NBER WORKING PAPER SERIES

NEWS AND THE DOLLAR/YEN EXCHANGE RATE, 1931-1933: THE END OF THE GOLD STANDARD, IMPERIALISM, AND THE GREAT DEPRESSION

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Working Paper No. 2683

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 1988

Takatoshi Ito is an Associate Professor, University of Minnesota, and National Bureau of Economic Research. This project was conceived while this author was a visiting associate professor of the Institute of Economic Research, Hitotsubashi University for a part of the summer of 1987. He is thankful to the Institute for the visiting arrangement. Financial support from National Science Foundation, SES-88-08828, is gratefully acknowledged. Kunio Okina is an Associate Professor, University of Tsukuba. Juro Teranishi is a Professor, Institute of Economic Research, Hitotsubashi University. This author is grateful to Mr. Shinji Yamashige for his excellent research assistance and to Securities Research Foundation (Shoken Kenkyu Zaidan) for financial assistance. This research is part of NBER's research program in Financial Markets and Monetary Economics. Any opinions expressed are those of the authors not those of the National Bureau of Economic Research.

NBER Working Paper #2683
August 1988

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ABSTRACT

According to the efficient market hypothesis, news in Tokyo is responsible for the exchange rate changes during the Tokyo market hours, while the U.S. news is responsible for changes in the New York hours. The intra-daily dynamics of the $/yen exchange rate from December 1931 to November 1933 is analyzed. Japan's decision to go off gold in December 1931 depreciated yen by 30% in a month, mostly in the Tokyo market. During 1932, the yen depreciated another 30%, mainly due to Japan's aggression in China and resulting diplomatic isolation. In 1933, the yen appreciated against the dollar, mainly in the New York market, due to the U.S. decision to go off gold. However, exchange rate volatility and its sensitivity to news declined over the two year period, because of increasing capital controls. Changes in the interest rate differential was found insignificant for the changes in the exchange rate. Political regime changes, such as a decision to go off gold, most influenced the exchange rate for the period considered. There were no policy decisions by Japan to cause yen depreciation to promote export and limit import in 1931-33.

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1. Introduction

This paper considers the news and its effects on the dollar/yen exchange rate from December 1931 to November 1933. The intra-daily data, i.e., the Tokyo and New York quotes of the day, are analyzed for the two year period, so that sources of the rapid exchange rate change can be better identified.

The investigation of exchange rate dynamics during this period is important for at least three reasons. First, it was the time that the exchange rate moved most for a short period of time. By identifying the factors affecting rapid depreciation, we gain insights into determinants of the exchange rate during the interwar period. Second, by analyzing the intra-daily data, it is possible to infer how efficient the international financial markets were during the interwar period. Third, the rapid yen depreciation in this period is often credited for the fast recovery of the Japanese economy after the depression of 1929-31. It is interesting to investigate whether the depreciation was planned for the concurrent and subsequent export drive or it was a result of market force.

In order to accomplish the objectives a news (event) analysis is employed. If the market is efficient, relevant news is reflected in the asset price, or the exchange rate in this case, within minutes of its revelation. It is also reasonable to assume, at least for the first approximation, that relevant news concerning the economic and political events in Japan are revealed during the Japanese market hours, and those in the U.S. are revealed during the U.S. market hours. Because of the time difference between Tokyo and New York, business hours of the two markets do not overlap. By recording the closing quotes of the two markets in the same day, it is possible to identify which market was more responsible for the

exchange rate changes, and hence to infer the origin of the news relevant to the changes. This method has been successfully employed for the period from 1980 to 1985 by Ito and Roley (1986), and for a one-year period after the Group of Five Plaza Agreement by Ito (1987). Including these studies, there have been many studies of exchange rate dynamics after 1973, but this paper is a first attempt, to the best of our knowledge, that investigate the dynamics of the intra-daily exchange rate during the floating exchange rate regime of the interwar period.

2. Background

From 1874 to 1897, the yen depreciate from about \$100/100 yen to \$50/100 yen. The yen was on the gold standard from 1897 to 1917. During the 1920s, many European countries restored the gold standard, and Japan attempted to restore the gold standard. These countries restored (or attempted to restore) the exchange rate at the "prewar (old) parity," the rate prevailing before the First World War.[1/] This is one of the reasons that European countries and Japan experienced a decade of stagnant, deflationary economy. (See Figure 1 for the dollar/yen exchange rate up to the Second World War.)

Insert FIGURE 1 about here

In Japan, the Great Kanto Earthquake of September 1923 and the Financial Panic of March 1927 were also marks of the troubled 1920s. In July 1929, Junnosuke Inouye became the Finance Minister of the Hamaguchi cabinet. He introduced a deflationary policy in order to restore the gold standard for the yen, a stated goal of the cabinet. There was no bond financing for the general budget of 1930, for the first time since 1907.

The central government expenditure decreased by 10.2 percent from 1929 to 1930, and decreased 5.2 percent from 1930 to 1931. The gold standard of yen, which was called "the resumption of gold export" in Japan, was restored in January 11, 1930. The value of yen had risen from $43/100 yen before the announcement of intention to restore the gold standard in 1929 to $49/100 yen in December 1929.

In addition to the deflationary policies, other external events, such as the agricultural crisis of 1930, and the decline in export to the U.S. following the U.S. stock market crash of October 1929, worsened the economic performance of Japan. For a two-year period from 1929 to 1931, the price of all farm goods declined by 39 percent, the Wholesale Price Index declined by 30 percent, and real Gross Domestic Fixed Capital Formation declined by 12 percent. At the same time, the real GNP stalled (to be precise, increased by 1.5 percent in two years) and real export increased by only 6.7 percent over the two years. However, the economic situation from 1929 to 1931 in Japan was much better than the United States, where real income dropped by 19 percent for the same period (and was still on its way down), and it was much worse in the 1921-23 recession in Japan when the real GNP dropped by 7 percent.

On September 21, 1931, British sterling went off gold, and the pound immediately depreciated. Many European countries followed suit: Denmark, Norway, Sweden, and Switzerland left the gold standard within a week after Britain's decision, as did Finland in October. In September 1931, Japan started to invade Manchuria. These events created strong pressure to invest in U.S. dollars. The Yokohama Shokin Bank, the predecessor of the Bank of Tokyo and the official bank for foreign exchange, met all the buy orders of dollars by taking sell positions. However, in order to settle the position,

the bank later needed transport species abroad. At the end of 1929, shortly before the return to the gold standard, the amount of gold reserves in the Bank of Japan was 1,072 million yen. By the end of 1931, shortly after the gold embargo, the gold reserve was reduced to 470 million yen, less than half of the level two years earlier. (Bank of Japan (1985, p.71).)

Japan decided to go off gold on December 13, 1931./2/ The yen depreciated about 30 percent within a month and about 60 percent in a year. This is one of the most dramatic changes in the yen/dollar exchange rate in the market./3/ Although one of the reasons for the rapid depreciation was an adjustment from the overvalued parity during the gold standard, other reasons may have contributed to depreciation, especially after the initial phase of the exchange rate adjustment. Japan launched a military assault on mainland China, and was condemned in the League of Nations. The Great Depression of the United States was getting worse, and the United States went off the gold standard in 1933. This paper will carefully considerd these various events and will quantify their effects on the changes in the exchange rate.

The depreciation of yen, along with the fiscal and monetary stimulus, is often credited for the fast recovery of the Japanese economy from 1931 to 1933./4/ Although the effect of the yen depreciation of 1931-1932 on the Japanese recovery is an interesting topic of investigation, it is beyond the scope of this paper. (For European economies, see Eighengreen and Sachs (1985) for the effect of exchange rates on the economic recovery.) Instead, we will investigate whether the yen depreciation was engineered as a policy objective or determined in the efficient market.

