

**“Great Inflation and Central Bank independence in Japan”**

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Abstract: Japan suffered a very high inflation rate in 1973-74. The CPI inflation rate rose near 30% in 1974. It is commonly argued that the oil crisis is the culprit for the 1973-74 high inflation. However, the inflation rate had already reached a 10% threshold, months before the onset of the oil crisis in October 1973. In fact, inflation was largely a result of monetary policy mistakes. The interest rate cut of June 1972 was not necessary and the interest rate hike of April 1973 was too little too late. The policy mistakes were result of poor judgment of the Bank of Japan, pressure from the government to avoid yen appreciation, and institutional non-independence of the central bank. Contrary to what one might think, the Bank of Japan came out of the Great Inflation of 1973 with stronger voice. It must have argued that its recommendation to tighten monetary policy should not be overruled or the same mistake would result. The Bank of Japan obtained the de facto independence by this logic after 1975. When faced with the next economic recovery in 1979, again accompanied by oil price increases, the Bank of Japan was able to tighten monetary policy in a timely manner to contain the inflation rate under 10 percent.

Key words: inflation, central bank independence; the Bank of Japan; oil crisis

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## **1. Introduction**

When the new Meiji government, after overturning 260 years of the Tokugawa Shogun rule, decided to open the country to the western world in 1868, it had to build in a hurry many legal institutions—such as Democracy, Constitution, Diet (parliament), Commercial law, Criminal Law—as well as economic and social infrastructure—such as the banking system, railways, and postal system.

The Bank of Japan was born in 1882, after the new Meiji government studied the banking systems of the western world, experimented unsuccessfully the national banking system (without central bank) of the United States and then decided to adopt the central banking system modeled after the Belgium central bank. During more than 125 years of its uninterrupted history, the Bank saw three episodes of high inflation, defined as more than 20 percent of CPI inflation rate: (1) Years during the WW I; (2) Years immediately following the end of WW II; and (3) 1973-74. The first episode is due to the extreme boom during the WW I when Japan could benefit from export boom. The second episode, when the prices increased more than 200 times in a few years, is due to the devastation of productive capacity as a result of devastation toward the end of WW II.

The main focus of this paper is to examine the third episode of high inflation, when the CPI inflation reached above 10 percent from May 1973 to September 1975, and above 20 percent for the entire year of 1974. (The inflation rate is defined as the percentage increase over the same months of the preceding year.)

It is commonly argued that the oil crisis was the culprit for the 1973-75 high inflation. However, the inflation rate has reached already 10% several months before the Middle East crisis occurred in October 1973. The oil crisis only aggravated, though very badly, the inflationary spiral that had been already in progress.

Reasons for the great inflation of 1973-74 can be attributed to the following factors. First, in late 1972, the Bank of Japan underestimated the strength of the economy and potential of prices to rise quickly. Second, there was a strong aversion to yen revaluation/appreciation. This was particularly true between December 1971, when the Smithsonian Agreement was reached, and February 1973, when the yen was finally floated. The appreciation pressure made the monetary authorities to intervene selling the yen, which added liquidity in the market. Politicians also voiced their opposition

to yen appreciation at any cost. The Bank lowered the official discount rate (ODR) in June 1972, when the recovery in output activities became obvious. Third, Mr. Kakuei Tanaka became Prime Minister (PM), advocating large fiscal spending. There was strong pressure from the government to keep the interest rate from rising. It was convention then that any interest rate change was subject to preliminary discussion and a tacit approval from the government and Prime Minister before actually decided in the Monetary Policy Committee. It was not until April 1973 that the ODR was raised. By that time, the CPI inflation rate was more than 9%. The first three steps of interest rate hikes in 1973 (out of 5 times) were too little too late. By the time of oil price hike of October 1973, the fight against inflation was already lost. Both headline and core CPI inflation rates rose above 20% by the beginning of 1974.

High inflation and social chaos finally convinced the Bank and politicians to apply strong tightening. The interest rate was raised five times, cumulatively from 4.25% to 9%, in 1973. Disinflation in 1974 was accompanied by a sharp output decline, a great sacrifice. The negative growth rate of 1974 was the first time since 1950.

