

Discussion Paper Series No.191

**A Myth of “the Keynesian before Keynes:”
Low Interest Rate Policy in the Early 1930s in Japan**

SHIZUME Masato Kobe University

June 2006

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A Myth of “the Keynesian before Keynes:”

Low Interest Rate Policy in the Early 1930s in Japan

Masato Shizume*

Research Institute for Economics and Business Administration

Kobe University

Rokkodai 2-1, Nada-ku, Kobe 657-8501, Japan

E-mail:shizume@rieb.kobe-u.ac.jp

June 2006

[Abstract]

Departing from the gold standard was the necessary condition for early recovery from the Great Depression in 1930s (Eichengreen and Sachs[1985]). Then, was it the sufficient condition for an independent monetary policy? I explore Japan's monetary policy during the interwar period, focusing on the macroeconomic policy innovation in the early 1930s. I explore the view of the Japanese policymakers at that time, making use of newly available archives from the Bank of Japan. I derive a new series of representative long-term interest rate data from the market price of one particular government bond. Then, I explore the relationship between long-term interest rates of Japan and the two financial centers, Great Britain and the United States. The Japanese experience shows how strong the Golden Fetters were during the post-gold-standard era. The institution of the gold standard had an enduring influence on Japanese policymakers, even after its constraints were no longer formally binding.

JEL Classification: E42, N15

* I thank Mariko Hatase, Hideki Izawa, John James, Yoichi Matsubayashi, Ryuzo Miyao, Takashi Nanjo, Kunio Okina, Mari Onuki, Hugh Rockoff and Richard Smethurst for helpful comments and discussions. Any remaining errors are of my own.

1. Introduction

The international gold standard was regarded as the most sophisticated monetary institution before the First World War (WWI). London was the world financial center. Policymakers around the world followed “the rules of the game” of the gold standard to keep the gold parity. And the efforts by the policymakers strengthened the international monetary system as a whole.

The situation changed after WWI. Money did not flow from creditor countries to debtor countries as before. After the suspension of the gold standard during WWI, the policymakers tried to restore the gold standard. Their efforts did not succeed and ended up with the Great Depression. In retrospect, the policymakers were obsessed by the Golden Fetters (Eichengreen [1995]).

Departing from the gold standard was the necessary condition for early recovery from the Great Depression in 1930s (Eichengreen and Sachs[1985]). Then, was it the sufficient condition for independent monetary policy? In this study, the case for Japan shows that the answer was NO. The Japanese experience shows how strong the Golden Fetters were during the post-gold-standard era. The institution of the gold standard had an enduring influence on Japanese policymakers, even after its constraints were no longer formally binding.¹

Japan’s economic policy during the interwar period was strongly influenced by both the gold standard and the Great Depression. Japan joined the gold standard in October 1897. Japan suspended the gold standard in September 1917, following the Western countries. Japan tried to return to the gold standard in the 1920s, and finally

¹ This study is complement to Eichengreen [1995] in a sense. He views the gold standard system as a kind of decentralized cooperation mechanism with inherent vulnerability. He describes the Great Depression as a case for the vulnerability came real. His study focuses mainly on the core countries though he mentioned some peripheral countries including Japan. This study is an attempt to explore how a peripheral country looked at and responded to the collapse of the system.

did so in January 1930. Japan departed from the gold standard in December 1931 under the leadership of Korekiyo Takahashi, who returned to the Finance Minister position, in the midst of the Great Depression.

Many observers argue that Takahashi brought new policy institutions. They are impressed by economic policies conducted by Takahashi and his colleagues in the early 1930s. Some claim that Takahashi intuitively understood the mechanism of the Keynesian policy before Keynes' seminal work of *General Theory of Employment, Interest and Money* in 1936, and virtually carried out Keynesian policies without any contact with Keynes and his colleagues.² Some argue that Takahashi's three-pronged economic stimulus package, depreciation of the yen, expansion of government spending, and lowering of interest rates, contributed to the early recovery of the Japanese economy from the Great Depression (Nakamura [1971], Patrick [1971]). Some argue that Takahashi's era was the turning point of policy regime from laissez-faire to active interventions and strict control of the national economy by the government in Japan (Miwa [1982], Ito [1989]).

There are only a few previous studies employing quantitative analyses on Takahashi's economic policies. Nanto and Takagi [1985] stress the effects of the increase in exports accompanying the depreciation of the yen. Cha [2003] emphasizes the effects of the debt-financed fiscal expansion. Yet, very few have focused on the developments of monetary policy during Takahashi's era. Most previous studies have been constrained by the lack of data and historical materials when conducting empirical research on monetary policy in the interwar Japan.

I explore Japan's monetary policy during the interwar period by focusing on the macroeconomic policy innovation in the early 1930s. I explore the contemporary view of

² Kindleberger [1973], pp.166-167. I define the Keynesian policy as a discretionary macroeconomic policy either on the monetary or fiscal side associated with a managed currency system.

the Japanese policymakers at that time, making use of newly available archives from the Bank of Japan (BOJ). I derive a new series of representative long-term interest rate data from the market price of one kind of government bond to overcome the data constraints. And I explore the relationship between long-term interest rates of Japan and the two financial centers, Britain and the United States.

2. Macroeconomic Policy Trilemma

Obstfeld and Taylor [1997, 2004] utilize the concept of the macroeconomic policy trilemma in historical studies of a number of countries' monetary policies. They claim that a chosen macroeconomic policy regime can only succeed in at most two out of three goals:

- 1) full freedom of cross-border capital movements,
- 2) a fixed exchange rate,
- 3) independent monetary policy oriented toward domestic objectives.

They argue that the gold standard is the typical case of maintaining free capital movements and a fixed exchange rate, while sacrificing independent monetary policy. They also argue that national policymakers became more inclined to controlling international capital flows after the financial upheavals of the Great Depression.³

Kindleberger describe the essence of Takahashi's economic policies as deficit financing with the flexible exchange rates.⁴ Kindleberger's notion presumes that if the Japanese policymakers decided to pursue an independent monetary policy which enabled deficit financing, they should also move to the flexible exchange rate system.⁵

Interwar Japan was a typical small and open economy, and its economic

³ Komiya and Suda [1983] look at the postwar Japan's choices of monetary policy regime and exchange rate system in the same context.

⁴ Kindleberger [1973], p.166.

⁵ In the same context, Hamilton [1988] claims that the government's commitment to fiscal soundness and monetary stability was the essential part of the gold standard.

policies were subject to international conditions. The question is; were the Japanese policymakers, including Takahashi, free from the influence of the fixed exchange rate system? A flexible exchange rate system might not have been applicable to post-gold-standard Japan as it was a small and open economy. If so, how did Takahashi and his colleagues bring a quick and robust recovery in the midst of the Great Depression? I will try to answer these questions in the remainder of this paper by employing narrative and quantitative analyses.

3. Some Basic Facts

I will now review some related events, focusing on the return to and departure from the gold standard. Then, I will look at macroeconomic indicators.

Japan lifted the gold embargo and effectively resumed convertibility of the yen on January 11, 1930. Japan was the last of the gold club member countries to return to gold standard after World War I. Japan imposed the gold embargo again and effectively departed from the gold standard on December 13, 1931. The day of Japanese departure was about 3 months after the British departure, and the first day that Takahashi became Finance Minister again. Takahashi served as Finance Minister, except for a few months, until February 26, 1936, when he was assassinated by a group of militarists.⁶

Japan stayed the gold standard for less than 2 years. The period of *de jure* gold standard for interwar Japan was shorter than any other gold club members.⁷ That does not mean, however, that Japan was free from the enduring influence of the gold standard in the pre- and post-gold standard period.

Figure 1 shows the developments in the yen rate to the pound-sterling and to

⁶ He once resigned on the cabinet resignation in July 1934, and came back in office in November of the year.

⁷ The second shortest next to Japan is Switzerland, which stayed on gold for 3 years and 2 months (August 1928-September 1931), and the third is Norway, which stayed on gold for 3 years and 5 months (May 1928-September 1931). Bank of Japan [1997].

the dollar. It confirms the commitment to the par rate during *de jure* gold standard. It also suggests efforts by Japanese government to stabilize the yen at around the pre-WWI par rate during the pre-gold standard period. It highlights the sharp decline right after the departure from the gold standard. The yen depreciated by 40 percent vis à vis the pound-sterling from the old parity rate when the rate was stabilized again at the new level in the beginning of 1933.