3. Data and Definitions

The closing rate of the exchange rate (in units of dollars per 100 yen) in the Tokyo and New York markets are collected daily from newspaper, Chugai Shogyo Shinpo from December 1, 1931 to November 30, 1933.[5] The Japanese Standard Time (JST) is fourteen hours ahead of the Eastcoast Standard Time (EST). Tokyo is the first major market to open in a day. It opens a few hours after closing of the New York market of the preceding day. Since there is no major market or news coming out between the New York closing and the Tokyo opening, the Tokyo opening can be well approximated by the New York closing quote. (See Ito and Roley (1987) for the validity of this claim in the 1980s.) When the Tokyo market closes, the Shanghai and Indian markets are still open, and the London market opens in a few hours after the Tokyo market closes. The late afternoon session of the London market overlaps for a few hours with the morning session of the New York market.

We define the change in the Tokyo market on day t, TOKYO(T) as the change from the New York close of day T-1, NYDY(T-1), to the Tokyo close, TKDY(T), and the change in the New York market, NYORK(T), is defined as the change from the Tokyo close to the New York close of the day.

$$TOKYO(T) = TKDY(T) - NYDY(T-1)$$

$$NYORK(T) = NYDY(T) - TKDY(T).$$

Note that in this definition, the New York market includes changes in the Indian and European markets, too. Whenever the New York market is mentioned in the rest of this paper, this proviso applies.

For purposes of comparison, the 24-hour change in New York, NYORK24(T), is also defined and used.

$$NYORK24(T) = NYDY(T)-NYDY(T-1)$$

The advantage of having the intra-daily data over the daily data will be

evident from considering the information contents of the TOKYO and NYORK decompsition compared with NYORK24.

The call rate in Tokyo, TKR, and the call rate in New York, NYR, are also collected from the same source. The interest differential between the two countries is defined as,

INTDIF(T) $\equiv$ NYR(T)-TKR(T).

If capital flows attracted by the interest rate differential were a major determinant of the exchange rate changes in the 1930s, like the case in the 1980s, then the interest rate differential should explain the exchange rate changes. This conjecture will be tested in section 8.

The daily exchange rate (the New York quote) from December 1931 to November 1933 is plotted in Figure 2, and the summary statistics including the decomposed market changes are shown in Table 1.

Insert Figure 2a, 2b and Table 1 about here

Observe, first, that a rapid change in the exchange rate came in various waves (regimes). A wave of rapid changes was followed by a relatively calm period before another wave of changes. This pattern is common to the post Bretton Woods experiences.[6] Theoretically, a regime of yen depreciation (or appreciation) should correspond to a bunch of news relevant to the exchange rate determinations. Second, the yen depreciated by about \$30/100 yen in one year following the gold embargo, and then stabilized around \$21/100yen for several months. After the U.S. went off gold, the yen slowly appreciated by \$10/100 yen in several months. Thus, in net over the two year period, the yen depreciated by \$19/100 yen. Clearly, a different force on the value of yen appeared in 1933. Third, the geographical source of

major disturbances shifted from Asia to the United States over the two years of our sample. The standard deviation in the Tokyo market was larger than in the New York market for one year following the Japanese gold embargo. However, from December 1932 to November 1933, the volatility of the New York market exceeded that of the Tokyo market.

As indicated in figures, various regimes are identified over the two year period. In most cases, when a regime started and ended is clearcut.[7] Table 2 is a statistical summary of changes in the dollar/yen exchange rate for each regime. In the following sections, each regime will be examined closely.

Insert Table 2 about here
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4. Regime I: Takahashi's Decision to Go Off the Gold Standard

In the three weeks starting on December 11, 1931 (Regime 1), the yen depreciated by about 30 percent. In fact, there were two phases in this regime. First, the drop occurred immediately before and after December 13, the day the yen went off gold. Second, the yen depreciated for three days starting December 27 apparently with no significant news.

When the cabinet collapsed on December 11 citing the "incompatibility" within the cabinet, there was widespread anticipation that the yen would go off gold. On that day, the leading business newspaper began a serial of articles about what would happen to the economy if gold exports were suspended, and the market was reasonably certain that this would occur. However, there was great uncertainty about the political future and trading on the Tokyo exchange virtually came to a standstill. On December 12, another large drop in quotes in the Tokyo market was recorded. We may conclude that a drop in the value of yen from \$48 to \$40 over ten days from

December 11 was a direct reaction to the (anticipations of) a gold embargo. The source of disturbances was clearly in the Tokyo market and so was revealed by statistics. In fact, most of the drop of the yen occurred before the forthcoming announcement of the gold embargo. This is evidence in support of the view that markets were efficient and expectations were rational in the beginning of the 1930s.

Another drop of $5/100 yen at the end of the month was caused with no new information. It is not obvious why the yen depreciated on December 28 (in Tokyo) and on December 29 (in New York). The drop on December 28, according to newspapers, was due to speculations. For example, due to the anticipated decline in the yen, importers of (raw) cotton hastened the deal (i.e., a classical case of leads). The newspaper on December 30, 1931 carried an article written in New York about the drop on December 29 in the New York market which said that "Bankers and financial experts cannot find particular causes for the crash of the yen." Since there are instances in which large movements in the exchange rate cannot be associated with significant news events even in the 1980s, it is not surprising to find an episode of a speculative attack in the 1930s.

5 Adventures in Imperialism and the Yen's Depreciation in Early 1932

During the first month and a half of 1932 (Regime Q-I), the foreign exchange market was volatile, although the depreciation, which mainly happened in Tokyo, and appreciation, which mainly happened in New York, cancelled each other out. In February and June, there were waves of yen depreciation, which were results of Japan's aggressions in China, which drew criticism from the rest of the world.

Although Japanese imperialism started earlier, its speed of aggression

accelerated during the year of 1932. In January and February, Japan attacked Shianghai. In March, Manchuria became "independent" with a government many western nations regarded as a puppet of the Japanese military. When these conflicts developed, the yen depreciated. In particular, a sharp decline on January 29 was a response to the Japanese attack on Shianghai on January 28. These aggressions took place during the Tokyo market hours, thus causing a yen depreciation in the Tokyo market. In a few instances, signs of truce caused the yen to appreciate (for example, on February 29 and March 10).

In January, depreciation occurred in the Tokyo market, responding to the news of the attack on Shianghai combined with the fear of losing the Chinese market for export. However, the depreciation was countered by appreciation in the New York market. The news of the Japanese aggression might not have been taken seriously enough in New York, and the dollar was weakening with the news of the troubled U.S. economy (to be discussed in detail shortly).

From the middle to the end of February, the yen depreciated by $4/100 yen (Regime II). This reflects the reaction of foreign investors to increasing political criticism of the Japanese activities in Shianghai and Manchuria. On February 16, the League of Nations adopted an appeal to Japan on the issue of the Shianghai incidents, and a fact-finding mission was dispatched by the League of Nations, arriving at Japan on February 29. Most yen depreciation this time occurred in the New York market. This is evidence that foreign governments' reaction to the Japanese military adventures were the key to the yen depreciation. Let us elaborate on this conclusion.

Newspapers reported that major sellers of yen against dollars (in New York) were American banks, while the Japanese banks sold dollars for profit-taking, although the pressure of selling yen dominated buying yen. (Chugai Shogyo Sinpo, February 26, 1932.) It was also reported that the loss of reputation made it difficult for Japan to issue, or rollover, the dollar-denominated bonds issued abroad. It seemed that American investors were more informed about the determination of the U.S. government to penalize Japan for her military adventures in China.

In the U.S., the Great Depression was in progress. New York stock prices lost 40-50 percent of their value in the first half of the year. The government countered with measures to inflate the money supply. The fear of possible inflation caused the European investors to pull their investments from the United States. The net flow of gold out of the U.S. amounted to 623 million dollars, making the balance at the end of June at 3.92 billion dollars. This large outflow of gold prompted rumors of the gold embargo by the U.S., for example, on March 29, and depreciated the dollar against yen. However, these events were dominated by the yen depreciation news mentioned above.

The Japanese political instability in the 1930s was twofold. As mentioned above, international criticism of Japanese aggressions in China was a great factor in yen depreciation. However, there were other domestic disturbances in Japan. There were several political assassinations in Japan. On February 9, ex-Finance Minister Inouye was assassinated; on March 5, Mitui Zaibatsu executive Takuma Dan was assassinated; and on May 15, Prime Minister Inukai was assassinated. However, the domestic political instability did not cause an immediate sharp change in the value of yen. The exchange rate did not show any significant movement on February 9 or 10,

and the assassination of the Prime Minister caused a yen depreciation of only a small amount (less than by $1) temporarily on May 16.

