments at shorter intervals, such as the financial panic of spring 1898 and the banking panic of spring 1901.⁵³ In the financial panic of 1898, assets to the private sector and liabilities to the government increased for five months and then returned to the original level, but banknotes remained relatively stable with no indication of sharp deposit withdrawals. Meanwhile, during the banking panic of spring 1901, monthly data in the Bank's balance sheet show a decline of assets to the private sector, an increase of assets to the government, and a decline of banknotes at the same time. This reflects the instability of the financial system and policy response. It was difficult to grasp these developments occurring in a shorter interval with the conventional annual data.

c-2. 1905–13

For the Russo-Japanese War in February 1904–September 1905, the government issued foreign debts to finance wartime expenditures. In the Bank's balance sheet, items of foreign exchange assets and liabilities to the government increased, and the ratio of total assets to GNP increased to 26 percent (or 900 million yen) in 1905–07, mainly reflecting the Bank's business services to the government. Total assets then declined in 1908–09 due

⁵² Demands for funds were strong in promoting modern industries and military buildups. A tendency of trade deficit occurred again after the adoption of the gold standard.

⁵³ In the financial panic of spring 1898, exports of cotton yarn to China (under the silver standard) stagnated after Japan's adoption of the gold standard, thereby causing failures of firms and banks (BOJ Centennial Committee (1983a) pp. 86–96). In the banking panic of spring 1901, suspension of payment in south-western Kumamoto prefecture sprawled in the south-western, western, central, and eastern districts of Kyushu, Kansai, Chubu, and Kanto (BOJ Centennial Committee (1983a), pp. 128–137).

to the fund transfer from the Bank to the government's revenues, and their ratio to GNP increased again in 1910 to 22 percent (or 9 million yen) owing to the foreign debt refinances at maturity.⁵⁴ Then, total assets declined to about 13 percent (700 million yen) but remained higher than those before the Russo-Japanese War, reflecting the foreign debt issuance and the overseas specie held by the government and the Bank (BOJ Centennial Committee (1983a), pp.168–171). Among the items, foreign exchange assets and liabilities to the government largely fluctuated due to the War, but banknotes remained stable, with a ratio to GNP at the 8–10 percent level, despite the uptrend in nominal value. On the asset side, cash and bullion in the asset item also remained stable, at a ratio to GNP of 4–6 percent.⁵⁵

Next, the developments of monthly data clarify the monthly timing of foreign debt issuance for war finance in 1905, and the repetition of debt issuance and fund receipt several times in that year. In February–May 1907, a small banking panic occurred and banknotes declined slightly. Also in March 1907, foreign exchange assets and liabilities to the government largely increased again after foreign debts were refinanced with a lower rate, and then declined again after the funds were transferred to the government revenue (MOF History Office (1998a), p. 459). Also, in October 1907–May 1908, banknotes declined but assets to the private sector increased, indicating the Bank's efforts to minimize contagion after the U.S. financial panic of 1907. Monthly data capture these developments (BOJ Centennial Committee (1983a), pp. 223–224, 232–238).

d. 1914–19 (World War I)

In this period, the Bank's balance sheet shows different trends between ratios to GNP and nominal values, and we should describe each development separately.

The ratio of total assets to GNP in 1914–19 increased from 13 to 19 percent under the uptrend of trade surplus during World War I (Figure 12). Among the items, foreign exchange assets (deposits at the government's overseas agency) increased from 5 to 8 percent under such trade surplus. Liabilities to the government increased consistently.⁵⁶

⁵⁴ The increase of total assets in 1910 was mainly in foreign exchange assets (deposits to the Yokohama Specie Bank as the overseas agency) as well as liabilities to the government (foreign currency discount bills) after the refinance of foreign debts (BOJ Research Department (1958), pp. 147–154). This would reflect the Bank's business services, in terms of treasury funds and foreign exchange, to the government. ⁵⁵ In 1911–13, trade deficit persisted despite the sluggish economy, possibly reducing the amount of specie necessary for maintaining the gold standard. The fear of currency crisis gradually strengthened (BOJ Centennial Committee (1983a), pp. 249–252, 278–283).

⁵⁶ In addition, a mild increase of assets to the private sector in 1919 reflected the start of a rediscount of banker's acceptance by the Bank for smooth financing of industries, which expanded during the war, although strict screening reduced applications (BOJ Centennial Committee (1983a), pp. 487–503, 521–529).

Banknotes also increased from 7 to 10 percent, indicating a higher growth of banknotes than nominal GNP.

Nominal values also increased at a pace faster than ratios to GNP. In terms of nominal value, total assets became 4 to 5 times as large (from 0.6 billion yen to a range of 2.4–3.0 billion yen⁵⁷) and banknotes became 3 to 4 times as large (from 0.4 million yen to 1.1–1.6 billion yen) under high inflation. Nominal GNP also became 3.3 times as large in 1914–19 (from 4.7 billion to 15.5 billion yen), affecting the Bank's balance sheet. The larger increase in banknotes than in nominal GNP caused the higher ratio of banknotes to nominal GNP under the economic expansion of this period.

Monthly data also show that the growth of total assets accelerated in mid-1917. The United States entered World War I in April 1917, and the war's escalation probably affected Japan's economy with a lag. From mid-1918, the Bank's balance sheet expanded further in banknotes, and liabilities and assets to the government, under the supply shortage and strong demand with no slack, symbolized by the rice riots from July 1918.⁵⁸

e. From 1920 to June 1928 (sluggish economy after World War I)

After World War I, the economy was sluggish and the inflationary nominal values leveled off. Ratios of GNP and nominal values of the Bank's balance sheet both show a similar trend, and monthly data capture the changes that may be obscure in semiannual data.

In 1920–28, total assets were fluctuating downward, under the gradual disappearance of the trade surplus that had occurred previously. The ratio of the Bank's total assets to GNP declined from 18 to 15 percent, and 2.8 billion to 2.5 billion yen in nominal values (Figure 13). Then, during the financial panic of 1927 in March–May, total assets increased in terms of both the ratio to GNP and yen value. Among the items, the ratio of foreign exchange assets to GNP largely declined from 7 to 2 percent in 1920–28, or from 1.1 billion to 0.3 billion yen, because of a smaller trade surplus. Meanwhile, the ratio of assets to the private sector to GNP increased from 2 to 5 percent, or from 0.4 billion to 0.8 billion yen, reflecting the Great Kanto earthquake (September 1st, 1923) and the financial panic of 1927. Still, the development of banknotes remained stable, with ratios to GNP in the 9–10 percent range or the 1.3–1.7 billion yen range, aside from short-term effects from the earthquake

⁵⁷ We show the range instead of a value, considering the large difference between the end-June value (2.4 billion yen) and the end-December value (3.0 billion yen). Hereafter, the same applies.

⁵⁸ In mid-1918, the government considered economic growth as the top priority and was reluctant to tighten monetary conditions to tame inflation. The government was also cautious about a sharp drop in foreign demand after the armistice of World War I in November 1918 (BOJ Centennial Committee (1983a), pp. 429–449).

and the financial panic.

Monthly data capture the changes in 1920–28 that are obscure in semiannual data. In 1920–28, in addition to the earthquake of 1923 and the financial panic of 1927, the banking panic of 1922 (in October–December 1922) occurred.⁵⁹ We confirm the developments of these events with monthly data. First, in the financial panic of 1927 in March–May, banknotes soared from 1.1 billion to 1.6 billion yen, a 45 percent increase in two months, and then rapidly went back to the previous level after June. At the same time, assets to the private sector increased in line with banknotes stably at a high level after June 1927. They show that banknotes returned to the Bank within a short period, while the elevated level of the Bank's assets to the private sector indicates the greater credits to households and firms from private-sector banks, originally from the Bank. In this period, liabilities to the private sector (current deposits from private-sector banks) also partly increased.⁶⁰

In the banking panic of 1922, banknotes also surged from 1.1 billion to 1.35 billion yen from October to December, a 22 percent growth in two months, and then declined in January 1923. Compared to the panics in the Meiji era with stable banknotes in monthly data, this may imply a considerable change in the developments of banknotes during a financial panic. In addition, after the earthquake in September 1923, banknotes surged from 1.14 billion yen to 1.36 billion yen, a 19 percent growth in one month from August to September 1923. In this case, banknotes after the earthquake took a longer time to return to the previous level in March 1924 than banknotes after the financial panic did.

Assets to the private sector surged in the same way during the above three events, but the length of time differed largely among the three events. Among the surges of assets to the private sector, the length of time after the banking panic of 1922 was as short as about one month, but the length after the earthquake of 1923 was about 18 months, and the length after the panic of 1927 was ten years. Semiannual data also capture the surge after the panic or the earthquake but fail to capture changes every month. Monthly data should be beneficial to capture these short-term changes in the Bank's balance sheet with more granularity. Furthermore, a proper recognition of a shock and its length should be a prerequisite in analyzing a shock and the length of the effect by a shock after the event, and in assessing whether the effect may either disappear shortly or remain long. They are

⁵⁹ BOJ Centennial Committee (1983b), pp. 29–37, 48–102, 169–263 describes each event. In addition, BOJ Centennial Committee (1983b), pp. 3–9 also refers to an event in March–May 1920 as a panic reaction. However, it appears that the impact was limited, considering the less volatile monthly data as well as the shorter description.