There are three possibilities on the relationship between the Bank of Japan and the government (including PMs) for the 1972-73 period. First, the Bank of Japan did not know that the inflationary pressure was building in the economy. Examination of a memoire and the Bank history document reveals that this was probably not the case. Second, the Bank of Japan knew that the inflationary risk was rising, but did not seek tightening in time because of fear of being turned down. Third, although the Bank of Japan knew of the risk and attempted to tighten, but the tightening proposal was rejected by the government. Close examination of the events reveal that the truth is somewhere between the second and third scenarios.

Contrary to what one might think, the Bank of Japan came out of the Great Inflation of 1973 with a stronger voice. The Bank must have argued that if its recommendation to tighten monetary policy was overruled, the tragic experiences of 1972-73 would be repeated. The lessons of the great inflation were learned by the public as well as the Bank of Japan. The Bank of Japan obtained the *de facto* independence with this logic when an economic recovery occurred in 1979. The ODR was raised much earlier this time than in 1973. Even more remarkable here was that the ODR was raised during the months of a budget debate in the Diet—between January and March—that was considered to be a political no-no before. The real interest rate remained positive in

1979-80, in contrast to large negative in 1973-74. As a result, even with a sharp oil price increases in 1979-80, the inflation rate in Japan remained moderate, peaked at 8.7%.

The rest of this paper is organized as follows. The next section reviews the 120 year history of inflation in Japan. Section 3 describes the detail events, political developments as well as monetary policy decision making during the 1970s. The years that include the first oil crisis, 1972-74, will be considered the case of monetary policy mistakes. (See Ito (1992; pp. 125-127) for earlier description of the “mistake.”) In comparison, the years that include the second oil crisis, 1978-80, will also be considered as a success. Section 4 will be devoted to some econometric analysis to substantiate the arguments in the preceding sections. Section 5 concludes the paper.

## **2. Long History**

The yen, as the currency of Japan, was introduced in 1871, and the Bank of Japan was established in 1882. During the 125 year history of the Bank of Japan, there are only three episodes of very high inflation: [Figure 1](#) shows the CPI inflation rate from 1880 to 2007 for Japan. Except for very high inflation rate during the WW I years and hyper inflation during the years immediately following WW II, Japan did not experience very high inflation rate even before the economy grew to become an advanced country. Only episode of high inflation during the peace time was recorded in 1973-74. [Table 1](#) shows the WPI and CPI inflation rates in the three episodes. Since the two earlier episodes are directly related to the World Wars, many factors that defined the inflation rates in those years are beyond control of the central bank. The only interesting episode from the viewpoint of monetary policy is the third episode, namely in 1973-74. This period will be analyzed in detail in the next section.

The rest of this section is devoted to an overview of the long history of inflation dynamics and the associated exchange rate movement. Most of the discussion follows Ito (1997) who examined the yen/dollar exchange rate as well as the inflation dynamics of the two countries. When the yen was introduced in 1871, one yen had the same gold value with the US dollar. Hence, the exchange rate was 1 yen for 1 dollar. Legally it was the gold-pegged currency, but in reality, it was convertible to silver. Hence, over the following twenty-five years, the yen depreciated steadily against the US dollar, mainly reflecting depreciation of silver against gold. By 1895, 1 US dollar was worth 2 yen.

During the de facto silver convertible years, the Japanese prices—both CPI and WPI—were oscillating between inflation and deflation, the average inflation rates of Japan from 1880 to 1896 were 1.1% in terms of CPI and 2.1% in WPI. The highest inflation rates were 14.5% for CPI in 1880, 9.0% in WPI in 1896. The inflation rates in the US were slightly lower than Japan, -0.4% for CPI and -1.5% for WPI. The highest rate was 7.5% for CPI and 11.1% for WPI, both in 1880. Although as a silver standard country, Japan experienced higher inflation rate than the United States, the inflation difference was more or less offset by the nominal depreciation of the yen vis-à-vis the US dollar.