New Prime Minister Saito formed an all-party coalition government on May 26 and called a special parliamentary session from June 1 to June 15. The special session passed, among others, the Act of Preventing Capital Flight [Shihon Tohi Boshi Ho] (which became effective on July 1).

However, the parliamentary session was followed by another wave of yen depreciations (Regime III). This time, according to newspapers, speculators in Shianghai were to blame, combined with hightened political instability caused by a conflict at the Manchurian customs office (on June 27). The drop in yen might also have been hastened by import leads (of cotton) and by speculations which tried to avoid the capital controls that were soon to be imposed./8/

In sum, the Japanese yen depreciated due to the U.S. criticisms of Japanese imperialism. The instability between military aggression and signs of truce, combined with the uncertainties in the U.S. economic prospects, caused great volatility, as can be seen in the standard deviations in Table 2, Regimes Q-I, Q-II, and III.

6. Increasing International Conflicts in the Second Half of 1932

During the month of July 1932 (Regime Q-III), the exchange rate market was rather calm. This was mainly because of the newly enacted capital controls. Although the law of preventing capital flight would be found ineffective later, uncertainty about implementing procedures in the first month under the law made the transaction very thin, resulting in minor volatility (with standard deviations, less than .20).

In the second half of 1932, there were two waves of yen depreciations,

one from August 5 to 19 (Regime IV) and another from October 26 to November 29 (Regime V). Yen depreciations in both regimes were mainly caused by speculations outside Japan.

Since the capital flight prevention act was found to be ineffective as a means of stopping capital movement, domestic speculations were not effectively sealed by the new law to prevent capital flight. Investors and speculators saw the weakening of the yen due to the diplomatic isolation of Japan, which in turn was caused by increasing criticism from the United States and other countries of Japan for its handling of Manchuria and aggression toward China.

The Japanese activity in Manchuria and in mainland China was investigated by the League of Nations. A fact-finding mission, which came to Japan in February and submitted a report in October, was surprisingly (to the Japanese) critical of Japan. The increasing tensions between Japan and the western nations prompted foreign speculators to sell yen. It was considered at the time, "the movement of the yen depends on the foreign countries' attitude toward Japan." (Chugai Shogyo Shinpo, October 4.)

The speculations occurred outside Japan, as evidenced by a larger share of yen depreciation in the New York market during regimes IV and V. As Finance Minister Takahashi defended himself from the growing criticism for yen depreciation, by saying that "speculations abroad cannot be controlled [by the Japanese government]." (Chugai Shogyo Shinpo, August 25, 1932)

7. U.S. Financial Crisis, FDR's New Deal, and the Dollar Off Gold

The dollar/yen exchange rate changes in 1933 were dominated by the U.S.-oriented news. The yen appreciation was evident in the New York market rather than in the Tokyo market, becuase the dollar was depreciating (not

only against yen but also against sterling) in response to the U.S. news. The financial crisis in March 1933, Franklin D. Roosevelt's New Deal, the decision to move dollars off the gold standard, and the increase in the purchase price of gold contributed to the dollar depreciation throughout 1933. Let us consider in detail exactly how each event corresponds to the dollar depreciation (yen appreciation).

After being criticized for its military activities in China and Manchuria, Japan withdrew from the League of Nations in March 1933. Japan became gradually, but steadily, isolated in the international political circles.

From December 1932 to mid April 1933 (Regime Q-V), the dollar/yen exchange rate was rather stable. Although the yen had started to appreciate from a low of $20 recorded in November 1932, the process was very slow. The stability in the $/yen level was rather surprising in light of many events which we would consider fundamental to the determination of the exchange rate. In the spring of 1933, a financial crisis developed in the United States. On February 14, a bank moratorium was imposed in Michigan, followed by other states. On March 3, New York and Illinois declared moratoria. By this time, moratorium had spread to 38 states and operations and withdrawal were limited in 10 other states and the District of Columbia. On March 4, Franklin D. Roosevelt was inaugurated and new policies and directives were issued immediately. The nationwide bank moratorium, the suspention of convertibility, and the gold embargo was announced on March 5. The financial market, including the exchange market was closed from March 4 to March 12. When the market was reopened on March 13, strict capital controls were imposed to prevent capital flight and speculation. The gold export was restored with a licensing system (effective on March 10). It was not until

April 19 that the dollar went off gold.

The interest rate was raised sharply when the moratorium was lifted. The New York Federal Reserve Bank raised the discount rate to 3.5 percent, and the call rate jumped to 5 percent. The quotes of the dollar/yen rate were not available in the Tokyo market during the period of moratorium. The Japanese finaicial market was unaffected by the sharp increase in the call rate in the United States.

It is puzzling from the viewpoint of the efficient market hypothesis that the dollar did not depreciate (so that the yen against the dollar did not appreciate) in March, when it became obvious from various news stories that the dollar was going to be off gold soon. It is possible that resuming gold export, though licenses were needed, was enough to reassure the market. It may also have been the case that capital controls in Japan were strict and effective, so that the speculations could not take place. Alternatively, the appreciation pressure from widening the interest rate spread was just enough to cancel the depreciation pressure from an increased probability of going off gold permanently.

In the beginning of April, applications for gold export increased sharply. President Roosevelt announced the gold embargo on April 19. The dollar depreciation from April 19 to April 25 (Regime VI) was solely caused by the decision by the United States to go off gold. Most depreciation took place in the New York market, and the volatility in the New York market was very large. The interest rate was stable at 0.725 percent in Tokyo and 1.0 percent during this period. The stability of the interest rates with the exchange rate changes contrasts the March episode described above.

From the end of April to the beginning of June (Regime Q-VI), the market was rather quiet. Although the total change was small, there is some evidence from "market decomposed accumulated changes" that news in the Tokyo market was causing the yen to depreciate while news in the New York market was appreciating it. On May 1, 1933, the Foreign Exchange Control Law became effective. This superceded and strengthened the Law of Preventing Capital Flight introduced a year earlier. With this new law, the government was given the authority to control every aspect of foreign exchange. In fact, Japan tried to stabilize the value of yen with this exchange control law. When the dollar left the gold standard on April 20, Japan decided to fix the value of yen to sterling, with a wide band. After April 20, the yen was between 1 shilling 2 pence and a half and 1 shilling 2 pence and 1/16 for the rest of the year. Therefore, any change in the $/yen value after April was actually the change in the value of the dollar against sterling and yen.

From June 3 to July 18 (Regime VII-R), the dollar depreciated by more than $5/100 yen. At the end of May, the U.S. formally abolished the gold linkage, setting off another depreciation wave. When the U.S. representative opposed taking measures to stabilize the exchange rate (on June 28) in the Monetary and Economic Conference in London (June 21 - July 27), and when President Roosevelt further indicated that he would put a priority on domestic stimulation, another wave of dollar depreciation resulted. Again, most of the relevant news originated in New York. This scenario is confirmed by a high mean of depreciation of dollars and high volatility in the New York market for the VII-R regime.

The yen depreciated from mid-July to the end of July by $3/100yen (Regime VIII). The depreciation was mainly caused in Tokyo market.

However, no obvious reason for this is found.

From August to the end of October (Regime Q-VIII), the exchange market was quiet. A strong recovery of the U.S. economy was expected due to the policy package under the New Deal during the summer of 1933. The stock price increased by 50% from the bottom recorded in March. However, in September, it became evident that production and employment rates were not improving as planned. The performance of the economy disappointed workers and the number of strikes increased.

On October 22, President Roosevelt announced that the government would purchase gold at higher prices. A government agency, the Reconstruction Finance Corporation, started buying domestically produced gold at $31.36/troy oz. on October 25, and then the price was gradually raised to $34.06 on December 18. Moreover, the New York Federal Reserve Bank was instructed to purchase gold from abroad. The U.S. bought $12 million of domestic gold and $5 million of foreign gold. More money would be circulated, prices would be increased and the production would be increased. Essentially, this was a deliberate dollar devaluation (depreciation) policy.