⁶⁰ The extraordinary session of the Diet on May 1927 authorized the Bank to make special advances (BOJ Centennial Committee (1983b), p. 181). Accordingly, the Bank's current deposits from private-sector banks increased (BOJ Research Department (1963), p. 467).

also necessary in assessing how the shock may affect the Bank's assets to private-sector banks and ultimately their credit to firms. Monthly data, enabling the capture of such a short-term shock properly, should be beneficial for research.

f. From July 1928 to 1931 (stagnation after the gold standard restored)

From July 1928 to 1931, the great depression in the United States and Europe spilled over to Japan. Under the restored gold standard, Japan experienced a severe depression (the Showa depression of 1930–31). The Bank's total assets declined (Figure 3 and the "f" part of Figure 14), and a severe deflation caused different trends between ratios to GNP and nominal values. We should describe the developments of each trend separately.

The ratio of total assets to GNP in 1928–31 remained at the 15–16 percent level. The items also remained stable in general, and for example, banknotes remained in a narrow range of about 10 percent within small seasonal fluctuations. Meanwhile, cash and bullion declined sharply from 7 to 4 percent in September–December 1931, from the suspension of the gold standard by the United Kingdom to the suspension by Japan. The Bank's assets to the private sector and assets to the government also increased, indicating the Bank's credit provision as a policy response to the external shock.⁶¹

However, total assets in 1928–31 declined from 2.4 billion to 2.0 billion yen, about a 20 percent decrease. Banknotes declined under the depression. Cash and bullion barely remained at a level of 0.9 billion yen from the beginning of 1930 to mid-1931 upon the return to the gold standard. However, from September 1931, when the United Kingdom left the gold standard, cash and bullion rapidly declined over three months, halving to about 0.5 billion yen in December 1931. Monthly data enables us to capture these developments with more granularity.

g. From 1932 to February 1936 (Takahashi's macroeconomic policy)

The "g" part in Figure 14 corresponds to the period of the expansionary macroeconomic policy package under Finance Minister Korekiyo Takahashi. The policy package consists of the managed currency system with an embargo on gold exports, fiscal policy with the Bank's purchase of government bonds, and monetary policy with lower interest rates.⁶²

⁶¹ BOJ Centennial Committee (1983b), pp. 485–517, BOJ Centennial Committee (1984), p. 96, BOJ Research Department (1963), pp. 570–575 denotes the circumstances of the time. In September–December 1931, the active purchases of specie mainly by the Yokohama Specie Bank for settling imports caused a shortage of yen currency and tightened its demand-supply condition including other private-sector banks. In response, the Bank increased credit to other banks through collateralized loans with government bonds and discount bills.

⁶² Among the studies in *Kinyu kenkyu* issued by the Bank's Institute for Monetary and Economic Studies, Shima (1983), Shizume (2001), Ide (2001), and BOJ IMES (2001) mainly discuss Takahashi's macroeconomic policy. These studies assess the policy positively as a precursor of Keynesian policy

They caused obvious changes in the Bank's balance sheet. In a transition from severe deflation to inflation, nominal GNP growth was higher than the growth of the Bank's total assets, causing the developments of the Bank's balance sheet to differ between nominal values and ratios to GNP.

Total assets in terms of nominal value increased from about 2 billion to 2.5 billion yen in 1932–35, mainly reflecting an increase of assets to the government from 0.3 billion to 0.9 billion yen underwritten by the Bank. On the liability side, banknotes also increased consistently. Meanwhile, the ratio of total assets to GNP declined slightly. The Bank's balance sheet in terms of nominal values plainly increased under the expansionary macroeconomic policies, but this increase was cancelled out in terms of ratios to GNP under the progress of inflation. Among the items, assets to the private sector and banknotes on the liability side were on a downtrend in terms of the ratio to GNP.

Monthly data in this period show little obvious changes, as in other periods. A small exception was the tendency of banknotes to begin swinging upward in December.

h. From March 1936 to August 1945 (from the Feb. 26 incident to the Pacific War)

Under the wartime regime, the Bank's balance sheet shows conspicuous developments. Total assets increased about fivefold during the seven-year period of 1936–43, and especially skyrocketed threefold during the one-year period of 1944–45 (Figure 15).⁶³ Apart from the inflation effect, the ratio of total assets to GNP remained on a sharp uptrend, from 12 percent in 1936–39 to 17 percent in 1943, 25 percent in 1944, 33 percent in March 1945, and 48 percent in September 1945.^{64, 65}

On the liability side, banknotes mostly caused the increase of the total in both nominal values and ratios to GNP, as well as liabilities to the government during the Pacific War. Banknotes were stable, in the 9–11 percent range, in 1936–39, gradually began to increase in 1940–43, and then surged to a very high level in a very short time. Banknotes reached

and negatively as a trigger to the postwar spiral inflation under fiscal deficit expansion, although the extent of pros and cons in each paper differ. Regarding the transmission mechanism of Takahashi's policy package, Shibamoto and Shizume (2014) analyze the dynamics of policy shifts, using structural VAR model and monthly data, such as output, prices, exchange rate, and money.

⁶³ Total assets in terms of nominal value increased in 1936–43 from 2.2 billion to 11.1 billion yen (each June), and increased in 1944–45 from 18.9 billion to 57.6 billion yen (each September). The uptrend of quarterly interpolation of nominal GNP in the time (Figure 3) was 3.5 times as large in 1936–43 (17.7 billion to 62.5 billion yen, each second quarter), and 1.6 times as large in 1944–45 (from 76.1 billion to 120.6 billion yen, each third quarter).

⁶⁴ It should be noted that nominal GNP in 1945 may contain a range of measurement error, owing to the effects of incomplete price surveys in wartime and the early postwar reconstruction.

⁶⁵ Cash and bullion in nominal value showed changes in 1937–38 (an increase by the revaluation of gold and a decline after transferring the increment to foreign exchange asset) more clearly than the same item in terms of ratios to GNP. BOJ Research Department (1963) pp. 702–744.

the 16–18 percent range in 1944 with the severe war situation and tighter controls for expanding munition productions, and surged to the 21–34 percent range in 1945 with full-scale air attacks paralyzing Japan's domestic transportation.^{66, 67}

On the asset side, assets to the government and assets to the private sector largely increased. In terms of ratios to GNP, assets to the government surged from 5 percent to 13 percent in 1936–44, due to the purchase of government bonds to finance wartime expenditures. Assets to the private sector increased in 1942–43 from the start of the Pacific War, and then surged in 1944–45 to the 15 percent level in March 1945, to satisfy the financial necessities of munitions companies.⁶⁸ Foreign exchange assets also surged to 8 percent in 1945, reflecting temporary finance for the occupied areas (unsettled overseas balance in "agency account").⁶⁹ Cash and bullion swung upward in mid-1937 and then declined.⁷⁰

Monthly data capture the geometric increases in total assets and banknotes with more granularity. For example, for both total assets and banknotes, the growth accelerated after the start of the War with China in July 1937 without a formal declaration. Monthly data in 1940–45 also show the accelerating tempo of growth, as the situation worsened upon the start of the Pacific War (December 1941), the withdrawal from Guadalcanal (February 1943) as a symbol of the defeat afterward, the tighter control for larger munition

⁶⁶ As the background to the skyrocketing banknotes, the large-scale air attacks all over Japan in 1945 were an influential factor, in addition to the spread of military expenditures nationwide. The issue of weekly *Toyo keizai* magazine on July 18, 1945, reported a decline of deposits in large cities under the nationwide air attacks and a surge of cash outlays by the evacuees from cities. Some of the Bank's branches opened in the wartime for the smooth circulation of banknotes.

⁶⁷ Banknotes in nominal value increased fivefold during the seven-year period of 1936–43 (from 1.5 billion to 7.4 billion yen, each June), and increased threefold during the one-year period of 1944–45 (from 13.7 billion to 41.4 billion yen, each September), far greater than nominal GNP did.

⁶⁸ The Munitions Companies Act (October 1943) institutionally obliged large banks (such as major banks and the Wartime Finance Bank) to lend to munitions firms swiftly with simple procedures as a necessity. The Bank also helped these large banks by lending to them directly and by arranging their syndicate loan to munitions firms (BOJ Centennial Committee (1984) pp. 305–310, 355–359).

⁶⁹ In the Pacific War, the huge amount of wartime paper money (military scrip and puppet bank notes) circulated in the occupied areas. People undervalued these types of paper money relative to Bank of Japan notes. (For example, 1 yen in Bank of Japan notes was actually exchanged for 100 yen in paper money in the occupied area, although 1 yen in such paper money was formally on par with Bank of Japan notes in the government budget.) In such case, the government nominally incurred a gap between the budgetary and actual expenditures by borrowing from the Overseas Fund Bank, which was established by the government in early 1945, or borrowing from Yokohama Specie Bank before that. See MOF History Office (1998b), pp. 250–257, MOF History Office (1955), pp. 367–386, MOF and BOJ (1948) p. 352, BOJ Centennial Committee (1984), p. 412. For their settlements after the war, see footnote 73.

⁷⁰ The Bank revalued gold on August 1937 (BOJ Centennial Committee (1984), pp. 212–215, 375–376).

productions (in 1943–44),⁷¹ and the more intense air attacks over Japan proper (from early 1945 to the surrender).

i. From September 1945 to 1952 (the postwar reconstruction)

From September 1945 to 1952, we mainly assess the development of the Bank's balance sheet in terms of ratios to GNP, because the nominal value under the rampant postwar inflation ("i" part of Figure 16) is difficult to assess.⁷²

The ratio of total assets to GNP rapidly declined in 1945–52, from 48 percent in September 1945 to 20 percent in September 1946, and to 17 percent in September 1947 with fluctuations. In 1948–52, total assets were stable, at 10 percent. Banknotes dropped from 34 percent in September 1945 to 10 percent in March 1946, after the emergency measures in February 1946, which voided old banknotes to reduce money in circulation. Specifically, the government and the Bank collected old banknotes in circulation to deposits of private-sector banks, and then froze these deposits by imposing withdrawal limits in new banknotes to reduce money in circulation, thereby containing high inflation. However, banknotes soon bounced back and soared to 18 percent in March 1947, under the strong money demand and high inflation. As the postwar reconstruction progressed in 1948–52, banknotes declined to a peacetime level of 8 percent in 1952.