Once Japan joined the gold standard club in 1897, it was maintained until WW I. The gold standard then was a significant discipline device against inflation, just as theory would suggest. Japan maintained the gold standard at the rate roughly two yen to one dollar. Since inflation rate during WW I in Japan was higher than the US, attempting to get back to the gold standard at the old parity meant deflationary policy, similar to experiences among European countries. Indeed, the inflation rate was mostly negative during the 1920s. With unfortunate events like the Great Kanto Earth Quake of 1923 and the banking crisis of 1927, timing of getting back to the gold standard was put off until January 1930. The timing of restoring gold standard turned out to be worst, as the world economy, especially the US economy, was heading toward the Great Depression. Japan got off the gold standard only after 22 months in December 1931, following many European countries. The yen/dollar exchange rate depreciated quickly as the United States maintained the gold standard until 1933. It did not take too long that the value of the yen in terms of one dollar became half of the gold standard rate, that is, four yen per US dollar.

Before WW II, the yen depreciated vis-à-vis the US dollar over the years, but the change of the nominal yen/dollar rate reflected more or less the inflation differential between the two countries. That is, the real bilateral exchange rate did not show any trend. Much of productive capacity in Japan was destroyed at the last phase of WW II. Hyper inflation followed as the country was occupied by the Allied Force. Within several years, the price level became almost one hundred times of before the war. The new yen/dollar rate was fixed in 1949 as 360 yen per dollar. (According to some evidence, the choice of 360 was intended to restore the real exchange rate prior to WW II, most likely in terms of WPI rather than CPI.) With it, strong fiscal and monetary tightening, known as the Dodge Plan, was introduced by the order of the Allied Force.

The hyper inflation suddenly stopped. This may be the early example of the exchange rate based stabilization policy—later reinvented by the IMF.

During the Bretton-Woods era, monetary policy was operated to maintain the fixed exchange rate policy. Since significant capital control existed, monetary policy did have some degree of freedom (that is, the interest rate in Japan could be different from the U.S.). The balance of payments had to be maintained, so that the Bank of Japan applied monetary restraints whenever the booming economy increased imports far exceeding exports, depleting foreign reserves. However, Japan was a diligent student of the Bretton-Woods regime. It held 360 yen per dollar from 1949 until the day that President Nixon announced the suspension of conversion of the US Dollar on August 15, 1971.

During the Bretton-Woods years, the Japanese CPI inflation rate was higher than the US CPI, while the Japanese WPI inflation rate was much more comparable to a US counterpart. Comparing the CPI inflation rate, Japanese rate almost double of the US rate for each of the 1950s (4.1% in Japan vs. 2.1% in the US) and 1960s (5.7% in Japan vs. 2.8% in the US). For the WPI inflation rate the Japanese rate was rather close to the US rate: it was higher in Japan in the 1950s (4.2% in Japan vs. 1.7% in the US) but reversed in the 1960s (1.3% in Japan vs. 1.7% in the US). This is a strong indication that the Balassa-Samuelson effect was working through the CPI inflation differential. See also Ito (1997) for the discussion and the data source.

From the 1950s to 1970s, main monetary policy instrument then was the official discount rate (ODR), supplemented by the reserve ratios (ratios were different for different kinds of deposits). The monetary aggregate growth rate was monitored but not emphasized. All deposit rates were under strict controls (until the mid-1980s) and linked to the official discount rate. The bank lending rates to corporations were also indirectly controlled. Total lending amounts were also controlled by the Bank of Japan. Commercial banks had to submit lending plans every quarter and results were monitored carefully. The total amount of lending (increases) was controlled for each bank. This practice is called the “window guidance.” Private-sector corporations were not allowed to borrow from abroad or deposit abroad. All export earning in the US dollar had to be converted into the yen and importers had to obtain the foreign currencies from the Bank of Japan. Individuals were also under strict approvals for obtaining foreign currencies. No foreign currency deposits were allowed. See Ito

(1992: Ch. 5) for more detailed description of the transformation of the financial markets from a controlled system to a liberalized system.