These events were responsible for a large depreciation of the dollar against yen from October 21 to November 21 (Regime IX). The dollar depreciated against yen by more than $4/yen, about 5% for this period. Since the major news originated in the New York market, the New York market was responsible for the depreciation of the dollar, and the volatility of the New York market far exceeded that of the Tokyo market.

8. Interest Rate Effects on the Exchange Rate Determination

In the modern view of the portfolio balance approach, the exchange rate strongly responds to the interest rate differential. In fact, exchange rate fluctuations back in 1927 and 1928 were caused by capital flows prompted by interest rate differentials (Bank of Tokyo (1969)). It is of our interest to check whether the interest rate differentials between Japan and the United States was at all relevant to the exchange rate movement from 1931 to 1933. The time series of the differential in the call rates of the U.S. and Japan is depicted in Figure 3a. The change in the exchange rate is shown in Figure 3b for comparison. Casual observations of these figures do not convince us that the interest differential was dominantly responsible for changes of the exchange rate. In order to rigorously evaluate the effect of the interest rate differential on the exchange rate, we proceed to test a particular hypothesis.

Insert Figures 3a and 3b about here

If uncovered interest parity and rational expectations hold, the interest rate differential between the U.S. and Japan would predict movement in the dolar/yen exchange rate (for example, see Ito (1988) for arithmetics of uncovered interest parity). In particular, a higher U.S. interest rate, according to uncovered interest parity implies the expected yen appreciation. If expectations are rational (unbiased), the realized (ex post) rate is the sum of the expected rate and the random forecast errors. From this point of view, one may want to regress the change in the realized future exchange rate, NYDY(t+1)-NYDY(t), on the interest rate differential, INTDIF(t) = NYR(t)-TKR(t). We expect the positive sign on the interest rate differential. Results are shown in Panel A of the Table 3. An estimated

coefficient of INTDIF has a wrong sign but insignificantly different from zero. This conclusion is valid with or without the constant term. The result is also robust with respect to a sample split. Thus, uncovered interest parity combined with rational expectations would not explain the exchange rate movement. However, the predicted change in the exchange rate overnight due to the interest rate differential would be very small, so that it would not be depicted in the regression.

Insert Table 3 about here

An alternative link between the interest rate and the exchange rate is the following channel. If the monetary policy is going to change, the interest rate is most likely to pick up first. In other words, the change in the interest rate differential represents the news to the financial market. Therefore, if this is a major source, the change in the interest rate differential would be significant in the exchange rate equation. The portfolio balance approach would predict that an increase in the U.S. interest rate attracts the foreign investment into the U.S., thus causes the dollar appreciation (yen depreciation). Therefore, according to theory, the coefficient of INTDIF(t+1)-INTDIF(t) on the should be negative. The regression results are shown in panel B of Table 3. The estimated coefficients in all equations are insignificant, with or without the constant term, and whether a full or a split sample is considered. Therefore, the explanatory power of the interest rate on the exchange rate changes is very weak. However, the failure of ditecting any influence from the interest rate to the exchange rate may not be surprising, considering the fact that the exchange rate was much more volatile than the interest

rate differentials, as depicted in Figure 3b.

In sum, only a fraction of the exchange rate volatility is explained by the interest rate differential or its changes. This negative result justifies our news analysis approach in preceding sections, in that the exchange rate responded primarily to political decisions and actions during the two year period.

9. Was Yen Depreciation a Policy Objective?

The conventional wisdom is that Takahashi's policy depreciated the yen and the depreciation helped export. See Nanto and Takagi (1985, p.371) and Nakamura (1983, ch. 9). The view is correct to the extent that Takahashi decided to go off gold and allowed a hard landing in December 1931. However, it would be misleading to say that Japan pursued a deliberate depreciation policy to help an export drive in 1932.

Our close examination of the exchange rate movements reveals that the yen depreciation per se was not a policy objective. After the hard landing, the yen depreciated further. Our analysis shows that military aggressions and foreign criticisms against them are resposible for a substantial part of the yen depreciation of the 1931-32 period. The financial market was sensitive to the political risk in holding the yen-denominated asset. The market might have foreseen trade sanctions, an embargo or a blockade against Japan, although actual problems as such did not materialize until years later. In the meantime, the Japanese export soared and the balance of payments started to improve in 1932.

We dismissed the (changes of) interest rate differential as a major source of changes of the exchange rate. However, one might counter to our position saying that fiscal and monetary policies were conducted, though not

evident in the interest rate, so that the exchange rate could be influenced. It is well-known that Finance Minister Takahashi conducted a debt-financed fiscal expansion. In fact, the (central) government expenditures increased by 32.5 percent and by 15.6 percent in Fiscal Years 1932 and 1933, respectively. However, money supply (M1) increased only 6.9 percent and 4.8 percent in 1932 and 1933, respectively. It is granted that fiscal policies contributed to the early recovery of the Japanese economy. However, it is quite questionable that those policies were conducted to prompt yen depreciation which in turn helped export and output.

If the yen depreciation was designed to promote export, it would have been promoted so by the government and the business. On the contrary, the Japanese business leaders were asking the government to stop the yen depreciation. The Chamber of Commerce in Osaka asked the government to stabilize (i.e., prevent depreciation of) the yen as early as January, 1932. The Tokyo Chamber of Commerce followed the suit in February. However, the opinions were mixed in the first half of 1932. After the yen dropped below $25/100 yen in the summer of 1932, the public opinion became solid in asking the government to stop the depreciation.

Although Finance Minister Takahashi had stuck to a position that he would let the market determine the level and there would be nothing the government could do to prevent yen depreciation, , the government gradually shifted its position. In July 1932, the Act of Preventing Capital Flight was introduced, although it soon became clear that loopholes were so large that the Act did not stop capital movement effectively. (See Bank of Japan (1985, pp. 84-89).) Facing a further depreciation in the second half of 1932, the government introduced a stricter law. The Foreign Exchange Control Law was introduced to the Parliament on February 14, 1933, passed the

Parliament on March 17, and became effective on May 1, 1933. This law was

Nanto and Takagi (1985), citing Nakamura (1983), gave the interpretation that the exchange rate control was introduced to limit import and to improve balance of payments, and preceded the United States, England and Germany. On the contrary, the law of 1933 was intended to limit capital export, thus preventing further depreciation of the yen. Exchange controls at least at the time of introduction were not aimed at limiting import or promoting export.

10. Concluding Remarks

In the beginning of our sample period, the international financial market were well organized and free from regulations. Exchange rate dynamics in 1931-32, without capital controls, had most of the characteristics common to that in late 1970s and the 1980s. The exchange rate changes came in waves, and they corresponded to many news relevant to the value of currencies. This observation is supported by a general success of our "news analysis." Major news, such as decisions to go off gold (which happend in 1931 in Japan, and in 1933 in the U.S.), caused the exchange rate flucutuations immediatly in the home market. (However, there were a few instances that the correspondence between relevant news and a large exchange rate movement broke down.) As capital controls were introduced in Japan (in the second half of 1932) and the United States (in 1933), capital movements with speculative motives were significantly curtailed.

In sum, reasons for the yen depreciation from December 1931 to November 1932 can be summarized as follows. The yen depreciated by about 30 percent ($50 to $35 per 100 yen) in three weeks following (the anticipation and reality of) the yen going off gold in December 1931 (Regime I). This was a

clear-cut hard-landing from the overvalued "old parity." Most depreciation took place in the Tokyo market just before and after the announcement of gold embargo. During the year of 1932, the yen lost another 40 percent ($35 to $20 per 100 yen) of its value in several waves of depreciations separated by calm periods (Regimes Q-I through Q-V). These depreciation waves correspond in timing to various episodes of Japanese imperialism aggressions. During the year of 1932, sources of depreciation and volatility gradually shifted from the Tokyo market to markets abroad. This is an evidence that foreign investors and speculators became more sensitive to the political risk of holding the yen as Japan became criticized by the international diplomatic circles. Clearly this depreciation was not engineered for export drive by the Japanese government's policy, but rather a byproduct of its military adventures.