On the asset side, foreign exchange assets dropped to about zero in September 1945– September 1946, after the item was settled as a government obligation.⁷³ Assets to the private sector declined from 20 percent to 3 percent in March 1947 under the normalization of credits for military productions. Assets to the government also dropped to 3 percent but turned to an increase in 1947 among stronger demand for postwar reconstruction and then remained at a high level. Foreign exchange assets increased to a 2–3 percent level in 1950– 52, to arrange the foreign exchange loan system⁷⁴ toward smoother imports after Japan regained sovereignty.

⁷¹ Assets to the private sector in 1943 increased in January–December but declined shortly in April– June. This may have been due to the government policy of promoting larger military production while quickly containing the oversupply of banknotes by promoting settlements with securities only, without cash, around June 1943 (MOF History Office (1998b), pp. 286–292, MOF History Office (1957), pp. 375–378). The worsening war situation overturned the short-term decline.

⁷² Japan's inflation in 1945–48 surged by a factor of several tens—the most severe increase since the Meiji era (Figure 8(2))—and nominal GNP in 1945–48 also surged by a factor of about 50 (Figure 3). Meanwhile, the Bank's total assets increased by a factor of about 10.

⁷³ After the surrender, the government settled the overseas balance in "agency account" as its own obligation and the amount disappeared from the Bank's balance sheet (MOF and BOJ (1948), p. 352).

⁷⁴ Foreign exchange assets and liabilities to the government increased in September 1951 to prepare the system that would enable the Bank to loan to private-sector banks in charge of foreign currency transactions.

In terms of nominal values, the outstanding developments are as follows. Banknotes surged from 30 billion yen to 300 billion yen in 1945–48, increasing tenfold, then leveled off from 1949 to spring 1950 under the retrenchment policy (as given later), and turned to an increase again in 1950 after the outbreak of the Korean War.⁷⁵ It was in 1953 when banknotes leveled off again. On the asset side, foreign exchange assets sharply declined in 1946, remained almost zero until 1950, and then increased in 1951. Assets to the government increased in 1945–49 and then slightly decreased in 1949–52. Assets to the private sector remained on an uptrend under the postwar reconstruction and the unexpected demand during the Korean War.

Monthly data capture the developments at a higher frequency. For example, banknotes surged from 41.4 billion yen in September 1945 to 58.6 billion yen in January 1946, and then declined, reaching 23.3 billion yen in March under the emergency measures voiding old banknotes. However, banknotes in April increased again and reached 355.3 billion yen at the end of 1948. Against the persistent inflation, the Supreme Commander of Allied Powers, dominated by the United States, decided to invite Joseph Dodge as a minister, and requested the government of occupied Japan to formulate retrenchment policy measures consistent with the Nine-point Economic Stabilization Principle.⁷⁶ Monthly data showed that banknotes leveled off from January 1949, in the early phase of the Dodge plan.

In addition, we briefly review the developments in 1953–55, a period of adjustment from the regaining of sovereignty to the Jinmu boom (from end-1954 to mid-1957).⁷⁷ Total assets and banknotes remained low, at a ratio to GNP of 10 percent or 7–8 percent, respectively. On the asset side, assets to the government increased, while assets to the private sector, such as discount bills, declined.⁷⁸ In terms of nominal value, total assets in 1953–55 were on an uptrend in the range of 0.7–0.9 trillion yen, and banknotes were in the range of 0.5–0.7 trillion yen.

(3) Findings throughout the years

This subsection assesses the findings throughout the years, with the developments of the Bank's total assets and items in 1882–1955, as reviewed above in semiannual data (ratios to GNP and nominal values) and monthly data (nominal value).

First, the Bank's ratio of total assets to GNP increased in wartime, including World War

⁷⁵ After the outbreak of the Korean War in June 1950, truce negotiations starting in July 1951 resulted in the armistice agreement in July 1953.

⁷⁶ BOJ Centennial Committee (1985), pp. 212–215, MOF History Office (1998c), p. 57.

⁷⁷ We briefly review 1953–55, considering both the periodization of the BOJ Centennial History (footnote 26) and this paper's coverage of 1882–1955 (Section 2(2) and footnote 2).

⁷⁸ BOJ Research Department (1978), pp. 32–54.

I, which increased Japan's external demand. The ratio of total assets to GNP surged to 27, 26, 19, or 48 percent, in the Sino-Japanese War of 1894–95, the Russo-Japanese War of 1904–05, World War I, and the Pacific War, respectively. The peak of total assets in these wars was obviously higher than the 10–15 percent in peacetime. The upswing remained for two years after the Sino-Japanese War, and about 5–10 years after the other wartime periods. This point is consistent with Ferguson, Schaab, and Schularick (2015) and Ferguson *et al.* (2023), assessing wars and current account surplus as factors that raised central banks' total assets. Meanwhile, compared with their consideration of financial crises as another factor, the effects of financial crises in 1882–1955 on total assets were relatively small in Japan. The surge in the Bank's total assets during the financial panic of 1927 was 16 percent at most, a level slightly higher than the peacetime level. Among the items, assets to the private sector remained elevated for about 10 years, but the increase was 2 percentage points at most, smaller than the increase in wartime.

Second, the ratio of banknotes to GNP remained stable, at 8–11 percent, except at the Bank's beginning in 1885–89, the time from the Pacific War to the beginning of postwar reconstruction in 1942–47, and the temporary fluctuation during the financial panic of 1927.⁷⁹ The ratio of banknotes to GNP remained stable in most of the wartime (the Sino-Japanese War, the Russo-Japanese War, World War I, the War with China in 1937–45), except the Pacific War.⁸⁰

The new monthly data captured the changes of every month meticulously, such as a temporary surge of banknotes in March–May 1927 during the financial panic of that year. The new data also enables us to identify which events among the financial and banking crises affected the Bank's assets to the private sector, how strong such effects were, and, how long such effects remained. The new data also captured the geometric surge of total assets in 1937–45, how and when items among total assets mainly contributed to the surge, consistently with historical events (such as the strengthened munition productions under the worsening in 1943–44 and the more intense air attacks in 1945). The monthly data also

⁷⁹ Banknotes remained stable, at 12 percent, in the first half of the Pacific War (in 1941–43).

⁸⁰ For stable banknotes in 1897–1943, "a backstop for an unsustainable increase in domestic demand" might be a common factor. In 1885–1931, the gold (or de facto silver) standard adjusted domestic demand through external balances. In 1932–36, Finance Minister Takahashi prevented an excessive expansion of military expenditures (Shizume (2009), p. 246, Shizume (2021), p. 100). In 1937–43, the government adopted the Materials Mobilization Plan, or the so-called budget of materials, allocating steel and other strategic materials to mainly military use and the rest to civilians, and making the military recognize the upper limit of resources (Kaya (1976), pp. 96–100). But from 1944 to August 1945, the military was unable to stop the war, demanding an irrational mobilization plan containing an allocation of steel by scrapping equipment and allocating food at a starvation level (Yamasaki (2016), pp. 492, 794).

clearly showed that the emergency measures with new banknotes in February 1946 taken to control the surge in banknotes failed after only two months, resulting in a more rapid surge in 1946–48.

(4) Differences between the Bank's historical and modern balance sheets

Lastly, we consider the differences between the Bank's historical balance sheet and the modern balance sheet. In general, a central bank's total assets and item composition may largely vary in different economic or institutional conditions. For convenience, we divided the period of 1955–2019 at 1995 (1955–95 mainly from the high growth period to the bubble burst, and 1995–2019 from the bubble burst to the current time). We then compare them with the period from the Meiji era to postwar reconstruction, as assessed before (Figure 17(1)).

First, in 1955–95, the Bank's ratio of total assets to GDP was stable, in the 8–10 percent range, close to the peacetime range in 1882–1955. On the liability side, banknotes remained stable, at 7 percent. On the asset side, each item fluctuated discretely, reflecting policy or various other factors.⁸¹ In other words, we may consider this development that banknotes on the liability side mainly determined the size of total assets, and items on the asset side changed against various factors across different periods accordingly. In addition, contrary to the development of nominal GNP in 1882–1955, nominal GDP in 1955–95 was mostly increasing. This uptrend of GDP, together with a stable ratio of the Bank's total assets to GDP, indicates that the nominal growth of the Bank's balance sheet was consistent with the economic growth in the same period (Figure 17(2)).

Next, in 1995–2019, the ratio of total assets to GDP rapidly increased from 10 percent to 100 percent (Figure 17(1)). In this period, as pointed out by Shiratsuka (2019), asset purchases on the assets side mainly determined the size of total assets, instead of the developments on the liability side. On the asset side in 1995–2019, assets to the government were generally on an uptrend (except 2006–11) under several instances of monetary easing.⁸² Assets in the form of purchases with a resale agreement and advances

⁸¹ In 1955–70, assets to the private sector were high under the strong demand for funds in the high growth period. In 1971–82, foreign exchange assets and assets to the government increased. After the U.S. declaration of terminating dollar convertibility for gold ("Nixon shock" in August 1971) and the first oil crisis from October 1973, economic growth weakened, and the issuance of government bonds increased. In 1983–95, assets to the private sector increased and then declined under the progress of financial deregulation, the emergence of the bubble economy, and the bubble burst. BOJ Centennial Committee (1985), pp. 552–595, BOJ Centennial Committee (1986a), pp. 74–114, and Shizume (2020), pp. 940–947.