### **3. Great Inflation of 1973-74**

#### 3.1. Transition from the the Bretton Woods to Free Float

The collapse of the Bretton-Woods regime in July 1971 suddenly freed the Bank of Japan from conducting monetary policy just for maintaining the balance of payments by controlling domestic demands. Theoretically the exchange rate can move freely to adjust imports and exports, and the Bank of Japan could concentrate its policy objectives to domestic prices. But, this did not happen, at least, until February 1973.

After some chaotic trading in the yen/dollar market and gradual appreciation of the yen after the collapse of the Bretton-Woods regime, the G10 countries agreed to a new parity with a narrow band, plus/minus 2.25%, for fluctuation in December 1971. The yen had appreciated gradually from 360 yen to 315 yen per dollar by the mid-December 1971. Under the Smithsonian Agreement of December 18, 1971, the central rate for the yen/dollar rate was determined, after tough negotiation, to be 308 yen/dollar, 16.88% revaluation (according to the IMF definition) from the Bretton-Woods rate of 360 yen/dollar.

The Smithsonian rate of 308 yen/dollar was regarded by many as the dangerously appreciated yen level. Export industries, particularly shipbuilding, were considered to be vulnerable. Guarding against further appreciation became a new national objective. As the yen had stuck at the most appreciated level (ceiling) of the Smithsonian band in 1972, the monetary policy and fiscal policy were conducted to stimulate domestic economy so that imports would increase and the trade surpluses would come down. Even if inflation would result from domestic demand increases, that would not be a problem, politicians insisted. Political pressure for keep monetary policy relaxed was strong, but no dissenting voice from the Bank of Japan was heard in the public.

#### 3.2. The “mistake”: Overview

Movements of the inflation rates, CPI and WPI, and the interest rates, ODR and call rate, from 1971 to 1975 are shown in [Figure 2](#) where all variables are defined as a change over the same month of one year earlier. [Table 2](#) shows Industrial production, M2 growth rate, and yen/dollar rate as well as CPI and WPI inflation. There were little cautionary signs of inflation until the summer of 1972, the CPI inflation rate being at

around 5%, and slightly declining, and the WPI inflation rate being at around 0%. However, the WPI started to increase in the summer of 1972, and quickly reached 5%, the level of CPI inflation rate, by November 1972. The sharp increase in the WPI was considered to be an indication of future inflation in the CPI.

In June 1972, the interest rate was cut to stimulate the economy. However, at the time of the interest hike, the WPI inflation rate started to increase and industrial production started to show a sign of recovery.

The WPI inflation rate continued to accelerate, and reached a 11 percent by April 1973, while CPI inflation rate reached 9.4% by April 1973. In April 1973, the Bank of Japan raised the policy interest rate (ODR) for the first time since the collapse of the Bretton-Woods collapse.

The first question is whether the interest rate cut in June 1972 was necessary and the second question is whether no monetary tightening until the CPI inflation rate at becoming near 10% in April 1973 was too slow to respond. If so, what would be a reason for policy mistake. The political economy answers will be given below.

Figure 2 (above) also shows that after the Middle East Crisis of October 1973, both CPI and WPI inflation rates increased sharply. The WPI inflation rate rose to near 35%, and CPI near 25% by the spring 1974. This is great inflation of Japan in no-war-related years. Due to very high inflation rate, the wages rose sharply in 1974 as well as 1973, in order to compensate for an increase in living costs. The companies were enjoying profits from demand stimulation of 1972 and 1973 (until the oil price shock, starting October 1973). The inflation spiral was in place from the mid-1973 to 1974. The oil price tripled from July 1973 to January 1974, with selective embargo by OPEC countries. The sharp increase in the imported oil prices aggravated the already-high-and-increasing inflation rate.