The the dollar/yen exchange rate moved from $20 to $30 per 100 yen in 1933. However, this was not the yen appreciation, but the dollar depreciation. The main news which affected the exchange rate originated in the United States. The effects of worsening of the Great Depression and the decision to go off gold by the United States dominated the market.

The end of gold standard and political events mainly drove the exchange market. The interest rate differential had little explanatory power on the exchange rate movement.

FOOTNOTES

/1/. Japan joined the gold standard in 1897 after receiving the 311 million yen (38 million British Pounds) indemnity from China as a result of the Sino-Japanese war of 1894-95. The established parity implied approximately 2 yen to the dollar. Japan, along with European countries, suspended the gold standard during the First World War. Sweden, after a strong deflationary policy, returned to the gold standard at the old parity in the beginning of the 1920s. British sterling returned to the gold standard in 1925, despite the advice of John M. Keynes against it. In 1926, France joined the gold standard, but at a fraction of the pre World War I parity due to the severe inflation after the war.

Although many European countries resumed the gold standard system in the 1920s, Japan did not formally return to the gold standard until January 1930. However, the domestic policies of 1920s were conducted in order to keep the exchange rate near the old parity, that is, approximately 2 yen/dollar or 10 yen/£. At the time, it was believed that returning to the gold standard would be stimulating to the sagging economy. However, the yen was overvalued, and the demand from United States was declining due to the weak economy and protectionism. Gold reserve drained and the Japanese economy was in a recession. This prompted the policy change under the new cabinet.

/2/ The Japanese gold reserve was declining quickly in 1931. Britain already left the gold standard in September. The market was expecting Japan to follow the suit after the Britain's decision. However, it took more than two months and cabinet change for Japan to

suspend its gold export.

Finance Minister Jun-nosuke Inouye in the Wakatsuki cabinet believed in the gold standard, for the stability of foreign trades, and repeatedly denied the rumor of suspension of gold embargo. On December 11, 1931, Prime Minister Wakatsuki and his cabinet members resigned. In an interview after the resignation is submitted, Finance Minister Inouye said, "It has been my belief that gold export should not be suspended. Considering current economic conditions, I do not recognize any reason for the suspension. Therefore, I will not suspend gold export so long as this cabinet lasts. The issue of gold should be considered by the next cabinet." (Chugai Shogyo Shinpo, December 12, 1931; authors' translation.)

The dramatic mistake of sticking to the fixed exchange rate when economic conditions were changed was going to be repeated some forty years later in Japan.

The new government led by Prime Minister Inugai was formed on December 13, 1931. The new Finance Minister, Korekiyo Takahashi immediately suspended the export of gold, and the convertibility of yen. The Ministry Directive No. 36, issued and effective on December 13, stated that "(i) Export of gold coins and bars is subject to approval of the Finance Minister; (ii) Violaters to (i) shall be imprisoned for a period not exceeding three months or shall be subject to a penalty not exceeding 100 yen; (iii) If a person sells gold bars, or if a person collects, melts, or defaces gold coins to be resold, then the person is subject to the same penalty as described in (ii)." For the basis of the directive, Finance Minister

Takahashi explained that "the economy and the fiscal budget have recently choked since the gold export (standard) is resumed. The government revenue has declined sharply, causing a massive budget imbalance; the industries has been stalling without any sign of recovery; the species has flowed out; the business community has been suffering tremendously; the interest rate has increased, causing a monetary crunch. The present course of the situation is not bearable. It is unavoidable to put the suspension of gold export as a pillar of new policy. This is the reason to announce the order of gold export suspension as the first action of the new government." (Chugai Shogyo Shinpo, December 13, extra, special edition, authors' translation.) During the days immediately after this order, Finance Minister repeatedly pointed out that the yen was overvalued and the depreciation would be good for the Japanese industry, and that it would be the best to let the market determine the exchange rate.

/3/ This period includes the suspension of gold export on December 13, 1931, experienced the 60 percent change (depreciation) from December 1, 1931 ($50/100yen) to November 30, 1932 ($20/100yen). This is all-time record for the most volatility for one year period, only rivaled with the period of rapid yen appreciation which includes the episode of the Group of Five, Plaza agreement on September 22, 1985. The yen/dollar rate changed slightly more than 60 percents, from May 25, 1985 ($1/251 yen) to May 24, 1986 ($1/155 yen). Note that the calculation of both periods is based on the value of dollar against yen (the IMF method).

There was no yen/$ exchange rate market during the Second World

War. Hence, the 84-fold change in nine years, from the pre-WW II ($23.4/100yen) to the post-WW II level ($1/360yen, set in 1949), was an exception for the volatility record.

/4/ Finance Minister Takahashi is credited for the Keynesian-type monetary and fiscal policies in the early 1930s. (See for details, Nakamura (1983, ch.9), Shima (1983) and Yamamura (1972).) Government expenditures were increased and financed by bonds which were monetized by the Bank of Japan. The interest rates were lowered in 1932 and 1933. In literature on the Japanese economic history, Finance Minister Takahashi is often nicknamed as a Keynes of Japan (for example, in Nanto and Takagi (1985)). It is also emphasized that his policies were executed before Keynes' General Theory was written, and even before the New Deal was announced in the United States.

/5/ The daily exchange rate is expressed in the T.T. selling rate (i.e., the rate for wire transfer). However, the quotes in Japan are expressed as the rate that banks are willing to sell the U.S. dollars bound for the New York, while the quotes in New York are expressed as the rate that banks are willing to sell the Japanese yen bound for Tokyo. Thus, the bid-ask spread has to be adjusted before the statistical summary is calculated. The following information is available for making inference on the size of bid-ask spread during the period in question.

First, for selected days, the newspaper also reports the ask rate in the Tokyo market. When the exchange rate experiences a very rapid change, such as one after the gold embargo, the bid-ask spread

was as much as $1 (when the level was $40/100yen, that is 2.5%). However, most of the time, the spread was between $.50 (i.e., 1.67%) and $.25 when the rate is volatile, and it was between $.25 (i.e., 0.83% at $30/100yen) and $.125 (i.e., 0.42% at $30/100yen) when the rate is calm. Second, the bid-ask spread for the pound/yen rate in the London market is available daily from December 1933 on. It suggests that the spread is mostly between 0.7 and 0.9 %, and occasionaly up to 1.4%. Third, if during each quiet period there is no particular bias in depreciation and appreciation news falling in the Tokyo and N.Y., then the per-day average change should be near zero in each market in each quiet (Q) regime after the bid-ask spread is adjusted.

These observations make us confident that the bid-ask spread can be inferred as notes in Table 2. It is not essential to precisely estimate the day-by-day bid-ask spread for our purpose. It suffices to estimate the average bid-ask spread for the regime. Moreover, our volatility measure, the standard error of the exchange rate change in a market, is independent from the estimate of the bid-ask spread, given that the bid-ask spread is taken to be a unknown constant.

/6/ A pattern of alternating tremulous and tranquil periods is common to the experiences in the post Smithsonian period. It is one of the "regularities" found by Mussa (1979). See, for example, waves identified by Ito (1987) for the period after the Group of Five, Plaza Agreement of 1985.

/7/ For the beginning and ending of some regims, dating other than one adopted in this paper could be conceivable. For example, the end

of the second regime could be March 8 instead of February 26, 1932. However, dating is not crucial to so long as the alternatives are reasonably close each other.

/8/ Bank of Japan (1985; p.65) lists another reason for the yen depreciation of this period: Seiyuukai, the majority party, advocated a further yen depreciation, and the advocated policy caused a speculative selling of yen outside Japan. This explanation is consistent with the fact that most of yen appreciation took place in the New York market. However, there is a difficulty with this explanation. The Japanese government at the time was going to impose the Act of preventing capital flight in order to stop yen depreciation caused by speculation. Policies of advocating the depreciation and of preventing capital flight are conflicting in their effects.