⁸² Specifically, they are the zero interest rate policy (from February 1999 to August 2000), quantitative easing policy (from March 2001 to March 2006), comprehensive easing policy (from October 2010), quantitative and qualitative easing (QQE, from April 2013), and QQE with yield curve control (from

against government debts as collateral increased in 2000–2004, whereas assets in the form of trust property, asset-backed securities, and equity trust funds increased in 2013–19. On the liability side, banknotes increased from 8 percent in 1995 to 14 percent in 2005, and then increased to 19 percent in 2019, the highest level since the early Meiji era except for the end of the Pacific War. In line with the asset side, liabilities to the private sector (such as current deposits) surged from 1 percent in 1995 to 12 percent in 2005, and then to 72 percent in 2019, an outstanding level historically.⁸³

The Bank's balance sheet after 1955 is out of the scope of analysis, but we may be able to summarize the above characteristics of the balance sheet after 1955 as follows:

- (i) In 1882–1955, total assets largely fluctuated mainly in wartimes, while banknotes remained stable.
- (ii) In 1955–1995, both total assets and banknotes remained stable, under the high growth period, the bubble economy, and its burst.
- (iii) In 1995–2019, total assets expanded rapidly, mainly due to the items on the asset side, under the repeated monetary easing and asset purchases.⁸⁴

For comparing data from different periods using super-long times series, we should carefully confirm the institutional background to each period, such as the developments of a central bank or a nation's other systems on the monetary, financial, or economic front. There are huge differences between each period in monetary and economic conditions, economic structures, frameworks and goals of policy authorities, and their concerns over business operations.⁸⁵ Another crucial point is data availability, which is necessary for such analyses. Reassembled historical data, from historical materials forgotten in the public domain and in archives, should be beneficial for the economic analysis at present, through an enlarged feasibility of an historical overview from such data.

September 2016). Nakaso (2017) overviews the evolution of these policy measures. Also in 1995, the Bank started a monetary policy with a target for the overnight call rate, and then short-term market interest rates declined below the official discount rate (Amamiya (2017), BOJ Research and Statistics Department (1996), p. 11).

⁸³ These annual values are the annual average of the monthly ratio (Figure 17(1), ratio of monthly value to nominal GDP, quarterly annual rate, seasonally adjusted).

⁸⁴ Banknotes on the liability side expand under a zero interest rate, but the analysis of mutual feedback between the asset side and the liability side is out of scope in this paper. Such analysis would require a macroeconomic model containing private-sector banks and firms, which is beyond the scope of this paper focusing on the Bank's historical balance sheet.

⁸⁵ Kuroda (2005), pp. 1–3 assesses Japan's fiscal and monetary policies in 1967–2003, and argues the importance of institutional memory from experiences over different generations and the difficulty of consistently assessing several periods from a time-independent viewpoint.

5. Conclusion

This paper newly reassembled data of the Bank's balance sheet at semiannual (1882–1955) and monthly (1897–1955) frequencies, from various historical materials. The paper then overviewed the developments of total assets and items of the Bank's balance sheet from the Meiji era to the postwar reconstruction, as well as the developments of the government paper money and the reserve funds before the founding of the Bank. The analyses showed characteristics common to several periods over the Bank's balance sheet, and the previously unseen short-term changes. The ratio of total assets to GNP remained at 10–15 percent in peacetime but increased to 19–48 percent in wartime. The ratio of total assets in financial crises increased to 16 percent at most, a lower level than the ratio in wartime. Among the items, banknotes remained stable, at 8–11 percent, except in the Bank's early years and at the end of the Pacific War. The new monthly data enabled us to capture the short-term changes in financial crises and rapid changes in economic and financial institutions, using items such as banknotes, assets to the government, and assets to the private sector.

This paper reassembled the Bank's balance sheet for about 70 years with semiannual and monthly data. This enabled us to assess the effect of an event on the balance sheet quantitatively, for events such as changes in institutional frameworks, in policies and in economic or political conditions both in Japan and abroad. Quantitative assessment is beneficial for considering frameworks and policies by central banks at present. The paper also confirmed the usefulness of the approach of reassembling forgotten data into a higher frequency and then assessing data together with qualitative information from historical materials.

Appendix: Nominal GNP in this paper

This appendix explains two technical aspects about nominal GNP: an interpolation of quarterly annualized rates using a linear trend, and two series of nominal GNP.

(1) An interpolation of quarterly annualized rates using a linear trend

An estimation of nominal GNP in quarterly annualized rates with seasonal adjustments requires too many assumptions. As a second best, this paper simply uses a linear trend to interpolate quarterly annualized rates in the current year if both the previous and next year values show the direction of the current year's annualized rates. Specifically, we assume the following (a) and (b):

(a) The average of the quarterly annualized rates is equal to the annual value.

(b) The direction of the trend (up or down) is the same for annual and quarterly values.

Then, we interpolate quarterly annualized rates (seasonally non-adjusted), following the next step (c) or (d).

(c) If the current year value becomes either a peak or a trough relative to both the previous and next year values, we assume the quarterly annualized rates of the current year as horizontally equal to the current year value. For example, if the previous, current, and next year values are 90, 100, and 95, respectively, we assume the values of the first, second, third, and fourth quarter, or Q1, Q2, Q3 and Q4 (hereafter the same), as all equal to 100.

(d) If the previous, current, and next year values have the same trend (up or down in two consecutive years), we assume the quarterly annualized rates in the current year as a linear trend with a slope following either substep (d-1) or (d-2) below.

(d-1) We assume a slope over 4 quarterly rates as equal to an annualized slope between the previous and next year, and then interpolate such quarterly rates. For example, if the previous, current, and next year values are 83.3, 100, and 120, respectively, we interpolate Q1 as 92.5, Q2 as 97.5, Q3 as 102.5, and Q4 as 107.5, such that quarterly annualized rates of the current year linearly increase 5 percent quarter-on-quarter and have an average of 100.⁸⁶

(d-2) If the quarterly rates by step (d-1) cause inconsistency with assumption (b) among the previous, current, and next year values, we assume that a slope over 4 quarterly rates will be less steep. Specifically, such slope should be the less steep value of either a slope

⁸⁶ In this case, we allocate the annual change of 20 percent (quarterly 5 percent) to each quarter according to the distance from the middle of the year. For example, considering that the center of Q4 comes 1.5 quarters after the middle of the year, we set the Q4 value as 107.5, a 7.5 percent increase (= 5% times 1.5 quarters) from 100 at the mid-year value. Similarly, we set the Q3 value as 102.5 because it comes 0.5 quarter after the middle of the year.

between the previous and current year, or a slope between the current and next year. For example, suppose the previous, current, and next year values are 95.2, 100, and 135, respectively. In this example, the annualized slope between the previous and next year is 20 percent. If we would interpolate quarterly rates of the current year using this slope, then such quarterly rates would cause inconsistency with assumption (b), because the current year Q1 would become lower than the previous year Q4 and the current year value was higher than the previous year value.⁸⁷ In this case, we assume the slope between the previous and current year (5 percent increase), and then interpolate Q1 as 98.125, Q2 as 99.375, Q3 as 100.625, and Q4 as 101.875 as the current year's annualized rates, which increase 1.25 percent quarter-on-quarter and have an average of 100.

Following the assumptions and steps from (a) to (d), quarterly interpolation using annual data of historical nominal GNP (Figure 3, black bar marker) gives quarterly data (Figure 3, white square marker). Among them, Table A-1 show excerpts of annual and quarterly data in 1913–18 and 1942–48 with calculation under step (d-1) and (d-2). Quarterly data in 1915 and 1944–46 are interpolated using (d-2), because (d-1) causes inconsistency (for example, annual 1914 is lower than annual 1915 but 1914 Q4 is higher than 1915 Q1).

Year	1913	19	1914		1915		1916		1917		191	18		
Quarter		Q1	Q)4	Q1	Q4	Q1	Q4	Q1	Q4				
Annual (bil. yen)	5.01	4	4.74		4.99		6.15		8.59		11.	.8		
Quarterly interpolation		4.74	4.	74	4.89	5.09	5.43	6.87	7.34	9.84				
using (d-1)				4	4.73	5.25	<u>5.43</u>	<u>6.87</u>	7.34	<u>9.84</u>				
(d-2)				4	4. <u>89</u>	<u>5.09</u>								
Year	1942	1943	3	19	1944		1945		Fiscal 1946		6	Fiscal 1947		1948
Quarter		Q1 (Q4	Q1	Q4	Q1	Q4	'46/1-3	'46/4-6 '47/1-3		-3 '⁄	'47/4-6 '48/1-3		
Annual (bil. yen)	55.8	63.8	3	74	74.5		114.5		474.0			1309.0		2666.0
Quarterly interpolation		59.7 6	67.9	69.8	79.2	96.0	132.9	223.4	313.8	634	.2 6	635.7	1982.3	
using (d-1)		<u>59.7</u> 6	67. <u>9</u>	65.0	84.0	49.1	179.8		50.7	897	.3 (<u>635.7</u>	1982.3	
(d-2)				69.8	79.2	96.0	132.9		313.8	634	2			

Table A-1Quarterly interpolation

Note: Quarterly data in 1945 and in fiscal 1946 are interpolations using a slope over 5 quarters. January– March quarter of 1946 is a linear interpolation. Underlined quarterly values in the rows of (d-1), (d-2) indicate usage for quarterly interpolation.

The following is a formulaic explanation of the above assumptions and steps, instead of a numerical example. The assumptions (a) and (b) correspond to equations (A-1) and (A-2), respectively, where nominal GNP in year t is y_t , and its quarterly annualized rate on quarter q is $y_{t,q}$, $q = 1, \dots, 4$.