I should note that for Japan, departing from the gold standard did not necessarily mean moving to a flexible exchange rate system. Rather, it meant a one-shot devaluation under a fixed exchange rate system. As a small open economy, Japan had good economic reasons to peg: to settle its trade account and to give relief to international investors.⁸ Also, Japan had a good political reason to return to and stay on the gold standard. One of the criteria for participating in the establishment of Bank for International Settlements (BIS) in 1929 was to have a “stable currency.”⁹

Figure 2 shows the developments in prices of goods and stocks from January 1928 through December 1936. Commodity prices declined in 1930 and 1931. Compared to the end of 1928, the wholesale price index fell by 39 percent, and the retail price index fell by 31 percent by October 1931. Prices of goods rebounded in the first half of Takahashi’s term and were stable for the remainder of his term.

Stock prices dropped before the return to gold and stagnated during the gold standard period. They rebounded during Takahashi’s term. The *Oriental Economist*

⁸ Previously issued Japanese external bonds matured in January 1931. The bonds were issued in 1905 during the Russo-Japanese War and denominated in the pound-sterling. Before the Japanese returning to gold, the Western investors insisted that the stable currency of Japan was prerequisite for the debt conversion. Japan successfully issued refinancing bonds in May 1930, after returning to gold.

⁹ In the negotiation in the Young Committee, “the stable currency” referred to keeping gold parity. Japan succeeded to include an exceptional clause for a victorious county to be able to participate without referring to the stable currency clause. Still, Japanese negotiators regarded joining to and staying on the gold standard as a source of power within BIS. Cho [2001], p.100.

Stock Price Index peaked in July 1928, fell by 64 percent by October 1930, and stagnated afterwards until the end of 1931. It surged during the first half of Takahashi's term, and regained its 1928 peak level by the beginning of 1934.

Figure 3 shows the developments in interest rates. The Bank of Japan (BOJ) kept its official discount rate (ODR) at 5.48 percent through 1928-29, and reduced the rate to 5.11 percent in October 1930. After the British departure from gold in September 1931, BOJ raised the rate twice to 6.57 percent through the end of the year to suppress capital outflow.

After departing from the gold standard, BOJ reduced the rate three times in 1932 and once in 1933. The rate fell to an unprecedented low of 3.65 percent from July 1933 through the end of Takahashi's term.¹⁰

I should note that interest rates in private sector were higher than the ODR and more or less uncorrelated with the ODR. That may have reflected high credit risk premium on private debts under the financial instability in interwar Japan. I will return to this point later in this paper.

Figure 4 shows the developments in monetary aggregates. "Cash in circulation" (the definition close to M1) peaked in August 1929 and dropped by 26 percent by June 1931. It rebounded during Takahashi's term.¹¹ Increase in money during Takahashi's term was consistent with fall in interest rates, reflecting easy monetary policy.

In general, macroeconomic indicators show signs of contraction during the period on gold and signs of recovery during Takahashi's term.

¹⁰ BOJ further lowered the rate to 3.29 percent in April 1936 after the assassination of Takahashi.

¹¹ From September 1931, BOJ began to report monthly data of "bank deposits" and "bank lending" at the biannual Meetings of Directors and Branch Managers. "Bank deposits" shows similar developments with "cash in circulation." It is presumable that reporting of "bank deposits" itself reflects BOJ's attempts for maintaining price stability without the anchor of gold.

4. Narrative Analyses

I will now explore the views of the Japanese policymakers at that time, especially at BOJ. I make use of newly available materials from the BOJ Archive, including the minutes of the biannual Meetings of Directors and Branch Managers.¹²

The narrative analyses illustrate the enduring influence of the gold standard on policy. The analyses suggest that Japanese policymakers were not free from the Golden Fetters before returning to, and even after departing from, the gold standard. The policymakers sacrificed monetary policy autonomy in order to stabilize the exchange rate and to maintain free capital movements under *de jure* gold standard. The policymakers also did the same thing during the suspension period of the gold standard in 1920s. The policymakers had a “fear of floating” after departing from the gold standard in December 1931.

(1) The Period of the Suspended Gold Standard (1919-1929)

BOJ Archive materials show that Japanese policymakers intended to return to the gold standard eventually, but for various reasons held back from doing so in a hurry. Incidents such as the Great Kanto Earthquake in September 1923 and the Financial Panic in spring of 1927, hinder the government’s final decision.

When Britain returned to gold standard in April 1925, Osachi Hamaguchi of Kensei-Kai Party was Finance Minister.¹³ He claimed that, in commenting on the British action, “We wish to follow them immediately, since that is on the right track of

¹² BOJ Archives became open to the public in 2002, but some of the documents were published by BOJ before that.

¹³ Both of Kensei-Kai (later Minsei-To) and Seiyu-Kai parties supported returning to the gold standard. Kensei-Kai was more active in promoting the preparation measures such as tight money and balanced budget, but the difference was only a matter of nuance. Cho [2001], p.101.

the gold standard. Unfortunately, we cannot do so right now because our conditions today do not allow it.”¹⁴

In January 1928, Finance Minister Chuzo Mitsuchi of Seiyu-Kai Cabinet announced that conditions were improving. He said, “We see good progress in business and financial restructuring since the Financial Panic of last spring. . . The balance of payments is improving. Exchange rates are steady reflecting favorable fundamentals without any artificial measures.”¹⁵

On July 2, 1929, Seiyu-Kai Cabinet resigned and Hamaguchi of Minsei-to Party (ex-Kensei-Kai) came to power. The Hamaguchi cabinet was committed to early lifting of the gold embargo. Former BOJ Governor Junnosuke Inoue joined the cabinet as Finance Minister.

On August 28, Prime Minister Hamaguchi distributed a leaflet to all families in Japan, and made a radio speech about the gold standard. In the leaflet, he said, “I believe that our country should lift the gold embargo immediately and get back on the right track of the international economy. . . To prepare for this, we must tighten our public and private economies as much as possible to decrease prices and imports. . . We should shrink today to grow tomorrow.”¹⁶

On November 21, Hamaguchi announced, “With all the internal and external preparation completed, I am now convinced that there are no economic obstacles to lifting the gold embargo. I order the Ministry of Finance (MOF) to lift the gold embargo, effective on January 11, 1930.”¹⁷

¹⁴ “Statement by Finance Minister Osachi Hamaguchi,” *Miyako Shinbun*, April 30, 1925, reprinted in Bank of Japan [1968], pp.390-391.

¹⁵ “Address by Finance Minister Chuzo Mitsuchi,” *Parliamentary Paper, House of Representatives*, January 21, 1928, reprinted in Bank of Japan [1968], pp.83-84.

¹⁶ “Zen-Kokumin-ni Uttau” (Call upon All the People), August 28, 1929, reprinted in Bank of Japan [1968], pp.395-396.

¹⁷ “Kin-Kaikin-ni Saisite” (On Lifting of the Gold Embargo), November 21, 1929, reprinted in Bank of Japan [1968], pp.396-397.

(2) The Period on Gold (1930-1931)

On January 11, 1930, Japan returned to the gold standard, and stayed on gold for 1 year and 11 months. The BOJ Archive materials show that Japanese policymakers clearly sacrificed monetary policy autonomy to maintain gold parity and capital mobility.

BOJ Governor Hisaakira Hijikata spoke at the Spring Meeting of BOJ Directors and Branch Managers on May 11, 1931. At that time, his main concern was how to keep external balance and exchange rate parity, and he felt no responsibility for the domestic economy. He said, "I cannot commit to improving business conditions in Japan's current domestic climate. I can say nothing more than to expect gradual improvement with more efforts by business community. I expect little effects of policy measures for now. . . Exchange rates are generally stable around the par level even in the season of the year in which volume of imports tend to mount. . . I don't expect large specie outflows in the future. . . I expect the balance of payments of fiscal 1931 to be balanced or at a small deficit."¹⁸

Britain abandoned the convertibility of pound-sterling on September 21, 1931, and Japan stayed on gold for 3 months more. BOJ tried to suppress capital outflows to support the gold standard. Market participants anticipated that Japan would follow Britain, inducing massive capital outflows. BOJ raised the ODR twice on October 6 and on November 5. This was the classical gold standard adjustment for a central bank facing capital outflow (Bagehot [1873]).