While the CPI inflation rate was very high above 20%, the industrial production growth rate turned negative in 1974, as shown in [Figure 3](#). The real GDP growth rate became negative, first time since 1955, the time GDP statistics are available. [Table 3](#) shows the GDP changes, quarter to quarter annualized rates, and year-on-year growth rates. [Table 4](#) shows the GDP growth rates. The year 1974 was a typical of stagflation—very high inflation rate with negative growth in output activities.



Table 3 (above) and vertical lines in Figure 2 (above) show timings of the monetary policy actions. The interest rate (ODR) was raised five times in the nine months period starting April 1973. However, there was no action in 1974. Obvious questions are why tightening did not come earlier and why there was not more tightening in 1974. We will answer these questions below

Figure 4 shows movements of CPI headline, CPI Core (excluding fresh food), CPI Core-Core (excluding food and energy-related). Since all three CPIs move together, it shows the role of energy was relatively small, in the run up to hyper inflation period of 1974. There are at maximum 5% point difference between Core and Core-Core, that is roughly the contribution of energy prices.

Negative growth in 1974 and quite depressed wage increase in 1975 were the reason that the inflation rate came down in the second half of 1974 and throughout 1975. The WPI inflation rate became below 5% in the spring of 1975, and by the end of 1975, the CPI inflation rate became below 10%. The great inflation of 1973-74 was over, with a heavy sacrifice in output activities in 1974.

### 3.3. Why easing went too far: the Mistake of June 1972

As explained above, the necessity of lowering the ODR by 50 basis points on June 24, 1972 is highly questionable since the output activities had shown the sign of recovery, and the prices, particularly the WPI, showed the sign of recovery.

Bank of Japan (1986) and Nakagawa (1981), former Bank senior official, describes what really went on behind the scene over this period.

In April 1972, Lowering the ODR were considered as a part of anti-yen appreciation package of the government. Inside the BOJ, opinions were divided into two camps, one favoring to lower ODR and the other considering the rate cut unnecessary. Governor Sasaki maintained to the press it was not necessary. On May 10, Governor Sasaki met Prime Minister Sato, and Governor was asked to consider lowering the ODR (BOJ (1986, p.381)). On May 11, Governor Sasaki mentioned that the ODR will be lowered on the condition that the bank deposit rates will be lowered. Inside that Bank, the proposal by Governor to lower the rate, although with one technical condition, was considered to be a surprise turnaround of his position.

It took more than a month to decide on the deposit rate, because the Ministry of Posts and Communication, which oversaw a Postal Saving System, opposed to the deposit rate cut. Finally, on June 23, the Postal saving deposit rates were lowered, and the BoJ decided to lower ODR.

This episode reveals three problems. First, Governor apparently was persuaded by Prime Minister on the interest rate decision. Second, as all the private-sector interest rates were effectively linked to ODR, the ODR decision should seep into the system automatically. However, bank deposit taking and Postal Saving deposit taking competed for household deposits. Thus, the Ministry of Posts and Communication could effectively block the timely implementation. Third, between the government plan of April and the actual implementation, two months had passed. Wisdom of lowering the interest rate should have been reassessed by the Bank of Japan as well as by the government in June.

Nakagawa (1981) regrets that the Bank (including himself) had not been courageous enough to scrap the plan of interest rate cut, since between April and June, economic activities picked up considerably. He, however, thinks that once the political process—forcing the Postal saving to lower the deposit rate—has gone through the cycle, it was difficult to scrap it. Nakagawa (1981) and others

#### 3.4. Why did tightening not come earlier

With the government and the Bank of Japan kept pressing domestic demand stimulation—again to avoid appreciation of the yen—in the first half of 1972, and the wish was granted. In the second half of 1972, the economy was growing with full steam. The GDP growth rate was increasing at the 9% to 10% range in the second half of 1972, and rose above 10% in 1973 (recall Table 3); the industrial production was increasing at 10 to 15 percent range from mid-1972 to end-1972. The CPI inflation rate was above 5.7% and WPI inflation rate was 6.3% in December 1972. It seems very natural that the Bank of Japan react to raise the interest rate as early as October 1972, and at latest in December 1972. Why was the ODR not raised until April 1973?