Moreover, the above-mentioned explanation implies the delayed reaction of the exchange rate to the news. If Yen moves in the New York market reacting to Japan-oriented news, it implies either that it took time to digest news or that the Japanese traders could not foresee how American traders would react to the news. Note that, in the 1980s, even if traders of different nationalities are heterogeneous, a reaction to the news is immediate since all traders can, and do, participate in any market in the world via telephone. The communication technology available in the 1930s did not allow the institutions in New York to trade in real time in Tokyo.

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TABLE 1

Entire (2-yr) period summary: 12/11/31 - 11/21/33 unit $/100yen

Total change = NYDY(11/21/33) - NYDY(12/11/31) = -18.62

PERIOD	MARKET		24-HR. CHANGE
12/11/31 - 11/21/33	TOKYO	NYORK	NYORK24
per day average change	-0.123	0.091	-0.032
per day std. deviation	0.529	0.461	0.495
number of observation	419	412	560
accumulated change	-51.43	37.49	-18.14

SAMPLE SPLIT

12/11/31 - 11/29/32	TOKYO	NYORK	NYORK24
per day average change	-0.150	0.035	-0.107
per day std. deviation	0.685	0.544	0.626
number of observation	228	226	279
accumulated change	-34.1125	8.015	-29.96

11/30/32 - 11/21/33	TOKYO	NYORK	NYORK24
per day average change	-0.091	0.158	0.042
per day std. deviation	0.229	0.323	0.297
number of observation	191	186	281
accumulated change	-17.3173	29.4735	11.82

Note: Since there are missing observations, the number of observations do not necessarily match the number of business days. When the changes are measured, one missing observation in a market will cause two missing observations in "changes."

TABLE 2

Regime	Dates	TOKYO	NYORK	NYORK24
I	12/11/31 - 12/30/31 [-14.28]			
	per day average change	-1.658	0.718	-0.925
	per day std. deviation	1.66	1.23	1.75
	number of observation	15	16	15
	accumulated change	-24.875	11.495	-13.880
QI	12/31/31 - 2/16/32 [-0.05]			
	per day average change	-0.30	0.29	0.002
	per day std. deviation	0.60	0.49	0.72
	number of observation	29	28	34
	accumulated change	-8.675	8.235	0.08
II	2/17/32 - 2/26/32 [-3.65]			
	Per day average change	0.16	-0.70	-0.514
	per day std. deviation	0.28	0.45	0.38
	number of observation	7	7	7
	accumulated change	1.0925	-4.8675	-3.60
Q-II	2/27/32 - 6/14/32 [-0.3]			
	per day average change	-0.000	-0.002	-0.005
	per day std. deviation	0.35	0.44	0.36
	number of observation	73	72	89
	accumulated change	-0.0025	-0.1475	-0.43
III	6/15/32 - 6/27/32 [-4.44]			
	per day average change	-0.24	-0.24	-0.404
	per day std. deviation	0.44	0.39	0.70
	number of observation	9	9	11
	accumulated change	-1.24	-3.05	-4.44
Q-III	6/28/32 - 8/4/32 [-0.19]			
	per day average change	0.16	-0.16	-0.006
	per day std. deviation	0.15	0.16	0.25
	number of observation	26	26	33
	accumulated change	4.235	-4.245	-0.19
IV	8/5/32 - 8/19/32 [-3.87]			
	per day average change	-0.03	-0.22	-0.30
	per day std. deviation	0.29	0.23	0.41
	number of observation	12	12	13
	accumulated change	-0.3875	-2.6125	-3.87
Q-IV	8/20/32 - 10/25/32 [-0.87]			
	per day average change	-0.03	0.06	0.01
	per day std. deviation	0.32	0.36	0.41
	number of observation	39	38	51
	accumulated change	-0.9975	2.2575	0.55

Table 2 continued

V	10/26/32 - 11/29/32 [-3.56]			
	per day average change	-0.01	-0.11	-0.16
	per day std. deviation	0.33	0.28	0.39
	number of observation	18	18	26
	accumulated change	-0.2625	-2.05	-4.18
Q-V	11/30/32 - 4/18/33 [1.44]			
	per day average change	0.004	0.01	0.02
	per day std. deviation	0.33	0.28	0.39
	number of observation	63	61	105
	accumulated change	0.2625	0.721	1.76
VIR	4/19/33 - 4/25/33 [3.12]			
	per day average change	0.26	0.33	0.52
	per day std. deviation	0.39	0.74	0.38
	number of observation	4	4	6
	accumulated change	1.055	1.315	3.12
Q-VI	4/26/33 - 6/2/33 [0.06]			
	per day average change	-0.20	0.20	0.002
	per day std. deviation	0.19	0.20	0.24
	number of observation	20	20	33
	accumulated change	-4.06	3.94	0.06
VIIR	6/3/33 - 7/18/33 [5.57]			
	per day average change	-0.14	0.32	0.14
	per day std. deviation	0.21	0.32	0.36
	number of observation	34	34	39
	accumulated change	-4.785	10.985	5.57
VIII	7/19/33 - 8/1/33 [-3.00]			
	per day average change	-0.39	-0.02	-0.27
	per day std. deviation	0.42	0.51	0.52
	number of observation	7	7	12
	accumulated change	-2.71	-0.16	-3.25
Q-VIII	8/2/33 - 10/21/33 [-0.19]			
	per day average change	-0.04	0.10	0.015
	per day std. deviation	0.19	0.27	0.26
	number of observation	45	43	64
	accumulated change	-1.9675	4.3675	0.93
IX	10/21/33 - 11/21/33 [4.12]			
	per day average change	-0.28	0.48	0.165
	per day std. deviation	0.15	0.40	0.43
	number of observation	18	17	22
	accumulated change	-5.115	8.305	3.63

Table 2 continued

Notes to Table 2

1. A number in [ ] is a total change for the regime.

2. The bid-ask spread is assumed as follows: (i) $0.50/100 yen from December 11, 1931 to December 30, 1932; (ii) $0.20/100 yen from December 31, 1931 to November 29, 1932; (iii) $0.15/100 yen from November 30, 1932 to April 18, 1933; (iv) $0.20/100 yen from April 19, to November 21, 1933. For the basis of this assumption, see footnote 5.

3. Since there are missing observations, the number of observations do not necessarily match the number of business days. When the changes are measured, one missing observation in a market will cause two missing observations in "changes."

Table 3

LHS: Daily (24-hour) % Change in the exchange rate,
100*(NYDY(t+1)-NYDY(t))/NYDY(t)

a. Uncovered Interest Parity

Sample	Constant	INTDIF(t)	D.W.	R bar sq.
12/11/31	0.0196	-0.149	1.92	0.001
- 11/19/33	(0.189)	(-1.212)		
12/11/31	-------	-0.132	1.92	0.003
- 11/19/33		(-1.579)		
12/11/31	-0.615	0.333	1.96	0.000
- 11/29/32	(-1.913)	(1.001)		
12/11/31	-------	-0.260	1.93	-0.011
- 11/29/32		(-2.129)		
11/30/32	0.173	-0.004	1.97	-0.004
- 11/20/33	(2.004)	(-0.034)		
11/30/32	-------	0.115	1.94	-0.017
- 11/20/33		(1.049)		

b. Contemporary Interest Rate News

Sample	Constant	INTDIF(t)-INTDIF(t-1)	D.W.	R bar sq.
12/11/31	-0.0773	0.494	1.98	-0.001
- 11/21/33	(-1.093)	(0.817)		
12/11/31	-------	0.494	1.98	-0.001
- 11/21/33		(0.816)		
12/11/31	-0.325	0.746	2.05	-0.003
- 11/29/32	(-2.761)	(0.495)		
12/11/31	-------	0.757	1.99	-0.030
- 11/29/32		(0.496)		
11/30/32	0.171	0.415	1.99	-0.001
- 11/20/33	(2.266)	(0.800)		
11/30/32	------	0.418	1.94	-0.019
- 11/20/33		(0.800)		

Note: The number inside () is the t-statistics.