The Research Department of BOJ submitted a report dated October 13, 1931 to the Fall Meeting of Directors and Branch Managers. It stated, "The British departure

¹⁸ "Documents on the biannual Meetings of Directors and Branch Managers, Spring-Fall, 1931," BOJ Archive No.3942.

from the gold standard triggered other countries to be suspect each other... Rumors floated in London and the European Continent. The rumors suggested that Japan also might impose a gold embargo. . . We have been forced to ship substantial amount of specie abroad. . . BOJ, responsible for maintaining the gold standard and for maintaining specie, has followed the normal principles under such internal and external circumstances, and raised the rate.”¹⁹

Eigo Fukai, a distinguished economist and then Vice Governor of BOJ, later wrote in his memoirs, “In retrospect, it would have been sensible for Japan to depart from the gold standard immediately because the British departure was a change in global situation. . . But Japan held still enough specie, even though it had lost some after the lifting of gold embargo. The trade balance had improved, and the balance of payments was in equilibrium. Considering this, we concluded that it was possible to stay on gold as a matter of pure monetary policy.”²⁰

Fukai’s memoirs suggest the contagious aspect of the British financial crisis. Japan was in a vulnerable position in the international finance. If things went normally, there might be no problem. But, the British financial crisis triggered the capital flight from Japan within the chain-reaction toward the collapse of the international gold standard.

(3) The Period after the Gold Standard (1932-1938)

Fukai wrote in his memoirs that he gave four pieces of advice to the returning Finance Minister Takahashi on December 13, 1931, the day of Takahashi’s appointment.²¹

¹⁹ “Documents on the biannual Meetings of Directors and Branch Managers, Spring-Fall, 1931,” BOJ Archive No.3942.

²⁰ Fukai [1941], pp.251-252.

²¹ According to Fukai’s memoirs, the resigning Finance Minister Inoue consulted Fukai about the transition of foreign exchange arrangements on December 11. Then, Fukai

- 1) impose a gold embargo immediately,
- 2) abandon gold convertibility of the yen with an emergency imperial decree as soon as possible,
- 3) conduct a prudent monetary policy to control the money supply in absence of the gold standard's controls in order to maintain the value of currency,
- 4) take the required legal actions to control foreign exchange transactions if these were necessary.

Fukai got a mixed response from Takahashi. Takahashi resisted the second point of abandoning the gold convertibility, while totally agreeing with the first and third points of immediate gold embargo and prudent monetary policy. Fukai was surprised by Takahashi's resistance on the second point. Fukai surmised, "Mr. Takahashi seemed to want to avoid cutting a formal linkage between gold and the currency." Takahashi was indifferent about the fourth point of foreign exchange control.²²

The Capital Flight Prevention Law was proclaimed on July 1, 1932, and came into effect on the same day. Under the law, the government reserved the power to impose restrictions on foreign exchange transactions.

A MOF official explained that international capital movements were still free in principle and that capital controls were regarded as exceptional under the Capital Flight Prevention Law. Kazuo Aoki, the Chief of Treasury Division, Financial Bureau of MOF, said in an explanatory session in the Diet, "We will secure the freedom of international capital flow in principle."²³

discussed on the issue with MOF, Yokohama Specie Bank and other BOJ officials. Fukai met Takahashi at around 3 pm. on December 13, and Takahashi assumed the office of Finance Minister in the evening of the day. Fukai act as one of primary policy adviser to Takahashi throughout Takahashi's term. Those episodes indicate Fukai's close ties with two Finance Ministers and his key role in the policy transition. Fukai [1941], pp.255-259.

²² Fukai [1941], pp.260-263.

²³ Osaka Bankers Association [1932], pp.107-108.

BOJ Archive materials show that contemporary policymakers at that time were aware of the macroeconomic policy trilemma. Tetsuzo Horikoshi, an executive director of BOJ, spoke about the Capital Flight Prevention Law at the Fall Meeting of Directors and Branch Managers in 1932.²⁴ He said that the purpose of the Law was to give the government the power to regulate foreign exchange transactions. He said, “If money increases by domestic policies, the exchange rate may fall. If we intend to maintain the exchange rate, we should curb our domestic policy. If we dare to pursue the domestic policy, we should sacrifice the exchange rate. We face risk with the gold embargo only. We should bring the equilibrium of balance of payments to stabilize the exchange rate. We may need some measure for balancing the balance of payments.”

Horikoshi expressed “fear of floating” in the speech, mentioning BOJ’s concern for capital flight. He said, “The primary concern for this country (at the time of lifting the gold embargo) was if the domestic investors would rush to foreign securities, inducing massive capital outflows, in the event of declining values of Japanese overseas bonds. BOJ advised the government to prepare for regulating these capital outflows.”

Horikoshi suggested little contradiction between Japanese domestic policy objectives and international capital flows in the current condition, and he indicated no urgent need for tight regulations to avoid capital outflows. He said, “So far, we have been managing with this formula. I don’t know if this kind of formula will be enough if things change in future. We might have to impose tighter regulations such as foreign exchange controls.”

The Foreign Exchange Control Law was proclaimed on March 29, 1933 and came into effect on May 1 of the year. Under the law, the regulations on foreign exchange transactions were substantially extended and tightened. Almost all the

²⁴ “Documents on the biannual Meetings of Directors and Branch Managers, Spring-Fall, 1932,” BOJ Archive No.3943.

transactions related to international capital flows were subject to regulation. At the same time, speculations on foreign exchange were forbidden by finance ministry ordinance.

Some narrative materials suggest that those laws and related actions by the authorities reduced international capital mobility. Takahashi spoke at the Bills Exchange Association Meeting on April 21, 1933. He said, “The government has established the measures to prevent domestic capital from flowing out of control. Now, we are able to pursue low interest rate policy to the full extent.”²⁵ Fukai later noted, “The measures actually adopted for exchange control were of a mild in nature; but a declaration by the Government in November, 1932, that it was determined to enforce drastic measures in case of need proved decisive.”²⁶

We cannot be sure from narrative evidence how strong the need for the foreign exchange control was, and how effective the control was. In this regard, quantitative analyses are supplementary to the narrative analyses.

5. Constructing A Series of Long-Term Interest Rate Data

(1) Previously Available Interest Rate Data

Obstfeld, Shambaugh, and Taylor [2004] use interest rates on bills discounted by banks and bills issued by the government (typically, treasury bills) to explore the relationship of countries' short term rates, including Japanese ones. In their analysis, Japan appears to be an outlier. Their analysis indicates that interest rates in peripheral countries moved together with those in the center country during the interwar period, implying that peripheral countries' monetary policies were more or less dependent on the center country. Their analysis suggests that Japanese interest rates had a weaker

²⁵ “Speech by Finance Minister Takahashi at the Bills Exchange Association Meeting,” Osaka Bankers Association [1933], No. 429, pp.17-25.

²⁶ Fukai [1937], p.392.

relationship with those of center country than did those of other peripheral countries.

The reported results of weak relationship of Japanese interest rates with those of the center country may be due to inadequate data. Previously available short-term interest rate data for the interwar period in Japan were those for private sector debts such as bills discounted at banks or certificates of lending of banks.²⁷ Those interest rates were subject to a high credit risk premium. The Japanese economy suffered from periodical financial panics and financial instability in the interwar period, and private debts were subject to high credit risk.

Figure 5 reports short-term interest rates in private sectors in Japan, Britain and the United States. Apparently, Japanese rates moved differently from the others, while British and American rates moved along with each other. Especially, Japanese rates were higher than the other two rates in the middle of 1920s and 1930s.

Table 1 shows the results of unit root tests for short-term interest rates on private sector debts in the three countries. I employ Augmented Dickey-Fuller (ADF) tests and Phillips-Perron (PP) tests. The results suggest the difference in time-series properties between the short-term interest rates in Japan and in the other two countries. The tests reject the existence of a unit root for Japan, indicating stationarity, while failing to reject the existence of a unit root for Britain and the United States, indicating non-stationarity.²⁸ There are no representative short-term interest rates on public debt in the interwar Japan such as treasury-bill rates to substitute for the existing data.²⁹

²⁷ The interest rates for “bills discounted” and “certificates of lending” were reported by Tokyo Bankers Association. Their maturities varied, and they were often refinanced on maturity. According to Aoki [1932], the average maturities in 1927 were about 2 months for bills discounted and 8 months for certificates of lending (Aoki [1932], p.45). It is often claimed that certificates of lending included various kinds of lending with higher risk and less liquidity than bills discounted. Sano [1936], p.8.