The simple answer for a delayed reaction to inflation signals was again the political pressure and consideration. The economy indeed become strong and inflation pressure mounted by end-1972. The ODR was not raised until April 1973.

The government decided to have a fiscal expansion package for the 1972 fiscal year budget (April 1972-March 1973) under Prime Minister Sato. The 1973 fiscal year was also intended to maintain fiscal stimulus. On July 7, 1972, Mr. Tanaka became Prime Minister. He won the Presidency of Liberal Democratic Party—who is automatically guaranteed to become Prime Minister—on the platform of “Reconstruction of the Japanese Archipelago”—large public works to build network of road and railroad infrastructure. He announced an additional fiscal spending program in August. In October supplementary budget and second additional plan of fiscal investment program was announced. He was very popular among the voters. It was clear that he would opposed to the rate hike. The Bank of Japan felt that it would not be possible to seek a rate hike. On November 9, PM Tanaka reiterated a strong opposition to yen revaluation (BoJ, 1986, p.403)

On November 13, the House of Representatives was dissolved, and on December 11, 1972, the general election took place. According to Bank of Japan (1986) and Nakagawa (1986), the Ministry of Finance told the Bank of Japan not to consider a policy change, even appearance during the election period.

Right after the election, the budget discussion started in the Diet and the budget debate and votes continued until March 13, 1973. Traditionally no monetary policy changes were made during the budget process, because that would affect the assumption of budget. This time, tradition was kept.

February 14, 1973, the yen was floated (earlier than the European currencies) as a result of heavy pressure for yen appreciation.. In March 1973, currency speculation became wide spread among the European currencies, resulting in free floating (end of the Smithsonian).

When the budge process was over, and the fixed-exchange rate fetter was broken, the Bank of Japan got an approval of the rate hike. On March 31, 1973, the approval was given (and implementation in two days later) in a chat between Finance Minister and Governor in the corridor of the Diet.

Eight months of selecting pro-spending Prime Minister, dissolution of the Diet, and the budget process in the Diet took away timely implementation of rate hike.

There was an explicit approval of inflation if it would contribute to keep the nominal exchange rate within the approved range under the Smithsonian rate. On August 9, 1972, MITI Minister Nakasone mentioned that he prefers domestic inflation to yen appreciation. (BoJ, 1986, p. 401) He said, “Japan is forced to choose between another yen revaluation and adjustment inflation. I think another yen revaluation should be definitely avoided; hence the economic activities should be stimulated,,,” The inflation to avoid appreciation was named as “adjustment inflation.” Indeed, one way to achieve real exchange rate appreciation—which may be required to keep the trade surpluses not to increase—is inflation. Of course, inflation carries high costs of adjustment and distortions, and inferior policy compared to appreciation of the nominal exchange rate. But, this was not shared among politicians then.

The step of the rate hike in April 1973, 75 basis point, was unusually high, probably reflecting the fact that the Bank was behind the curve. Three other rate hikes, May 30 (+0.50); July 2 (+0.50); Aug 29 (+1.00) followed in a hurry (recall Table 4 and Figure 3 above). However, the inflation rate continued rising. When the news of the Middle East War breaking out on October 6, 1973, the inflation rate was already in dangerously high level, CPI at 15%, WPI at 20%. The inflation rates shot up after October—some direct result of increasing oil prices, and some indirect, but immediate, effects of speculative inventory hoarding and panic buying. The Bank of Japan decided to raise ODR by 200 basis point on December 22, to put maximum pressure against inflation.

The real interest rate remained negative from October 1972 until the mid-1975. The period from October 1972 to mid-1974 is characterized as widening the gap (more negative interest rate) and accelerating growth—a clear sign of being behind the curve. The real interest rate remained negative until mid-1975. Tightening was too little too late throughout 1973.

A crucial question is whether the Bank of Japan knew of the danger of postponing the rate hike and if so, whether the Bank sought after the rate hike even with risk of clashing with the government.