⁸⁷ Here, the current year Q1 (92.5) following step (d-1) declines from the previous year Q4 (above 95.2), and the current year value (100) increases from the previous year value (95.2).

$$(y_{t,1} + y_{t,2} + y_{t,3} + y_{t,4})/4 = y_t.$$
 (A-1)

$$(y_{t+1} - y_t)(y_{t+1,1} - y_{t,4}) > 0 \text{ and } (y_t - y_{t-1})(y_{t,1} - y_{t-1,4}) > 0.$$
 (A-2)

Step (c) corresponds to equation (A-3).

$$(y_{t+1} - y_t)(y_t - y_{t-1}) < 0 \rightarrow y_{t,1} = \dots = y_{t,4} = y_t.$$
 (A-3)

Step (d) corresponds to equation (A-4).⁸⁸

$$(y_{t+1} - y_t)(y_t - y_{t-1}) > 0$$

$$\rightarrow y_{t,1} = (1 - 1.5 \times b/4)y_t , y_{t,2} = (1 - 0.5 \times b/4)y_t,$$

$$y_{t,3} = (1 + 0.5 \times b/4)y_t , y_{t,4} = (1 + 1.5 \times b/4)y_t.$$
 (A-4)

Step (d-1) corresponds to a case where the calculation of (A-4) using slope b from (A-5) satisfies (A-2).

$$b = \sqrt{(y_{t+1}/y_{t-1})} - 1. \tag{A-5}$$

Meanwhile, for some y_{t-1} , y_t , y_{t+1} , the calculation of (A-4) using slope *b* from (A-5) may not satisfy (A-2). In this case, we use (A-6) to calculate (A-4), following step (d-2).

$$b = (y_t/y_{t-1} - 1) \quad \text{if} \quad |y_t/y_{t-1} - 1| < |y_{t+1}/y_t - 1| ,$$

$$b = (y_{t+1}/y_t - 1) \quad \text{if} \quad |y_{t+1}/y_t - 1| < |y_t/y_{t-1} - 1| .$$
(A-6)

(2) Two series of historical nominal GNP.

This paper primarily uses estimates from Ohkawa, Takamatsu, and Yamamoto (1974) as an orthodox choice. Many studies use their historical GNP. At the same time, we consider an alternative series in light of criticisms about the precision of historical GNP.

As the orthodox series of historical nominal GNP, we use Ohkawa, Takamatsu, and Yamamoto (1974) for data in 1885–1951 (although data are not available in 1945 and are available only for the fiscal year in 1946–51). Data in 1875–84 are estimates on a production basis by Yamada (1957). Statistics Bureau (1988) and Japan Statistical Association and Statistics Bureau (2007) show both series as historical GNP. Nominal GNP in 1945 is the estimate (114.5 billion yen) from Saito (2021), pp. 43–44.⁸⁹ The 1945

$$NGNE_{1945}^{Est} = RGNE_{1944}^{EPA} \times \frac{RGDP_{1945}^{Est}}{RGDP_{1944}^{Est}} \times P_{1945}^{GNE,Est} , P_{1945}^{GNE,Est} = P_{1945}^{WPI} \times \frac{1}{2} \left(\frac{P_{1944}^{GNE}}{P_{1944}^{WPI}} + \frac{P_{1946}^{GNE}}{P_{1946}^{WPI}} \right)$$

⁸⁸ In (d), considering that the center of Q1 comes before 1.5 quarter from the center of the year, we set the Q1 value as the yearly value minus a change of 1.5 quarter (*b* is yearly, b/4 is quarterly slope). Similarly, we set Q2 as a yearly value minus a change of 0.5 quarter, Q3 as a yearly value plus 0.5 quarter, and Q4 as a yearly value plus 1.5 quarter, respectively.

⁸⁹ Gross Nominal Expenditure (GNE) in 1945 is estimated from real GNE in 1944 (from Economic Planning Agency or EPA), the estimate of real economic growth in 1945, and the estimate of GNE deflator in 1945 (using GNE deflator in 1944, 1946, and WPI in 1944–46), as shown below:

The estimate is 114.5 billion yen (≈ 20.113 billion yen × (5608/7394) × 3.50 × 1/2 × (3.70/2.32 + 43.7/16.27).

estimate uses wholesale price index (WPI) and real GDP for 1945 with an assumption that GNP deflators for 1944 and 1946 are proportional to WPI.

An alternative series of nominal GNP in 1874 and 1885–1951 are from Fukao, Nakamura, and Nakabayashi (2017a, 2017b, 2018). For data in 1874 and 1885–1913, Fukao, Nakamura, and Nakabayashi (2017a) consider Japan's economic developments before 1868 (proto industrialization) with the data appendix. Their nominal GNP estimates are higher than those in Ohkawa, Takamatsu, and Yamamoto (1974). Data in 1914–44 are from Fukao, Nakamura, and Nakabayashi (2017b) and data in 1946–54 are from Fukao, Nakamura, and Nakabayashi (2018). Data in 1945 is not available in Fukao, Nakamura, and Nakabayashi (2017b) so we use Saito (2021) again.⁹⁰

For an alternative series in 1875–84, we adopt the maximum value of each year among available estimates, such as Teranishi (1982), p. 617, Fujino (1994), p. 99, Muroyama (2014), p. 184, and Yamada (1957), to consider measurement errors as much as possible. Figure A-1 shows these estimates. Fukao, Nakamura, and Nakabayashi (black square marker) are higher than Ohkawa, Takamatsu, and Yamamoto (white square). Fujino (black circle), Teranishi (black triangle), and Muroyama (cross sign) are close to Fukao, Nakamura, and Nakabayashi.



Figure 3 shows annual data of the orthodox series (black horizontal bar marker), their quarterly annualized rates (solid black line with white square), and data of the alternative series (gray horizontal bar). The alternative series is generally 10 percent higher than the orthodox series, 30 percent higher in 1877–83, and 20 percent higher in 1884–87.

⁹⁰ If WPI in 1944–46 (2.32 in 1944, 3.50 in 1945, 16.27 in 1946, footnote 89 and in Saito (2021), p. 40) were more adjustable in consideration of household outlays with black market transactions (Koike (2020), figure 12), then an alternative nominal GNP in 1945 would be higher. However, no ratio of household outlays to nominal GNP or other basic data in 1945 is available. Thus, we use the same value from Saito (2021), p. 44 as nominal GNP in 1945 for the alternative series.

Figures and Tables

Table 1 Semiannual items of the Bank's balance sheet and aggregation across items

Asset side

Liability side

Items	Combined to		Items	Combined to		
Bullion	Cash and	1	Notes issued	Banknotes	1	
Cash	bullion		Treasury and government funds		1	
Treasury and government funds			of which: deposits for treasury.	1		
Advances to the government	Assets to the		deposits for government bond,			
Deposits	government		deposits for railroad bond, funds			
Agency accounts (from 1947)			for mint certificate, funds for	Liabilities to		
Securities			specie exchange, funds for	the		
of which: treasury bills, government bonds, yen-denominated bonds, et al.	Assets to the government		purchase bullion, funds for credit to Korean government, consigned money, consigned funds for fractional paper money	government Redemption accounts for		
Foreign currency denominated bonds	Foreign exchange assets		Funds for paper money redemption			
Advances to the private sector	-			paper money	ľ	
of which: Advances on fixed term, advances on current accounts, bills discounted, bills discounted of law	Assets to the		Government deposits	Liabilities to the government		
#55 or #56 of 1927, loans on bill, special loans on bill	Foreign		Private deposits	Liabilities to the private sector		
Loans in foreign exchange et al.	exchange assets		Other deposits (overseas related) such as deposits for overseas	Foreign		
Loans for national banknote redemption	Redemption account for paper money		credit received, deposits for overseas exchange settlement	liabilities	_	
i Overseas assets account	Foreign		Accounts for national bank note	account for		
	exchange		redemption	paper money		
Agency accounts (up to 1946)	assets		Due to other banks	Others		
National banknotes redemption	Redemption		Other liabilities		1	
account	paper money		of which: remittances outstanding,			
Bank premises	Bank premises	1	demonetized banknotes	Others		
Account for unpaid capital	etc.		guarantee, receipt for overseas			
Due from other banks]	credit, etc.		1	
Other assets (Initial prepaid expenses, expenses for convertible notes, expenses for	Others		Gold-silver adjustment account, funds for gold-silver revaluation, funds for contributor	Net worth		
banknote production, advances for interbank remittances, guaranty endorsement, advances for overseas credit, etc.)			Current earnings Reserve for expenditures Capital	Net worth	1	
		1	Surpluses			

Note: We omit the item names appearing only after 1955. Items at a detailed level in the primary source are limited, and the sum of data of detailed items may differ from the sum of data at a broader item level.Source: BOJ Centennial Committee (1986b) pp. 272–307.