²⁸ To be precise, I get some mixed results. PP test for Britain fails to reject the existence of a unit root, while ADF test reject it at 5 percent level of significance.

²⁹ Treasury bills were issued occasionally during the interwar period. But, they were

There are, however, long-term interest data for government bonds. Nippon Kangyo Ginko (Japan Hypothec Bank) collected the price data for bonds, and calculated compound yields to maturity of the bonds. The series begins only from July 1921, and the data is calculated only for the first working day of each month. Appropriate interest rate data for Japan are needed to explore the international relationship of interest rates.

(2) A New Series of Long-term Interest Rates

I have created a new series of long-term interest rate data. I derived it from the market prices of a government bond called “Ko-go” 5 percent government bond.³⁰ I use the price data of the “Ko-go” at spot transactions of the Tokyo Stock Exchange (TSE). I calculate compound yields to maturity on monthly average prices from January 1919 to December 1938.^{31 32}

During the interwar period, investors traded various types of bonds, including government bonds, municipal bonds and corporate bonds, both in the official markets and over the counter of securities companies. TSE served as the central market of Japan. In November 1932, TSE listed 37 issues of Japanese government bonds, 1 issue of foreign (Chinese) government bond, 95 issues of municipal bonds and 463 issues of corporate bonds at its spot transactions.

For two reasons, the interest rates on government bonds are important for the

circulated for short time and the availability of the interest rate data was limited.

³⁰ “Ko-go” 5 percent bond was issued in 1908-09 after 17 big private railway companies were nationalized in 1906-07. It was delivered to stockholders of previous railway companies. The maturity date was in 1962-63.

³¹ I use the “yield” function of excel spreadsheets. The monthly average price means the sum of traded values of bonds divided by the sum of traded quantities of bonds in a month.

³² I compare the results of my calculation with that of the previously available Nippon Kangyo Ginko data. Nippon Kangyo Ginko did not publish the process of calculation. So, I calculate the yield at the same day and for the same bond as theirs, and the discrepancies are less than 1 basis point (a hundredth of 1 percent).

analyses on monetary policy during the interwar period in Japan. First, the interest rates on government bonds are credit-risk-free interest rates which are comparable to other countries' interest rates. The rates on government bonds do not contain credit risk premium. In this regard, Interest rates on government bonds are different from other available interest rate series such as bills discounted or certificates of lending. Second, they were policy target rates for Japanese policymakers in the 1930s.³³ Fukai later observed Japanese monetary policy in the early 1930s as "Lowering interest rates on government bonds was essential to lower interest rates in general."³⁴ The BOJ in the 1930s regarded the open market operation of government bonds as one of its primary policy measures.

I have used "Ko-go" 5 percent government bond for deriving the representative long-term interest rate during the interwar period in Japan because investors regarded the "Ko-go" as the benchmark issue. The "Ko-go" was the most-actively-traded bond during the interwar Japan. Trading in the "Ko-go" accounted for 18 percent of the total number of transactions in government bonds at TSE in 1932.

6. Econometric Analyses

Using government bond data, I will now explore the relationship between long-term interest rates of Japan and two international financial centers, Great Britain and the United States.³⁵ I extend the approach taken by Obstfeld and Taylor [2004] and

³³ Theoretically, long-term interest rates are sum of the average of short-term interest rates in future, and the term premium. It is another issue to be explored how effectively a central bank is able to control long-term interest rates even if it enjoys the independent monetary policy from abroad. I just add that today's central bankers have big concern over developments in long-term interest rates, too.

³⁴ Fukai [1941], p.365.

³⁵ Long-term interest rate data for Britain and United States, which I use in this study, are monthly averages. The data for Britain are obtained from the NBER Macroeconomic History Database (<http://www.nber.org/databases/macrohistory/contents/>). The original data for Britain are from Board of Trade, *Statistical Abstract for the United Kingdom*. The data for United States are from Board of Governors of the Federal Reserve System, *Banking*

Obstfeld, Shambaugh, and Taylor [2004], using the degree of co-movements of domestic and international interest rates as the indicator of sacrificing independent monetary policy.

(1) Time-series Properties of the Long-term Interest Rates

I examine the basic time-series properties of long-term interest rates in three countries. Figure 6 shows developments in the long-term interest rates from January 1919 to December 1938.

Table 2 reports the results of unit root tests for the long-term interest rates in the three countries. The results indicate that the order of integration of the long-term interest rates of the three countries is all one.³⁶

I employ Granger causality tests on the interest rates in the three countries with the formula (1).

$$\Delta R_t = a_0 + \sum_{i=1}^p a_i \Delta R_{t-i} + \sum_{i=1}^p a_{F1,i} \Delta R_{F1,t-i} + \sum_{i=1}^p a_{F2,i} \Delta R_{F2,t-i} + u_t, \quad (1)$$

R_t denotes the domestic interest rate at time t, and $R_{Fj,t}$ denotes the foreign country's interest rate at time t (j=1,2).

Table 3 reports the results of Granger causality tests. The results are consistent with the conventional arguments on the interwar Japan as a small and open economy. The results indicate that movements in lagged foreign interest rates are statistically significant in explaining movements in current Japanese interest rates. Japanese long-term interest rates are Granger-caused by both of British and American rates with a lag of one month. Neither of British nor American long-term interest rates is Granger-caused by Japanese rates with a lag of one month. That is consistent with

and Monetary Statistics, 1943, p.429 and pp.468-471.

³⁶ To be precise, ADF test fails to reject the existence of a unit root for Japan, while PP test rejects it at 10 percent level of significance.

the notion that Japan was a peripheral country.

All of three countries' interest rates are Granger-caused by each other with lags of more than two month. That is consistent with the conventional understanding that the international financial market was integrated.

(2) Preparatory Tests for examining the Long-run Relationship

I examine the long-run relationship, defined as cointegration, in the interest rates of Japan and the two international financial centers. Table 4 reports the results of cointegration tests presented by Engle and Granger [1987]. It indicates that the Japanese long-term interest rates were cointegrated with the British ones through the interwar period. This result implies that the Japanese rates hold a stable long-run level relationship with the British ones. It indicates no such relationship between the Japanese rates and the American ones. This result implies that the Japanese rates hold no such a stable long-run level relationship with the American ones.

Gregory and Hansen [1996] argue that a simple cointegration test fails to detect cointegration in case of a structural change in the long-run level relationship between variables. I conduct cointegration tests with a structural change presented by Gregory and Hansen [1996], for the relationship between Japanese and American long-term interest rates. Table 5 reports the results. It indicates that the Japanese long-term interest rates were cointegrated with the American ones during the interwar period, and that there was a structural change in the relationship from around the end of 1932 or the beginning of 1933.

Table 4 also reports the result of the cointegration test between Japanese and British short-term interest rates on bills discounted at private banks. It indicates no cointegrating relationship between the Japanese short-term interest rates and the

British ones.³⁷

(3) Error Correction Models

An error correction model is applicable when there is a cointegrating relationship among a set of variables. The model describes the behavior of the variables to converge to the cointegrating relationship, a long-run equilibrium. In the model, the cointegration term is called the error correction term.

I formulate error correction models which explain the difference of Japanese long-term interest rates by lag-difference terms³⁸ and an error correction term.³⁹ The formula is expressed by equation (2).

$$\Delta R_t = \alpha + \sum_{j=1}^p \beta_j \Delta R_{t-j} + \sum_{j=0}^p \gamma_j \Delta R_{b,t-j} + \omega(\sigma + R_{t-1} - \theta R_{b,t-1}) + u_t, \quad (2)$$

R_t denotes the domestic interest rate at time t , and $R_{b,t}$ denotes the international base rate at time t . Table 6 reports the regression results.

Obstfeld and Taylor [2004] and Obstfeld, Shambaugh, and Taylor [2004] argue that the cointegrating slope coefficient, θ , represents the long-term level relationship between the domestic interest rate and the international base rate. The expected sign of θ is positive. If the domestic interest rate moves parallel with the international base rate, then, $\theta = 1$. They also argue that the absolute value of the coefficient of error correction term, or the adjustment speed, ω , represents the degree of dependency of the domestic interest rate towards the international base rate.⁴⁰

³⁷ It is arguable to test the cointegration between these two series, since the unit root tests indicate that Japanese short-term interest rate series is stationary, or I(0), and that British short-term interest rate series is non-stationary, or I(1). I report the results of the cointegration tests for the comparison between short- and long-term interest rates.