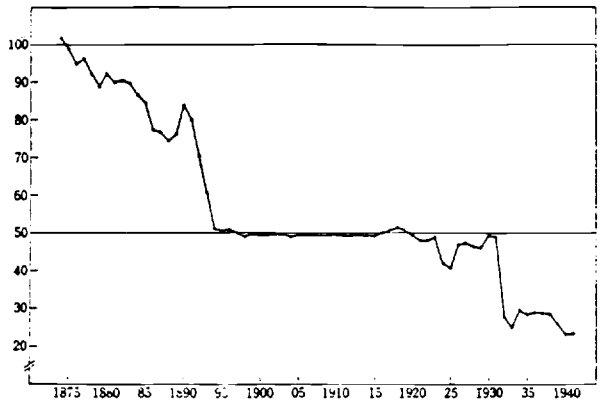


FIGURE 1

The exchange rate, 1874-1941: $/100yen

Source: I. Yamazawa and Y. Yamamoto, Trade and International Balance of Payments, Estimates of Long-Term Economic Statistics, vol. 14, Tokyo, Toyo Keizai Shinpo-sha, p.64.

FIGURE 2 A

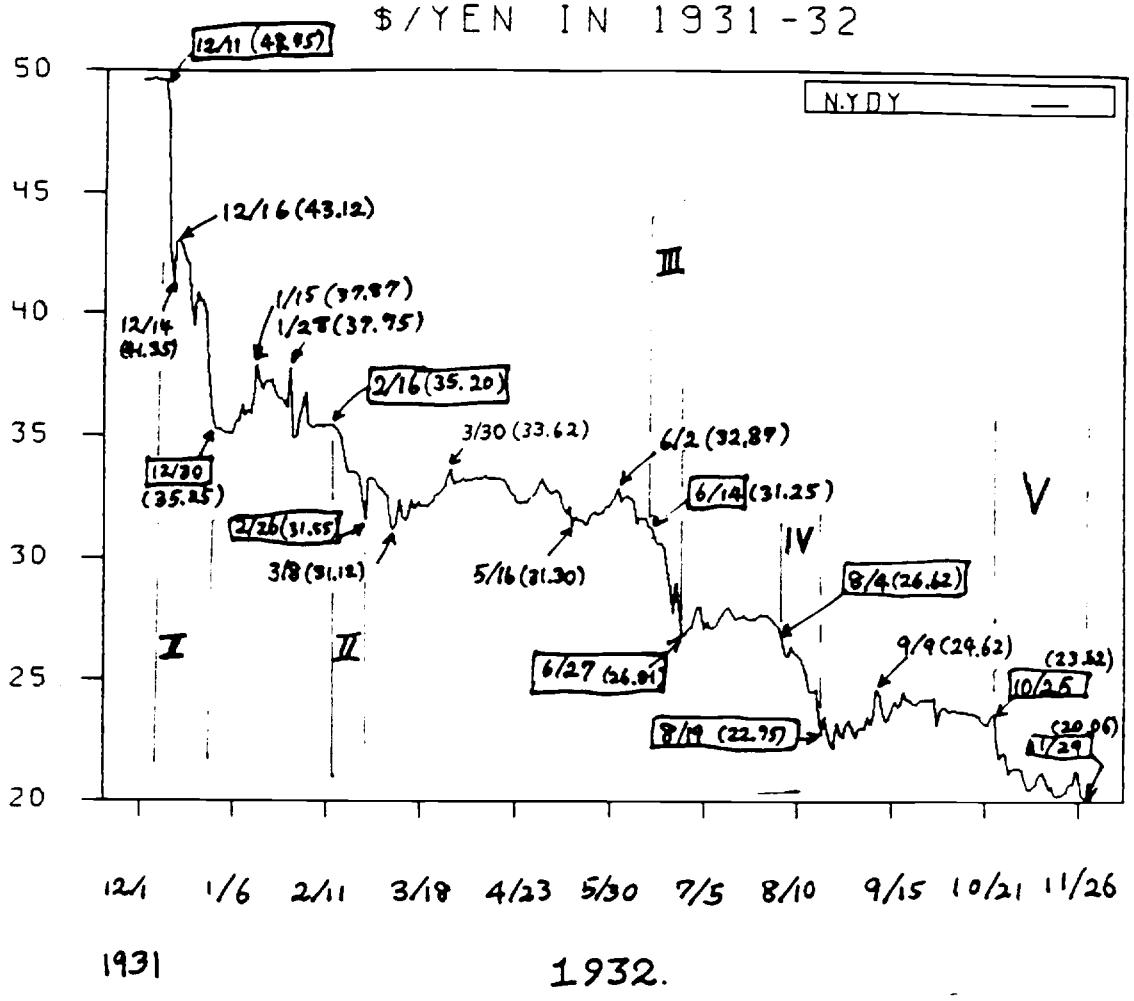
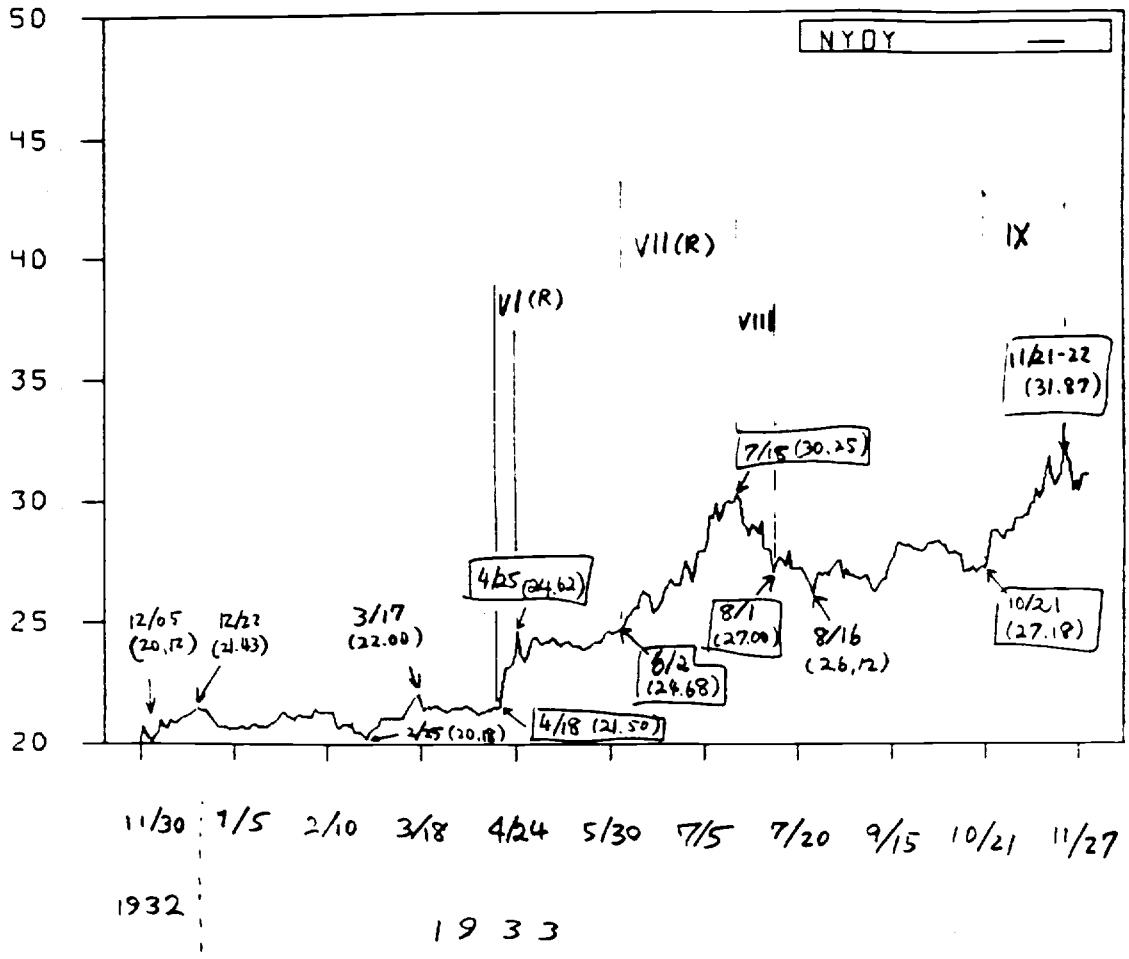

$/YEN IN 1931-32
N.Y.D.Y.
50
45
40
35
30
25
20
12/11 (48.95)
12/16 (43.12)
12/14 (44.35)
1/15 (37.87)
1/28 (37.75)
2/16 (35.20)
12/30 (35.25)
2/26 (31.55)
3/8 (31.12)
3/30 (33.62)
5/16 (31.30)
6/2 (32.89)
6/14 (31.25)
6/27 (26.91)
8/4 (26.62)
8/19 (22.97)
9/9 (29.62)
10/26 (23.32)
11/29 (20.96)
I
II
III
IV
V
12/1
1/6
2/11
3/18
4/23
5/30
7/5
8/10
9/15
10/21
11/26
1931
1932.