Items	1897 1900	05	10	15	20	25	30	35	40	45	50	Combined to
Cash and bullion	J						٦,		·		1	Cash and
Gold coin and bullion							<u>}</u>	<u> </u>			}→	bullion
Other cash							ų	<u>.</u>			<u>ÿ</u> →	F anaian
Advances for foreign exchange									•		}	Foreign
Funds for foreign exchange	-	1				1						exchange
Agency account (to 1946)			2					+		<u> </u>	<u> </u>	255615
Advances to the government,								<u>+</u>				
Dravia anal dalivary to the gavernment			4									
Advenses to the government			1			1		1				
Advances to the government			· [1			1	Assets to the
Goverment and other bonds]					1			,	government
Funds for fractional paper money								1				
Special cash on government account	-				-			1	•			
Agency account (from 1947)								ļ		<u> </u>	<u>}></u>	
Bills discounted				1				<u> </u>	1		r{→	Assets to
Advances			⊒					<u>+</u>			⊦ >	the private
Advances in general									L		1	sector
Advances for interbank remittances											<u>}</u> >	
Bank Premises							•					Bank
Unpaid capital	<u> </u>						•					premises, etc.
Other assets											↓ →	
Due from other banks	1						۹,				}	Others
Items in transit	1		·				i i					
T 1 114 1	<u>и у</u>			•		•			•		/	
Liability side												
ltems	1897 1900	05	10	15	20	25	30	35	40	45	50	Combined to
Capital subscribed	┠			<u> </u>				<u>+</u>			<u>⊹</u> >	
Surpluses	<u> </u>										<u>├</u> →	Net worth
Reserves											<u> </u>	
Banknotes issued											↓ →	Banknotes
Government deposits	}		<u> </u>				+		·		<u> </u>	
Government current deposits	1						·	<u> </u>			}	
Govenrment other deposits	1						i	÷	i		1	Liabilities to
Funds for fractional paper money	1							Ļ	ii			the
Sinking funds	1							1				government
Due to the government for loan	1										}	
issued				·							1	
Other deposits		1	1		<u> </u>						1	Liabilities to
			1		1	-				1		
Financial Instituton deposits											├	the private
Financial Instituton deposits Deposits for interbank remittance											├ →	the private sector
Financial Instituton deposits Deposits for interbank remittance Other deposits (for overseas credit)											├> ├> └>	the private sector Foreign exchange
Financial Instituton deposits Deposits for interbank remittance Other deposits (for overseas credit) Overseas account											├	the private sector Foreign exchange liabilities
Financial Instituton deposits Deposits for interbank remittance Other deposits (for overseas credit) Overseas account Other liabilities									-		├	the private sector Foreign exchange liabilities
Financial Instituton deposits Deposits for interbank remittance Other deposits (for overseas credit) Overseas account Other liabilities Due to other banks							r		_			the private sector Foreign exchange liabilities Others

Table 2 Monthly items, transition across time, and aggregation in this paper

Assets side

Notes: Each item name is the representative one in the Bank's weekly report, for brevity.

Each cell with an arrow or solid line depicts data availability, where the row and column of a cell means the item and the year of data available. Ellipsis (...) or a blank cell means partial or no availability, respectively. Angled and crossing lines denote an item combination within the group. Black squares and black diamonds denote a surviving and merged item, respectively, in an item combination across the groups. For example, "advances for foreign exchange" was combined with "advances in general" in May 1942.

White squares and diamonds denote a temporary combination from mainly domestic "Advances" to "Agency Accounts." In 1905, after receiving government funds from foreign debt issuance, the Bank booked the deposits at Yokohama Specie Bank as "Advances" because the Bank did not have the item "Agency account." We combine this surge with the item "Advances" from June 1905 to April 1909.



Figure 1 The Bank's balance sheet in 1882–1955, semiannual data to nominal GNP

Ratio to GNP, percent

Notes: For nominal GNP, see the appendix. Each letter between vertical broken lines denotes the period in the BOJ Centennial Committee (1982, 1983a, 1983b, 1984, 1985, 1986a, 1986b).

The legends in the graph above show the core of the item name for brevity. For example, "To government" (area of horizontal lines) obviously stands for "Assets to the government" in the upper part and "Liabilities to the government" in the lower part of the graph. The same applies to other figures.

Sources: The author's calculation using the aforementioned material of BOJ archives No. 80901 and BOJ Centennial Committee (1986b).

Figure 2 Sensitivity of total assets ratio to nominal GNP



(1) Total assets ratio to GNP under a different GNP series

Note: The orthodox and alternative series of nominal GNP are mainly from Ohkawa, Takamatsu, and Yamamoto (1974) or Fukao, Nakamura, and Nakabayashi (2017a) respectively. See the appendix for details.





Note: Monthly total assets in March, June, September, and December above are the total assets ratio to quarterly annualized rates of nominal GNP, linearly interpolated. As mentioned in Section 3 (2), monthly total assets are at the end of a mid-month week before 1945, and at the end of the month from 1945.



Figure 3 Nominal GNP, 1874–1955

Note: See the appendix for details. We omit quarterly rates using alternative GNP for brevity.

Sources: As for Nominal GNP, the orthodox series, 1875–84 are from Yamada (1957), 1885–1951 are from Ohkawa, Takamatsu, and Yamamoto (1974). We interpolate quarterly values linearly for years with an obvious up or down trend. (For other years with a peak or trough, we regard quarterly values as the same value of the annual data.) Data from the second quarter of 1951 are Cabinet Office *National Accounts*. As for the alternative series of Nominal GNP, 1875–84 are from the maximum of several estimates, and 1885–1951 are mostly from Fukao, Nakamura, and Nakabayashi (2017a, 2017b, 2018).



Figure 4 Government paper money and bank notes issued in 1873–90

Note: Data are at the end of month. There are two types of government paper money, one for circulation, and the other for temporal finance of revenue in the short-term.

Sources: MOF (1932b), p. 277, MOF (1932d) p. 382–383, Meiji zaiseishi hensankai (1905b),pp. 255–277, Meiji zaiseishi hensankai (1905d), pp. 327–338.





Note: Data in 1873–74, 1875–85, and 1886–90 are the end of December, June, and March, respectively. Data before 1872 is not available.

Sources: MOF (1932a), pp. 12-13, 46, MOF (1932c), pp. 418-419.



Figure 6 Price of paper money for gold or silver yen, and price of rice in 1868–93

Note: One unit of *koku* equals to about 5.13 bushels or 180 liters. The gray line after 1886 shows the price of silver for 1 gold yen (paper money on a par with silver).

Sources: MOF (1932b), pp. 205, 245, MOF (1932c), pp. 346–350, 393–395, Toyo keizai (1927), pp. 145, 391.

Figure 7 Expenditures and revenues of the government in 1868–86



- Notes: General accounts of the central government. Ordinary expenditures include expenditure for servicing government debts. Extraordinary expenditures are expenses for suppressing the south-west rebellion in the special accounts for such military expenses. As for the vertical bars and the horizontal markers, the width and the height show the monthly length of the fiscal year and the amount of revenue or expenditure, respectively. The difference between "Ordinary expenditures" and "Taxes & other ordinary revenues" shows fiscal balance. The length of fiscal terms in 1868–86 was basically with 12 months, although the starting month varies, such as January, April, or July. The exceptional terms are as follows: December 1867 to 1868 with 13 months, January to September 1869 with 9 months, October 1871 to 1872 with 14 months (due to December 1872 lasting just 2 days when Japan changed from the Lunar calendar to the Gregorian), January to June 1875 with 6 months, and July 1885 to March 1886 with 9 months.
- Sources: MOF History Office (1998b), pp. 358–391, Meiji zaiseishi hensankai (1904b), pp. 165–392, Omori (2001).

Figure 8 Real economic growth, prices, and trade balance



(1) Real GNP growth rate

Sources: 1877–87 are from Muroyama (2014), p. 188 (estimated using consumption deflator only). 1886– 1930 are from Ohkawa and Shinohara (1979), using revised deflators of imports and exports from Ohkawa, Takamatsu, and Yamamoto (1974). 1931–44 and 1947–55 are from Miwa and Hara (2007) reprinting the government statistics. 1945–46 are from Mizoguchi and Nojima (1992).

(2) Prices



Sources: 1875–89 are from Arita and Nakamura (1992). WPI, 1897 base in 1889–1912 are from BOJ Statistics Department (1966a), p. 76. The other WPI, retail sales price index, CPI are from Miwa and Hara (2007) reprinting the official statistics.









Figure 9 The Bank's balance sheet in 1882–96

Note: As for the Nominal GNP used in the ratio, see Figure 3 and the appendix. Sources: BOJ Centennial Committee (1986b) and the aforementioned material of BOJ archives No. 80901.

Figure 10 Paper money, bank notes, and specie reserves in 1882–96





Sources: MOF (1932b), pp. 286–290, MOF (1932c), pp. 391–393, Asahi shimbun (1930), p.118, Toyo keizai (1927), p.147.



Figure 11 The Bank's balance sheet in 1897–1913



Figure 12 The Bank's balance sheet in 1914–19



Figure 13 The Bank's balance sheet in 1920–28



Figure 14 The Bank's balance sheet in 1928–31, and in 1932–36



Figure 15 The Bank's balance sheet in 1936–45



Figure 16 The Bank's balance sheet in 1945–52





(1) Total assets and items in terms of ratio to GDP

Ratio to GDP, percent

Ratio to GDP, percent

Notes: Ratios are a monthly value to a seasonally adjusted annual rate of a quarter with the month. We use monthly values here as the average of data of the current and the previous months for consistency with the mid-month basis. The items are the same as those in 1955, except "Purchase w/ resale, etc." (fundsupplying operations such as purchases with a resale agreement and advance against government securities as collateral) and "Trust property, etc." (such as stocks held as trust property, asset-backed securities, commercial papers, corporate bonds, equity trust funds, real estate investment trust funds).

(2) Total assets and nominal GDP (quarterly annual rate, seasonally adjusted)



Note: Nominal GDP in 1955-79, 1980-94, 1995-2008, 2009-19 is the 1990 base, the 2000 base (chain weighted), the 2011 base (chain weighted), and the 2015 base, respectively.

Sources: Bank of Japan, Bank of Japan Statistics, Economic Statistics of Japan, Economic Statistics Annual, Economic Statistics Monthly, Financial and Economic Statistics Monthly; Cabinet Office, National Accounts.