³⁸ Lag orders are chosen by Schwarz information criteria.

³⁹ Cointegrating vectors are calculated by the dynamic OLS method proposed by Stock and Watson [1993]. Lag orders are chosen by Schwarz information criteria.

⁴⁰ They employ the method developed by Pesaran, Shin, and Smith [2001] (PSS test) for testing the significance of the level relationship among a large set of country data. Since

First, I use British interest rate as the international base rate. I conduct two patterns of regressions regarding lag structure. In the formula reported in the first column, a), I use the same lag pattern as Obstfeld and Taylor [2004] and Obstfeld, Shambaugh, and Taylor [2004]. Their formula includes the difference of the base rate in time t ($\Delta R_{b,t}$) in explanatory variables.⁴¹ In the formula reported in the second column, b), I use the lag pattern used in a standard error correction formula, which does not include the difference of the base rate in time t ($\Delta R_{b,t}$) in explanatory variables.

Different lag patterns give qualitatively the same results. The coefficient γ_1 is not statistically significant. Other coefficients are statistically significant and have the expected signs. The statistical significance of γ_0 indicates the immediate impact on Japanese interest rates of British rates. The cointegrating slope coefficient, θ , is statistically significant, confirming the long-term level relationship between Japanese and British interest rates. The coefficient of error correction term or the adjustment speed, ω , has the absolute value of .07, indicating that the half-life of the initial disturbing shock to the long-run relationship is 9 to 10 months.

Second, I use American interest rate as the international base rate. I conduct the same regression as British rate, of which result is reported in the third column, c). I should note that the result in column c) has to be taken with a reservation because the cointegration tests support the existence of structural change in the long-run relationship.

Both of γ_0 and γ_1 are not statistically significant in column c).⁴² That

the orders of integration in the data for Japan, Britain and the United States are all 1, I do not employ PSS test and directly estimate the error correction model.

⁴¹ I assume that Japanese interest rates do not have influence on British rates because Japan was a small economy, and that there are no simultaneous biases. That assumption is also applied in Obstfeld and Taylor [2004] and Obstfeld, Shambaugh, and Taylor [2004].

⁴² The result of the formula without the difference of the base rate in time t ($\Delta R_{b,t}$) in

indicates weak responses in Japanese interest rate to American rate in the short horizon. Other coefficients are statistically significant and have the expected signs. The coefficient of error correction term or the adjustment speed, ω , has the absolute value of .06, indicating that the half-life of the initial disturbing shock to the long-run relationship is 12 months.

I also conduct a regression including dummy variables in the error correction term, because cointegration tests indicate the existence of a structural change. The formula is expressed by equation (3).

$$\Delta R_t = \alpha + \sum_{j=1}^p \beta_j \Delta R_{t-j} + \sum_{j=0}^p \gamma_j \Delta R_{b,t-j} + \omega(\sigma + \sigma_{\Pi} D_t + R_{t-1} - [\theta R_{b,t-1} + \theta_{\Pi} R_{b,t-1} D_t]) + u_t, \quad (3)$$

D_t has a value of zero before and in December 1932, and a value of one afterwards.

The result with the dummy variables is reported in the fourth column, d). Both of γ_0 and γ_1 are not statistically significant. Other coefficients are statistically significant and have the expected signs. The coefficient of error correction term or the adjustment speed, ω , has the absolute value of .012, indicating that the half-life of the initial disturbing shock to the long-run relationship is 5 months.

The dummy variable for the cointegrating slope coefficient, θ_{Π} , is statistically significant, indicating a change in long-term relationship between Japanese and American interest rates at the end of 1932. According to the regression result, the value of the cointegrating slope coefficient before and in December 1932, θ , is .253, and that after January 1933, $\theta + \theta_{\Pi}$, is .077. That indicates the level relationship between Japanese and American interest rates weakened at the end of 1932.

The cointegrating slope coefficients for American interest rate before and after the end of 1932 are smaller than that for British rate. The adjustment speed of Japanese interest rate to the disturbance in the American rate is higher than in the

explanatory variables is not reported. The result is similar to that reported in column c).

British rate if one assumes the structural change in the level relationship.

(4) Interpretation and Discussion

The quantitative analyses complement the narrative ones. The quantitative analyses indicate that Japanese long-term interest rate held a long-run relationship with British rate through the interwar period. The Japanese long-term interest rate held a long-run relationship also with American rate, but the relationship was weakened at around the end of 1932 or the beginning of 1933.

The existence of a long-run relationship of Japanese interest rate with center country's rates through the interwar period suggests the enduring influence of the gold standard.⁴³ Japanese policymakers were not free from the Golden Fetters after formally departing from the gold standard. They were not able to pursue monetary policy independent from the international capital markets. The choice for Japanese policymakers in the beginning of 1930s was NOT whether to peg or to float their currency; rather the choice was to what and at which level to peg their currency.

Japanese policymakers decided to peg the pound-sterling.⁴⁴ That implied that the Japanese monetary policy was to be dependent on the British monetary policy. It was a right decision, given the early departure of Britain from the gold standard and the greater possibility for easy monetary policy in Britain than in the United States. And that decision contributed early recovery of Japanese economy. Takahashi and his colleagues contributed to early recovery of Japanese economy, not because they pursued independent monetary policy, rather, because they followed easy monetary policy of

⁴³ One might argue that such a relationship could be the result of synchronization of business cycles rather than the result of currency peg. I do not exclude such a possibility, but narratives indicate the importance of currency peg rather than synchronization of business cycles.

⁴⁴ In this regard, Japan can be classified *de-facto* in pound-sterling bloc after the breakdown of the international gold standard.

Britain.

Japan was a small and open economy in the interwar period. Japan was indebted to foreign investors for foreign-denominated debts. Japan needed to earn foreign money to service its debts. The one-shot devaluation of the currency was a possible policy choice. On the other hand, Japan needed to avoid capital flight in the midst of the international financial crisis. Imposing capital control was another choice. Still, Japan had to show the credibility of its policy and currency to the international investors.

Hamilton [1988] describes the destructive power of international capital flows during the final stage of the gold standard. In such a situation, the policy choice for the policymakers in a small and open economy was limited. They needed to peg their currency to some other currency at a level that would be appropriate under the circumstances.

The Japanese experience during the interwar period is different from the standard Keynesian explanation of a closed economy. Rather, the story resembles the emerging economies in the currency crisis of late 1990s. Once forced to depart from a peg system by the contagious effect of international capital flows, the policymakers devalued their currency in one shot, and then tried to stabilize the currency at the new, equilibrium level. In doing so, the policymakers continued to pay attention to the international financial market.

I add a notation about the timing of the structural change in the long-run relationship between Japanese and American interest rates. There are two events which might be associated with the structural change. One possibility is the start of the underwriting of new issues of government bonds by BOJ in November 1932. Bank of Japan drastically increased the amount of open market operation by means of government bonds around the end of 1932. Another possibility is the economic

turbulence in the United States in the beginning of 1933 which eventually led to the American departure from the gold standard.

It is reasonable to assume that the structural change with the American rate was associated with the American event rather than the Japanese domestic event. If one assume that the Japanese domestic events, such as the start of BOJ underwriting of government bonds was the cause of structural change with the American rate, then the event would cause a similar structural change to the relationship with the British rate. I find no such structural change with the British rate.

So far, I have set aside the conduct of fiscal policy. I will explore it in future study.

7. Concluding Remarks

I have found evidence of the enduring effects of the gold standard after the departure of Japan in December 1931, as before the return in January 1930, both in qualitative materials and quantitative data. During the gold standard period in 1930-31 and during the suspension period in the 1920s, Japanese policymakers sacrificed monetary policy autonomy in order to stabilize the exchange rate and to maintain free capital movements. In 1932, the policymakers followed the decline in foreign interest rates rather than conducted an autonomous monetary policy even after departing from the gold standard.

In theory, a national policymaker is able to conduct autonomous monetary policy under the flexible exchange rate system. In reality, Japanese policymakers seemed to be still obsessed by the Golden Fetters even after departing from the gold standard. Japan experienced a decline in its long-term interest rate without closing its domestic capital market. Rather, the policymakers followed the developments in the international market.