BOJ (1986, pp. 409-411) described the inside thinking then. As the pace of inflation picked up, the Bank of Japan decided to push for the ODR hike in February 1973. The yen was floated on Feb 14 and appreciated substantially. This removed one constraint

on monetary policy. However, this produced political push for stimulus. Again, it was still in the budget process, to Bank of Japan tried to raise the reserve ratio, rather than the interest rate. The increase in the reserve ratio was decided on March 2, and implemented on March 16. Policy Board Chair noted, The economy recently has become more active; prices are rising high; and corporate investment has become strong, ..., in order to restrain lending of financial institutions and manage aggregate demand appropriately, ,, the reserve ratio was decided to be raised, upon approval of the Minister of Finance.” The budget bill was passed in House of Rep. on March 13, and Prime Minister Tanaka admitted on March 16 the need for policy switch to monetary tightening and fiscal adjustment for restraining aggregate demand. This gave an approval for a policy action toward tightening. The ODR hike was decided on March 31 (Sat) and implemented on April 2. “in order to restraint aggregate demand, ,,” In addition, quantitative restraint on lending from city banks was strengthened.

There is not much of a trace of struggle between the Bank and the government prior to February 1973, reading through BOJ (1986). The Bank was probably too much self-restrained, or gave up on fighting against the Ministry of Finance as well as inflation.

### 3.5. Political Economy

Let us have a recap on the Great Inflation episode. There were two kinds of major mistakes committed in 1972-73: too much easing, especially the June 1972 rate cut; and too little too late tightening that started in April 1973. Possible reasons for the mistake are as follows:

- (a) Was the Bank of Japan targeting the price stability?
- (b) Did the Bank of Japan fail to forecast inflation rate pick up?
- (c) Did the government put pressure on the Bank of Japan to stimulate the economy?
- (d) Did the Bank of Japan have courage to disagree?

Answers in short are as follows based on the documents that examined the decision makings of the 1970s.

- (a) No, the Bank of Japan did not put the price stability as priority number one;
- (b) Yes, the Bank of Japan knew the prices were rising;
- (c) Yes, the Bank of Japan was under pressure from the government to lower and keep low the interest rate; and could not resist the pressure

(d) No, the Bank of Japan did not fight back.

Let us elaborate on these points below.

### 3.5.1. Lack of clear policy objective under the Managed Float

Recall that the average inflation rate in Japan during the 1960s was 1.3% measured in WPI and 5.7% measured in CPI, and the economy did fine, growing at more than 10% a year and current account remaining surplus. Thus, it is not surprising that policy makers in 1971-72 were not alarmed by the CPI inflation rate at around 6%, especially when the WPI inflation rate at around 0%. The ODR was lowered four times between October 1970 and July 1971, in the hope of stimulating domestic demand further and avert appreciation of the yen. These actions were under the Bretton-Woods regime, and quite understandable, if maintaining the exchange rate regime was the superior objective.

After the Bretton-Woods regime collapsed, the Government and the Bank of Japan decided to resist the strong yen appreciation pressure by heavy intervention. However, they underestimated the strength of the Japanese manufacturing industries. By putting a policy objective to moderate the yen appreciation, inflation was tolerated.

### 3.3.2. Lack of political independence

The Bank of Japan law in the 1970s (until 1998) did not give the Bank a policy objective of price stability or legal independence from the Ministry of Finance. The objective of the Bank in the Law was to “maximize the potential of the economy” and the Bank policy was under the direction of Minister of Finance. On the other hand, the interest rate was supposed to be decided by the Monetary Policy Committee that includes appointments from outside the Bank. Theoretically, the MPC can make the interest rate decision which may be opposed by the government. The Government has power to replace MPC members as well as the Governor. In reality, the Bank senior executives sought after a tacit prior approval from the government over the interest rate decisions, and the MPC had become just an automatic approving body of the Bank executives. Getting approval of the interest rate changes was tricky. It often depended on the relationship between Governor and the Minister of Finance, or between Governor and Prime Minister

Later in 1998, the Bank of Japan Law was revised. Cargill, Hutchison, and Ito (1997; 2000) describes history and legal details of the Bank of Japan laws, with a comparison

of scores of legal independence between the old and new laws.