References

- Adachi, Seiji, *Datsu defure no rekishi bunseki: seisaku regime tenkan de tadoru kindai nippon* (Historical analyses of fighting deflation: modern history of Japan from policy regime change), Fujiwara shoten, 2006.
- Amamiya, Masayoshi, "History and theories of yield curve control: keynote speech at the financial markets panel conference to commemorate the 40th meeting" Bank of Japan, 2017. (https://www.boj.or.jp/en/about/press/koen_2017/ko170111a.htm, November 30, 2023)
- Arita, Fumiko and Takafusa Nakamura, "Tokyo ni okeru oroshiuri bukka shisu no ichisuikei: 1830–1936 nen (An estimate of wholesale price index in Tokyo: 1830–1936)," Jinbun shakai kagaku ronshu 5, Toyo eiwa university, 1992, pp. 39–66.
- Asahi shimbun, Nihon keizai tokei sokan (Source book of Japan's economic statistics), Asahi shimbun, 1930.
- Asakura, Kokichi and Chiaki Nishiama eds. *Nihonkeizai no kaheiteki bunseki 1868–1970* (Monetary analysis of Japanese economy), Sobunsha, 1974.
- BOJ (Bank of Japan), *The Recent Economic Development of Japan*, Tsukiji type foundry, 1915.
- —, The Financial and Commercial Statistics of Japan, Bank of Japan, 1923.
- —, Annual Report for the year 1940 (abridged), Bank of Japan, 1941.
- *—____, Business Report 1945–1947*, Bank of Japan, 1949.
- —, Annual Report 1949, Bank of Japan, 1950.
- BOJ Centennial Committee, *Nippon ginko hyakunenshi* (The centennial history of the Bank of Japan), volumes 1–6 and an appendix volume, Bank of Japan, 1982, 1983a, 1983b, 1984, 1985, 1986a, 1986b.
- BOJ IMES (Institute for Monetary and Economic Studies), "Workshop wagakuni ni okeru zaiseito chuoginko no katsudo rekishi teki siten kara no moyo (Summary of the workshop: Japan's fiscal and central banking developments from historical perspective)" Monetary and Economic Studies 20(3), Bank of Japan IMES, 2001, pp. 93–114.
- BOJ Monetary Affairs Department, "Central Bank Finances and Monetary Policy Conduct," *BOJ Report and Research Papers*, December 2023, pp. 1–63. (https://www.boj.or.jp/en/research/brp/ron_2023/ron231212a.htm, December 13, 2023)
- BOJ Policy Planning Office, "*Nihon ginko no seisaku gyomuto baransu shito kaiteiban* (Policy, Operations, and the Balance Sheet of the Bank of Japan, revised edition)," *Nippon ginko chosa kiho*, Autumn 2004, pp. 73–93.
- BOJ Research Department, *Nihon kinyu shi shiryo Meiji Taisho hen* (Materials on Japanese financial history 1868–1926), volumes 8, 9, 10, 11, Ministry of Finance Printing

Bureau, 1956a, 1956b, 1957,1958.

- *Nihon kinyu shi shiryo Showa hen* (Materials on Japanese financial history 1926–45), volumes 5, 9, 35, Ministry of Finance Printing Bureau, 1963, 1964, 1974.
- —, Nihon kinyu shi shiryo Showa zokuhen (Materials on Japanese financial history 1945–55), volume 1, MOF Printing Bureau, 1978.
- BOJ Research and Statistics Department, "Heisei 7 nendo [1995 nendo] no kinyu oyobi keizai no doukou (Annual review of financial and economic developments in fiscal 1995)," Nippon ginko geppo June issue, Bank of Japan, 1996, pp.1–72.
- BOJ Statistics Department, *Meiji iko honpo shuyo keizai tokei* (Hundred-year statistics of the Japanese economy), Bank of Japan, 1966a.
- ——, Supplement to Hundred-year Statistics of the Japanese Economy, English Translation of Explanatory Notes, Bank of Japan, 1966b.
- Bratter, Herbert M., "Japanese Banking," Bureau of Foreign and Domestic Commerce Trade promotion series No. 116, the U.S. Department of Commerce, 1931.
- Cohen, Jerome, Japan's Economy in War and Reconstruction, University of Minnesota Press, 1949.

Department of Finance, The History of National Debts in Japan, Okurasho, 1890.

- —, *The Report on the War Finance*, Department of Finance, 1906.
- —, The Fourteenth Finance and Economic Annual of Japan, Government Printing Office, 1914.
- -----, *The Fortieth Finance and Economic Annual of Japan*, Government Printing Office, 1940.
- Ericson, Steven J., Financial Stabilization in Meiji Japan: The Impact of the Matsukata Reform, Cornell University Press, 2019.
- Ferguson, Niall, Andreas Schaab, Moritz Schularick, "Central Bank Balance Sheets: Expansion and Reduction since 1900," CESIfo Working Paper No. 5379, May 2015.
- Ferguson, Niall, Martin Kornejew, Paul Schmelzing and Moritz Schularick, "The Safety Net: Central Bank Balance Sheets and Financial Crises, 1587–2020," CEPR Discussion Paper Series 17858, January 2023.
- Fujino, Shozaburo, Nihon no money supply (Japan's money supply), Keiso shobo, 1994.
- Fujino, Shozaburo and Juro Teranishi, *Nihon kinyu no suryo bunseki* (Quantitative analysis of Japanese finance), Toyo keizai inc., 2000.
- Fukao, Kyoji, Naofumi Nakamura and Masaki Nakabayashi eds., Nihon keizai no rekishi (A history of Japanese economy) vol. 3, 4, 5, Iwanami shoten, 2017a, 2017b, 2018.
- Goldsmith, Raymond W., *The Financial Development of Japan 1868–1977*, Yale University Press, 1983.
- Hayashi, Takehisa ed., Okurasho nenpo (MOF annual reports), vol. 1, 2, 3, 4, 5, 6, 7, 8, 9,

10, 11, Nihon tosho center, 2001a.

- ——, "Okurasho nenpo dai 2 kai (MOF 2nd annual report from July 1875 to June 1876)," Okurasho nenpo vol.1, Nihon tosho center, 2001b, pp. 1–95.
- ——, "Okurasho nenpo dai 4 kai (MOF 4th annual report from July 1877 to June 1878," Okurasho nenpo vol.2, Nihon tosho center, 2001c, pp. 1–83.
- ——, "Okurasho nenpo dai 12 kai (MOF 12th annual report from July 1885 to March 1886," Okurasho nenpo vol.5, Nihon tosho center, 2001d, pp. 1–200.
- -----, "Okurasho nenpo dai 13 kai (MOF 13th annual report from April 1886 to March 1887," Okurasho nenpo vol.5, Nihon tosho center, 2001e, pp. 1–226.
- ——, "Okurasho nenpo meiji 27 nendo (MOF annual report for fiscal 1994, from April 1894 to March 1895," Okurasho nenpo vol.8, Nihon tosho center, 2001f, pp. 1– 299.
- Hirayama, Kenichi, *Nichigin ETF mondai* (The issue of the BOJ's ETF), Chuo keizaisha, 2021.
- Hoshi, Takeo, and Anil Kashyap, *Corporate Financing and Governance in Japan: The Road to the Future*, The MIT Press, 2001.
- Ide, Eisaku, "Shinki kokusai no nichigin hikiuke hakkouseido wo meguru nihon ginko ookurasho no seisakusiso: kanri tsuka seido heno ikoki ni okeru aratana seisaku taikei (Policy debates on public finance between the Ministry of Finance and the Bank of Japan from 1930 to 1936)," Kinyu kenkyu 20(3), Bank of Japan IMES, 2001, pp. 171–202.
- Japan Statistical Association and Statistics Bureau (Statistics Bureau of the Ministry of Internal Affairs and Communications), *Historical Statistics of Japan New Edition*, Japan Statistical Association, 2007.
- Kaya, Okinori, Senzen sengo 80 nen (80 years before and after the war), Keizai ohraisha, 1976.
- Koike, Ryoji, "1940 nendai no kakei shohi no hokan (Interpolation of Japan's household consumption during World War II)," Keizai kenkyu 71(4), Hitotsubashi University Institute for Economic Research, 2020, pp. 289–316.
- Kuroda, Haruhiko, Zaisei kinyu seisaku no seiko to shippai (Success and failure of fiscal and monetary policies), Nihon hyoronsha, 2005.
- Matsukata, Masayoshi, *Report on the Adoption of the Gold Standard in Japan*, Government Press, 1899.
- -----, Report on the Post-bellum Financial Administration in Japan 1896–1900, Okurasho, 1901.
- Meiji zaiseishi hensankai, *Meiji Zaiseishi* (Financial history of Meiji era, 1868–1912), vol. 1, 3, 9, 11, 12, 13, 14, 15, Maruzen, 1904a, 1904b, 1904c, 1905a, 1905b, 1905c, 1905d, 1905e.
- MOF (Ministry of Finance), "Junbikin shimatsu (A chronology of the reserve fund)," MOF ed. Meiji zenki zaisei keizai siryo shusei (Materials of fiscal and economic

history in the early Meiji era), vol.11, Kaizosha, 1932a, pp. 1-46.