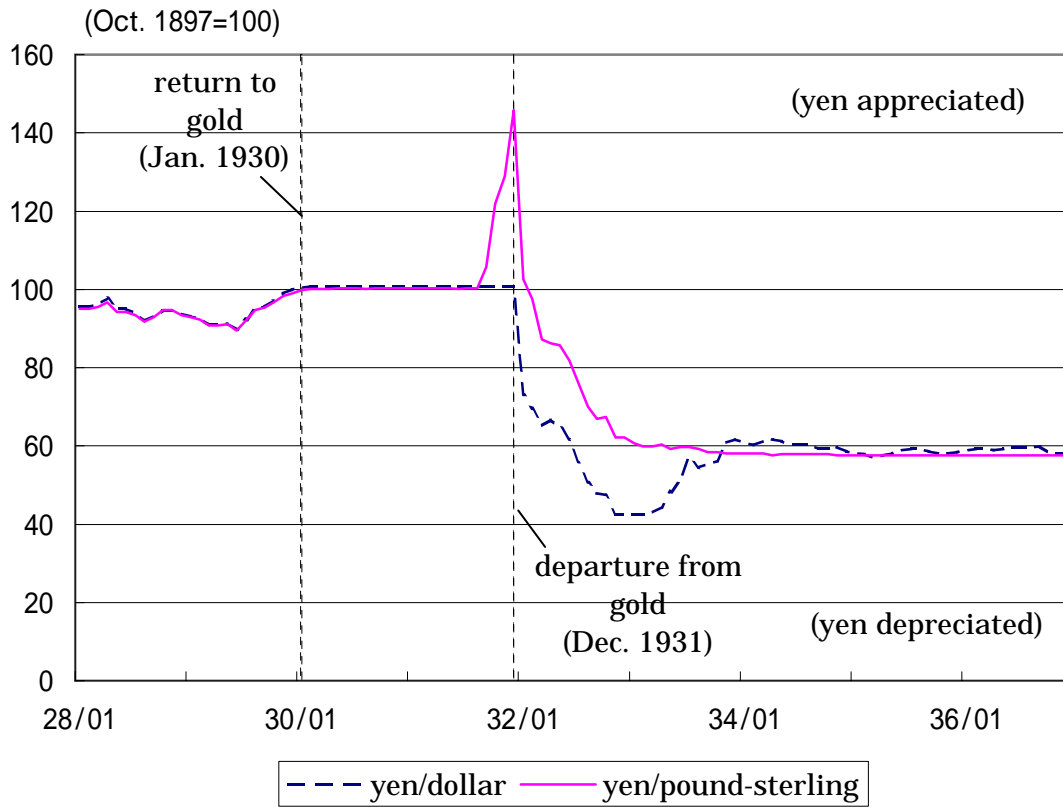
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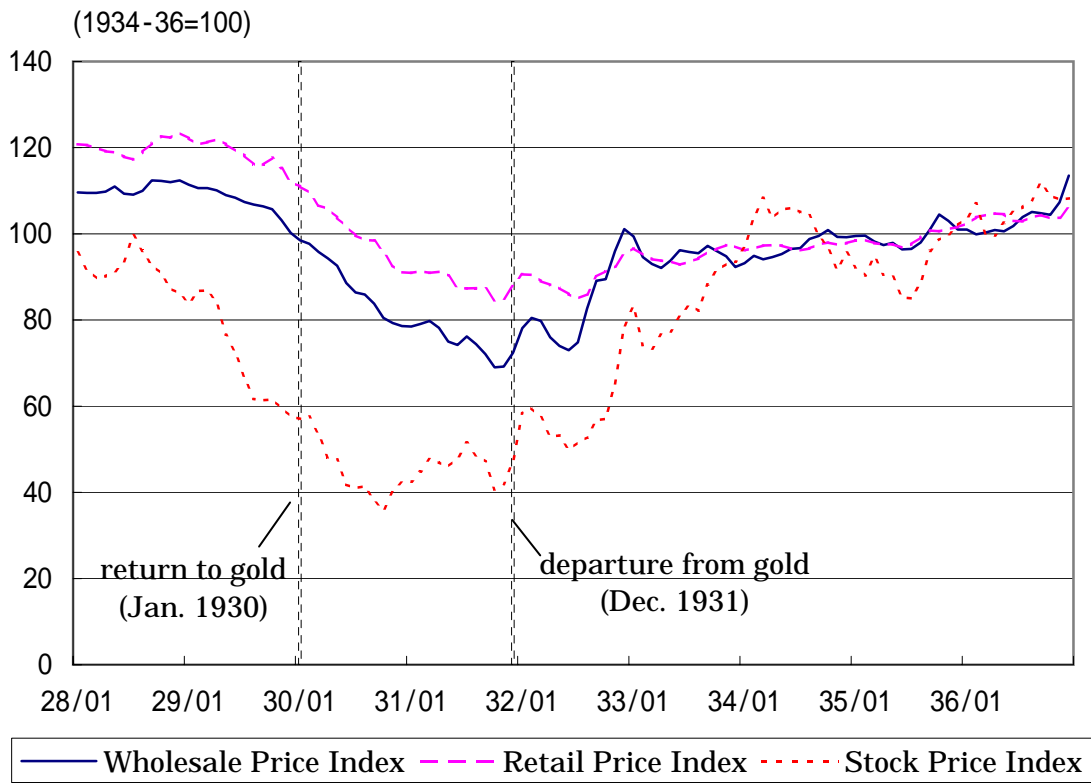
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Figure 1. Exchange Rates



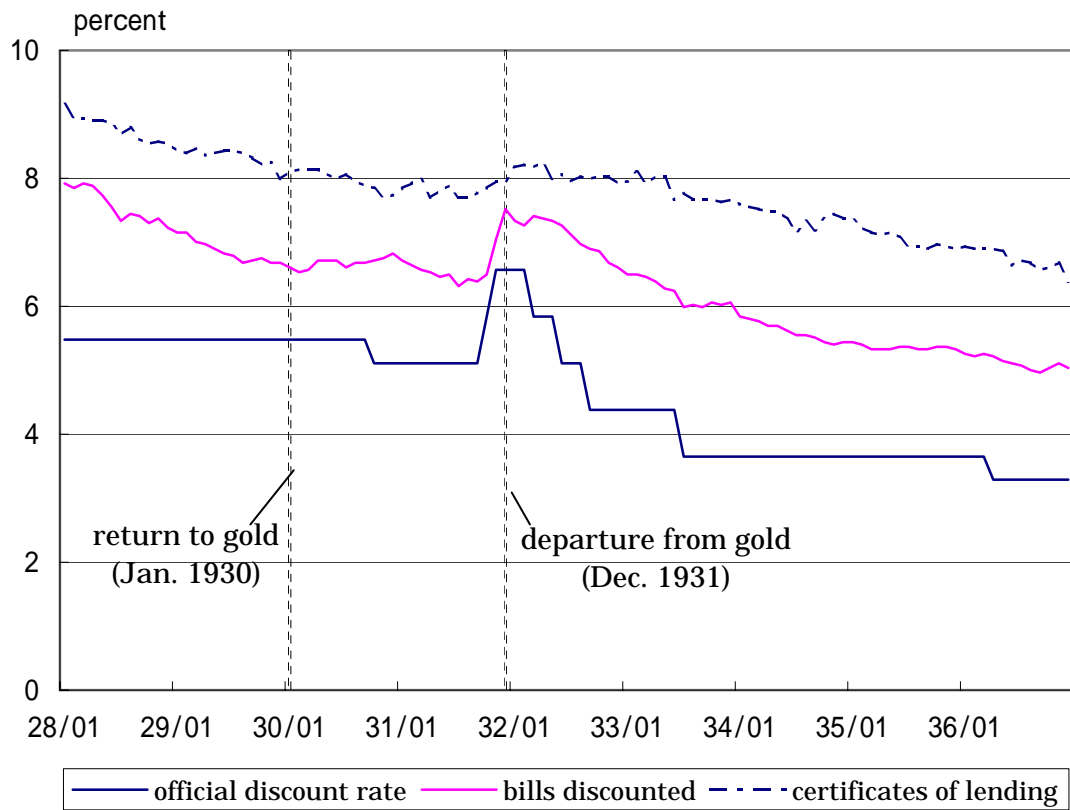
source: Ministry of Finance, *Reference Book of Financial Matters*.

Figure 2. Price Indexes



sources: Bank of Japan; Oriental Economist.