FIGURE 28

$/YEN IN 1932-38



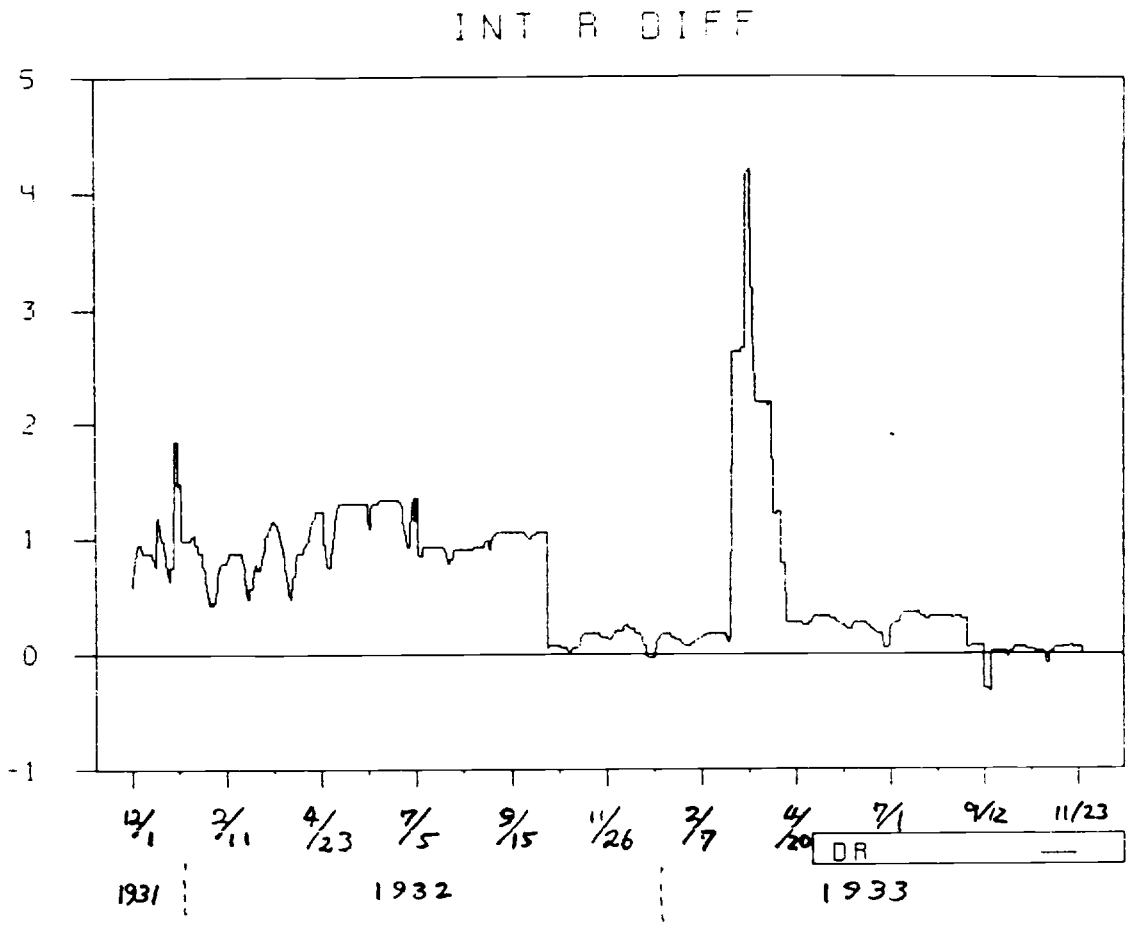

INT R DIFF
5
4
3
2
1
0
-1
12/1
3/11
4/23
7/5
9/15
11/26
3/7
4/20
7/1
9/12
11/23
DR
1931
1932
1933

FIGURE 3A

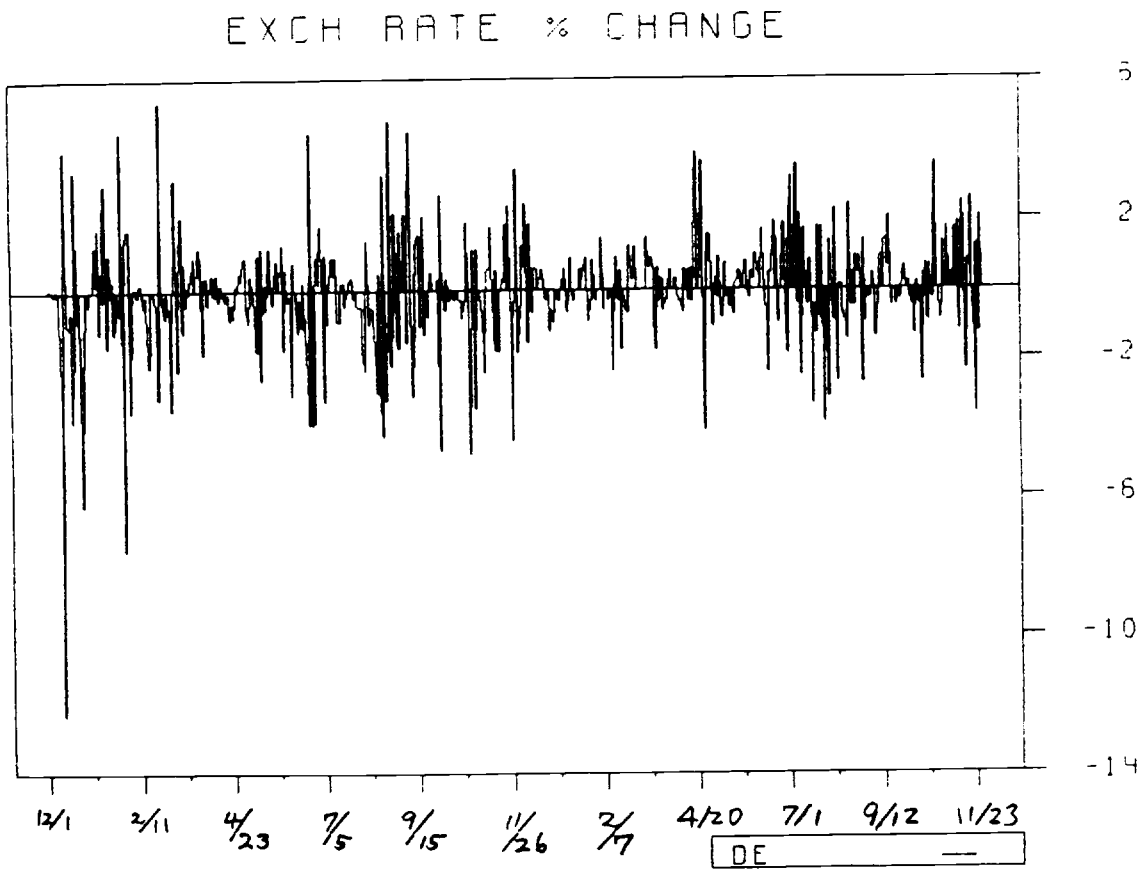

EXCH RATE % CHANGE
6
2
-2
-6
-10
-14
12/1
2/11
4/23
7/5
9/15
11/26
3/7
4/20
7/1
9/12
11/23
DE

FIGURE 3B.