- —, "Shihei seiri shimatsu (A chronology of government paper money)," MOF ed. Meiji zenki zaisei keizai siryo shusei (Materials of fiscal and economic history in the early Meiji era), vol.11, Kaizosha, 1932b, pp. 181–311
- —, "Meiji 30 nen heisei kaikaku shimatsu gaiyo (A summary of monetary reform for the gold standard in 1897)," MOF ed. Meiji zenki zaisei keizai siryo shusei (Materials of fiscal and economic history in the early Meiji era), vol.11, Kaizosha, 1932c, pp. 315–593.
- MOF ed. *Meiji zenki zaisei keizai siryo shusei* (Materials of fiscal and economic history in the early Meiji era), vol.11, Kaizosha, 1932d.
- MOF and BOJ, Zaisei keizai toukei nenpo showa 23 nen (Fiscal and economic statistics annual of 1948), Okura zaimu kyokai, 1948.
- MOF History Office (MOF, Financial History of Showa Office), *Showa zaiseishi* (Financial history of Showa, 1926–45), Vol. 4, 11, Toyo keizai inc., 1955, 1957.
- MOF History Office (MOF, Financial History Office), *Showa zaiseishi: shusen kara kowa made* (Financial history of Showa, 1945–52), vol. 19, Toyo keizai inc., 1978.
- —, Okurashoshi: Meiji, Taisho, Showa (The history of the Ministry of Finance) Vol. 1–
 3, Okura zaimu kyokai, 1998a, 1998b, 1998c.
- MOF History Office (MOF, Office of Historical Studies), *Fiscal and Monetary Policies of Japan in Reconstruction and High Growth 1945 to 1971*, Office of Historical Studies, Institute of Fiscal and Monetary Policy, Ministry of Finance, 2010.
- Miwa, Ryoichi and Akira Hara eds., *Kingendai nihon keizaishi yoran* (A survey of Japan's economic history for modern and post-modern period), University of Tokyo Press, 2007.
- Mizoguchi, Toshiyuki and Noriyuki Nojima, "*Nihon no kokumin keizai keisan*: 1940–55 (Japan's national accounts: 1940–55)", *The Hitotsubashi Review*, 107(6), 1992.
- Muroyama, Yoshimasa, *Matsukata zaisei kenkyu* (Studies on Matsukata's financial policy), Minerva shobo, 2004.
- —, Matsukata Masayoshi: wareni kisaku arazu tada shojiki aru nomi (No surprise. Honesty is the best policy), Minreva shobo, 2005.
- —, Kindai nihonkeizai no keisei: Matsukata zaisei to Meiji no kokka koso (Evolution of the modern Japanese economy: Matsukara's fiscal policies and national plans in Meiji), Chikura shobo, 2014.
- Nakamura, Takafusa, *Lectures on Moden Japanese Economic History 1926–1994*, LTCB International Library Foundation, 1994.
- Nakamura, Takafusa, edited by Hara, Akira and Hiroshi Abe, *Meiji taisho shi* (History of Meiji era and Taisho era) vol.1, University of Tokyo Press, 2015.
- Nakaso, Hiroshi, "Evolving Monetary Policy: The Bank of Japan's Experience, Speech at the Central Banking Seminar Hosted by the Federal Reserve Bank of New York," Bank of Japan, October 18, 2017.

(https://www.boj.or.jp/en/about/press/koen 2017/ko171019a.htm)

- National Monetary Commission, *Banking in Russia, Austro-Hungary, The Netherlands and Japan*, Senate Document No. 586, Government Printing Office, 1911.
- Nishikawa, Motohiko, *Chuo ginko: central bank no rekishi to riron* (Central bank: its history and theory), Toyo keizai inc., 1984.
- Nishimura, Yoshimasa ed., *Fukkou to seicho no zaisei kinyu seisaku* (Fiscal and Monetary Policies of Japan in reconstruction and high-growth: 1945–71)," the Policy Research Institute, Ministry of Finance, 1994.
- Ohkawa, Kazushi, Nobukiyo Takamatsu and Yuzo Yamamoto, *Estimate of Long-term Economic Statistics of Japan since 1868 vol. 1 National Income*, Toyo keizai inc., 1974.
- Ohkawa, Kasuzhi and Miyohei Shinohara eds., Patterns of Japanese Economic Development: A Quantitative Appraisal, Yale University Press, 1979.
- Omori, Toru, "*Meiji shoki no zaisei kozo kaikaku, ruiseki saimu shori to sono eikyo* (Fiscal reform, public debt consolidation, and their effects in the early Meiji era)," *Kinyu kenkyu* 20(3), Bank of Japan IMES, 2001, pp. 115–158.
- Patrick, Hugh, "Japan: 1868–1914", Rondo Cameron ed., *Banking in the Early Stages of Industrialization*, Oxford University Press, 1967, pp. 239–289.
- Reischauer, Edwin O. and Albert M. Craig, *Japan: Tradition and Transformation*, Charles E. Tuttle Company, 1978.
- Saito, Makoto, Strong Money Demand in Financing War and Peace: the Cases of Wartime and Contemporary Japan, Springer, 2021.
- Sawada Akira ed., "Segaiko jireki ishin zaiseidan, 1921 nen kan (Interview with Inoue Kaoru about early Meiji era, issued first in 1921)" Ryukei shosha, Meiji kouki sangyo hattasu shiryo vol.264, Ryukei shosha, 1995.
- Shibamoto, Masahiko and Masato Shizume, "Exchange rate adjustment, monetary policy and fiscal stimulus in Japan's escape from the Great Depression," *Explorations in Economic History*, 53, 2014, pp. 1–18.
- Shima Kinzo, "*Iwayuru takahashi zaisei ni tsuite* (Takahashi's macroeconomic policies)," *Kinyu kenkyu* 2(2), Bank of Japan IMES, 1983, pp. 83–124.
- Shirakawa, Masaaki, "Gendai no Kinyu seisaku: riron to jissai (Monetary policy: theory and practice)," Nikkei inc., 2008.
- Shiratsuka, Shigenori, "Size and composition of the central bank balance sheet: revisiting Japan's experience of the quantitative easing policy," *Monetary and Economic Studies*, Vol.28, Bank of Japan IMES, November 2010.
- ——, "Kinko jissitu kinri no teika ni taiou shita kinyu seisaku no houkousei (Monetary policy and the decline of real interest rates in equilibrium)" Kinyu zaisei jijo, March 11 issue, Kinyu zaisei jijo kenkyukai, 2019, pp. 32–35.
- Shizume, Masato, "Zaisei kiritsuto chuo ginko no baransu shito (Fiscal discipline and the central bank balance sheet)," Kinyu kenkyu 20(3), Bank of Japan IMES, 2001,

pp. 213–257.

- —, Sekai kyoko to keizai seisaku: kaiho shokoku nihon no keikento gendai (Global depression and economic policy: Japan's experience as a small-open economy and the present), Nikkei inc., 2009.
- —, "The Historical Evolution of Monetary Policy (Goals and Instruments) in Japan: From the Central Bank of an Emerging Economy to the Central Bank of a Mature Economy," Battilossi, Stefano, Youssef Cassis, and Kazuhiko Yago eds., Handbook of the History of Money and Currency, Springer, 2020, pp. 923–952.
- ——, The Japanese Economy During the Great Depression: the Emergence of Macroeconomic Policy and Open Economy, 1931–1936, Springer, 2021.
- Statistics Bureau (Statistics Bureau of the Management and Coordination Agency), *Historical Statistics of Japan*, Vol. 3., Japan Statistical Association, 1988.
- Tamaki, Norio, Japanese Banking: A History, 1859–1959, Cambridge University Press, 1995.
- Teranishi, Juro, *Nihon keizai no hatten to kinyu* (Japan's economic developments and finance), Iwanami shoten, 1982.
- Toyo keizai, Meiji taisho kokusei soran (Source book of Japan's strength, 1868–1926), Toyo keizai inc., 1927.
- —, Toyo keizai keizai nenkan (Toyo keizai economic annual, from 1917 to 1943), Toyo keizai inc., 1918–44.
- Tsuchiya, Takao, "*Nihon ginko hanki hokoku kaidai* (Explanatory notes for BOJ semiannual report)," BOJ Research department, *Nihon kinyushi shiryo meiji taisho hen*, vol. 8, Ministry of Finance printing bureau, 1956a, pp. 1–93.
- , "Nihon ginko hanki hokoku zoku (Explanatory notes continued for BOJ semiannual report)," BOJ Research department, Nihon kinyushi shiryo meiji taisho hen, vol. 9, Ministry of Finance printing bureau, 1956b, pp. 1–82.
- —, "Nihon ginko hanki hokoku eigyo hokoku jigyo nendo jigyo gaikyo kaidai (Explanatory notes for BOJ semiannual report, business report, annual business summary)," BOJ Research department, Nihon kinyushi shiryo showa hen, vol. 5, Ministry of Finance printing bureau, 1963, pp. 1–38.
 - —, "Nihon ginko jigyo nendo jigyo gaikyo, seisaku iinkai hokoku, tokubetsu keizai geppou kaidai (Explanatory notes for BOJ annual business summary, annual report to the board, and special economic reports)" BOJ Research department, Nihon kinyushi shiryo showa zoku hen, vol. 1, Ministry of Finance printing bureau, 1978, pp. 1–66.
- Umemura, Mataji and Takafusa Nakamura eds., *Matsukata zaisei to shokusan kogyo seisaku* (Public finance under Matsukata and policies for promoting industries), United Nations University, 1983.
- Yamada, Yuzo, Nihon kokumin shotoku suikei siryo zoho ban (Estimates of Japan's national accounts), Toyo keizai inc., 1957.

- Yamamoto, Yuzo, *Ryo kara yen ye: meiji zenki kahei mondai kenkyu* (From Ryo to Yen: monetary research issues in the early Meiji era), Minerva shobo, 1994.
- Yamasaki, Shiro, *Taiheiyo sensoki no bussi doin keikaku* (Materials mobilization plan in the Pacific War), Nihon keizai hyoronsha Ltd., 2016.