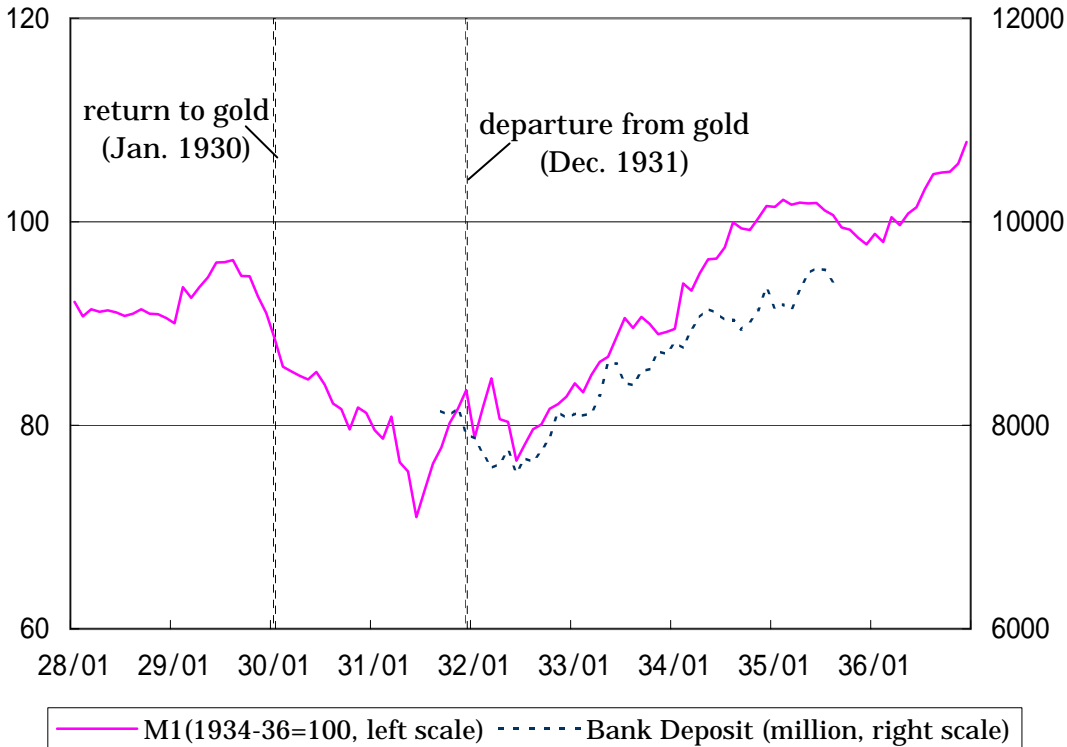
Figure 3. Interest Rates



Sources: Bank of Japan; Tokyo Bankers Association.

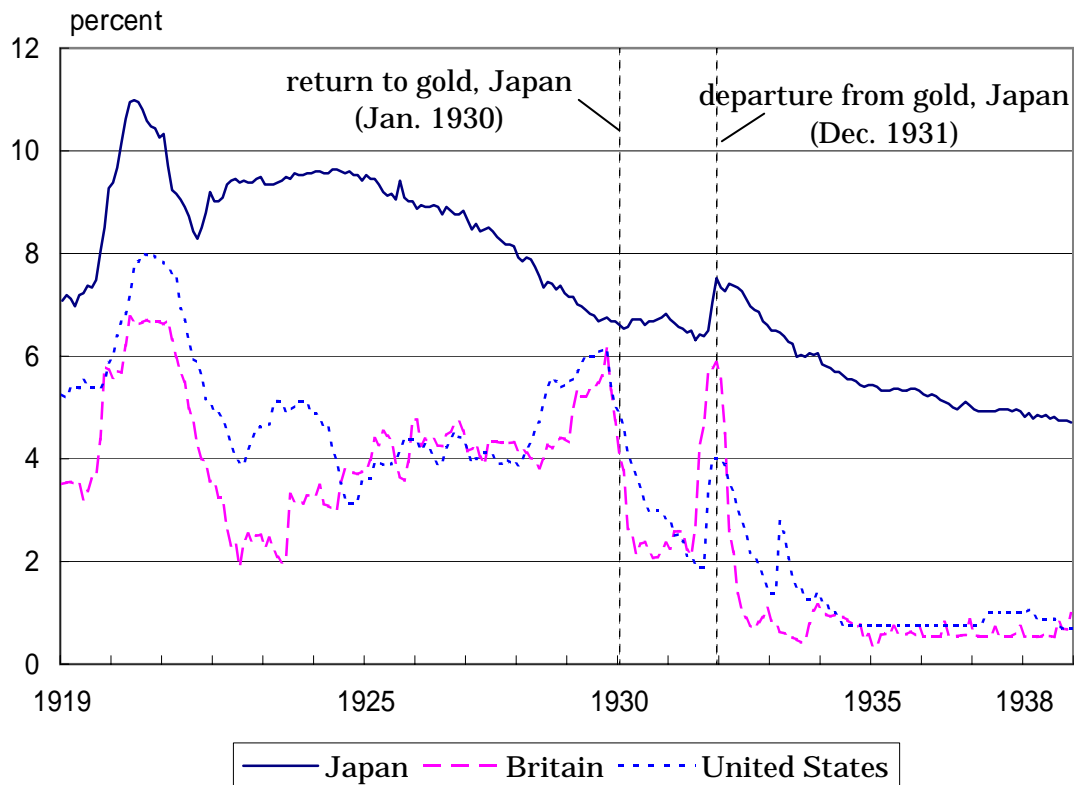
note: Bills discounted and certificates of lending are reported by members of Tokyo Bankers Association.

Figure 4. Money



source: Bank of Japan

Figure 5. Short-term Interest Rates

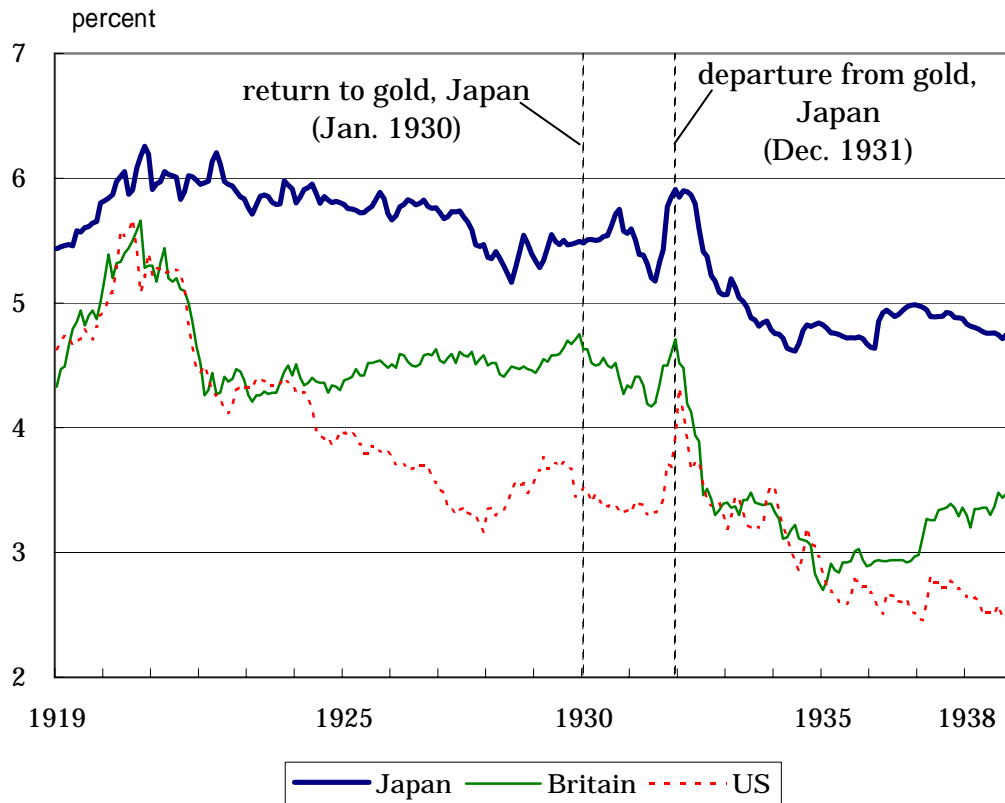


Sources: Tokyo Bankers Association;

NBER, Macrohistory Database, <http://nber.org/databases/macrohistory/contents/>.

Note: Data are interest rates on "bills discounted" for Japan and Britain, and on "commercial papers" for the United States.

Figure 6. Long-term Interest Rates



Sources: Tokyo Stock Exchange, *Monthly Report*; Nomura Securities, *Annual Report on Public and Cooperate Securities*; NBER, *Macrohistory Database*, <http://nber.org/databases/macrohistory/contents/>; Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics*.

Table 1. Unit Root Tests for Short-term Interest Rates
 (Sample period: Jan.1919-Dec.1938; Number of observations: 240)

Japan

	bills discounted	certificates of lending
(level)		
ADF	-3.710 ** (9)	-4.054 *** (5)
PP	-3.929 **	-4.236 ***
(first difference)		
ADF	-5.560 *** (8)	-4.134 *** (5)
PP	-10.948 ***	-18.032 ***

Britain and the Unites States

	Britain (bills discounted)	United States (commercial papers)
(level)		
ADF	-3.549 ** (2)	-2.832 (1)
PP	-3.027	-2.742
(first difference)		
ADF	-6.836 *** (4)	-9.982 *** (0)
PP	-11.006 ***	-10.035 ***

- Notes: 1. Tests are employed on the formula with a constant and a trend term for level data, and without them for first difference data.
 2. "***", "**" and "*" indicate rejection of a unit root in 1, 5, and 10 percent level of significance, respectively.
 3. numbers in parenthesis indicate lag orders for ADF tests. The lag orders are determined by being iteratively reduced from 12 to the order at which the longest lag term is statistically significant.
 4. The critical values are from Table 10.A.2 of Fuller[1996] for ADF tests, and from Mackinnon[1996] for PP tests.

Table 2. Unit Root Tests for Long-term Interest Rates

(Sample period: Jan.1919-Dec.1938; Number of observations: 240)

	Japan	Britain	United States
(level)			
ADF	-2.865 (11)	-2.931 (12)	-3.007 (9)
PP	-3.200 *	-2.738	-2.832
(first difference)			
ADF	-5.836 *** (10)	-4.099 *** (11)	-4.589 *** (8)
PP	-11.225 ***	-14.516 ***	-11.588 ***

Notes: 1. Tests are employed on the formula with a constant and a trend term for level data, and without them for first difference data.

2. "****", "***" and "*" indicate rejection of a unit root in 1, 5, and 10 percent level of significance, respectively.

3. numbers in parenthesis indicate lag orders for ADF tests. The lag orders are determined by being iteratively reduced from 12 to the order at which the longest lag term is statistically significant.

4. The critical values are from Table 10.A.2 of Fuller[1996] for ADF tests, and from Mackinnon[1996] for PP tests.

Table 3. Granger Causality Tests (F-Statistics)

Dependent Variable	Japan		Britain		United States	
Independent Variable	Britain	United States	Japan	United States	Japan	Britain
Max lags						
1	4.94 **	6.17 **	0.96	16.82 ***	0.99	17.89 ***
2	13.87 ***	11.58 ***	4.70 **	19.10 ***	8.71 ***	28.03 ***
3	12.89 ***	10.89 ***	9.93 ***	20.78 ***	8.61 ***	29.32 ***
4	12.69 ***	11.92 ***	11.57 ***	21.47 ***	8.14 ***	35.34 ***
5	13.16 ***	18.53 ***	12.62 ***	23.33 ***	8.50 ***	36.73 ***
6	17.06 ***	18.78 ***	17.63 ***	32.43 ***	13.49 ***	44.07 ***

Notes: 1. Tests are employed with the formula including self-lags, which are not reported in the table.
 2. "***" and "**" indicate statistical significance at 1 and 5 percent level, respectively.

Table 4. Cointegration Tests (Engle-Granger)

Dependent variable: Japan ("Ko-go" 5 percent bond for the long-term interest rate, bills discounted for the short-term interest rate)

Independent variables: Constant term and Great Britain (Consols/bills discounted) / Constant term and United States (Treasury)

Sample period: January 1919-December 1938, Number of observations: 240

	Long-term interest rate		Short-term interest rate
	Britain (Consols)	United States (Treasury)	Britain (Bills Discounted)
ADF statistics	-2.902 (1) **	-1.949 (11)	-2.313 (2)

Notes: 1. The table shows the results of ADF tests on the residuals of ordinary least square regressions (the Engle-Granger test).

The ordinary least square regressions are conducted in the formula below:

$$R_t + \mu + \lambda R_{b,t} + e_t,$$

2. The critical values are from Table IIa of Phillips and Ouliaris [1990]. "***" indicates statistical significance at 5 percent level.
3. Figures in parentheses show the lag order. The lag orders are determined by being iteratively reduced from 12 to the order at which the longest lag term is statistically significant.

Table 5. Cointegration Tests with A Structural Change (Gregory-Hansen)

Dependent variable: Japan ("Ko-go" 5 percent bond)

Independent variables: Constant term and United States (Treasury)

Sample period: January 1919-December 1938, Number of observations: 240

	United States (Treasury)	
ADF*	-4.817 +	[Dec. 1932]
Z _t *	-4.701 +	[Jan. 1933]
Z _a *	-38.642	--

Notes: 1. The table shows residual-based cointegration test statistics of "regime change" (C/S) presented by Gregory and Hansen (1996).

The "regime change" (C/S) is described as below;

$$R_t = \mu_1 + \mu_2 D_t + \lambda_1 R_{b,t} + \lambda_2 R_{b,t} D_t + e_t,$$

D_t has a value of zero before and at the time of the structural change; D_t has a value of one after the structural change.

2. Dates in brackets show the time points when the structural change occurs.

3. The critical values are from Table I of Gragory and Hansen [1996]. "+" indicates statistical significance at 10 percent level.

Table 6. Estimation Results of Japanese Interest Rate on International Base Rate (Error Correction Model)

Dependent variable: Japan ("Ko-go" 5 percent bond)

Estimation formula in column a), b), and c):
$$\Delta R_t = \alpha + \sum_{j=1}^p \beta_j \Delta R_{t-j} + \sum_{j=0}^p \gamma_j \Delta R_{b,t-j} + \omega(\sigma + R_{t-1} - \theta R_{b,t-1}) + u_t,$$

in column d):
$$\Delta R_t = \alpha + \sum_{j=1}^p \beta_j \Delta R_{t-j} + \sum_{j=0}^p \gamma_j \Delta R_{b,t-j} + \omega(\sigma + \sigma_{\Pi} D_t + R_{t-1} - [\theta R_{b,t-1} + \theta_{\Pi} R_{b,t-1} D_t]) + u_t,$$

Sample period: January 1919-December 1938, Number of observations: 240

	R _b : Britain (Consols)				R _b : United States (Treasury)			
	a)		b)		c)		d)	
α	-0.001	(-0.30)	-0.002	(-0.38)	-0.002	(-0.41)	-0.002	(-0.42)
β_1	0.287	(4.72) ***	0.299	(4.89) ***	0.322	(5.25) ***	0.358	(5.90) ***
γ_0	0.115	(2.44) **	--	--	0.060	(1.24)	0.052	(1.09)
γ_1	0.053	(1.08)	0.057	(1.14)	-0.055	(-1.12)	-0.062	(-1.31)
ω	-0.070	(-3.59) ***	-0.074	(-3.79) ***	-0.056	(-3.39) ***	-0.123	(-4.96) ***
half-life	9.61		9.01		12.00		5.27	
	(cointegrating vector)				(cointegrating vector)			
σ	-3.161	(-39.63) ***	-3.161	(-39.63) ***	-3.693	(-46.36) ***	-4.681	(-56.20) ***
σ_{Π}	--	--	--	--	--	--	0.068	(0.33)
θ	0.549	(28.54) ***	0.549	(28.54) ***	0.476	(22.40) ***	0.253	(12.36) ***
θ_{Π}	--	--	--	--	--	--	-0.176	(-2.52) **
adj. R ²	0.171		0.153		0.127		0.171	

Notes: 1. Figures in parentheses are t-statistics.

"***", "**", and "*" indicate statistical significance at 1 percent, 5 percent, and 10 percent levels, respectively.

2. D_t has a value of zero before and in December 1932; otherwise, D_t has a value of one.

3. In all cases of the error correction model estimation, lag orders are chosen to be 1 by Schwarz information criteria.

4. "Half-life" means the half-life of the shock based on the adjustment speed, ω .

5. Cointegrating vectors are calculated by the dynamic OLS method. Lag orders are chosen by Schwarz information criteria.