What could the central bank have done when there is no independence? Without independence, Governor could be replaced at will of the government. So are members of the Monetary Policy Committee. It was tradition that the change in monetary policy had to be negotiated with the Ministry of Finance (and Prime Minister), although by law the MPC at the BoJ could decide on its own power. Even lowering the interest rate was difficult because the Ministry of Posts and Telecommunications tended to oppose to lowering the deposit rate. Increasing the interest rate of course was much harder. Could Governor put his job on line to disagree the government? Maybe that was not a Japanese style.

#### **4. No Great Inflation that did not exist in 1979-80**

##### 4.1. Overview

Another oil crisis came at the end of the 1970s. If the oil crisis was a culprit of Great Inflation earlier, which I have refuted already, the same would happen. If the second oil crisis was managed—and indeed it was the case shown below—that would strengthen the case that the Bank of Japan made a mistake at the first time.

[Figure 5](#) shows the interest rates (ODR and Call rate) as well as the inflation rates (CPI and WPI) for the period from January 1976 to December 1980. The CPI inflation rate had down slowly to the five percent level by end 1977. The economy was back to normal from 1978 to the beginning of 1979. The economy showed the sign of a boom by end-1978. The WPI started to rise in the spring of 1979. This time, this was noted as a good forward indicator of CPI inflation. Although the CPI inflation rate was still stable at 3% range, the ODR was hiked in April 17, 1979, and again in July 24, 1979, as shown in [Table 5](#). The WPI continued to rise, although CPI was still lagging behind during the summer of 1979. The oil prices started to rise in the summer, and accelerated further after the hostage crisis at the US Embassy in Iran in October 1979.

As CPI inflation rate started to rise after October 1979, the Bank of Japan decided to raise the ODR further. The ODR was hiked again in November 2, 1979. The inflation rate continued to rise quickly.

The Bank of Japan sought and obtained an approval from the government to raise the policy interest rate, ODR, again in February and March of 1980. These were the first

time that the Bank of Japan was able to raise the interest rate during the budget process. The Bank could not respond quickly due to the moratorium during the budget process during the Great Inflation episode as described in preceding section. So, the fact it was achieved brought a tremendous joy to the Bank of Japan policy makers. The reason that enabled the Bank to persuade politicians and the Ministry of Finance was hyper-inflation experience of 1973-74. The Bank have convinced the Ministry and politicians of the importance of timely monetary policy actions. Many scholars including Cargill, Hutchison and Ito (1997) described that the Bank of Japan achieved a *de facto* independence from the government by 1979.

The CPI inflation rate was kept under 10 percent a year, and the real interest rate (call minus CPI inflation rate) remained positive. The effects of the second oil crisis was over by end-1980.

#### 4.2. Quick start of tightening, April, July, and November 1979

In January 1979, Governor mentioned that no more relaxing of monetary policy would come, and the policy stance was changed to “neutral.” In March 1979, OPEC raised oil prices by more than 10 percent. The WPI started to increase sharply from January to March.

With the first sign of the WPI increase, the Bank sought to raise the interest rate (Nakagawa, 1981, pp. 111-126). First, on March 20, Governor Morinaga mentioned that BOJ switched to a cautionary stance. In the early of April, Governor Morinaga told Prime Minister Ohira and Finance Minister that the BOJ wish to raise ODR. They were in favor, but some other cabinet members were not in favor. PM Ohira understood the BOJ position. The ODR hike was decided on April 16 (implemented on April 17).

Nakagawa (1981: pp. 116-126) also mentioned that the Bank understood that early actions were needed due to monetary policy lags to take effects. The WPI rose sharply from March to May, 1979, mainly due to energy prices. The business complained of monetary tightening, arguing that monetary policy was ineffective against imported inflation. The BOJ rebutted that the imported price increase would raise the CPI eventually and it will start the process of inflationary spiral, and output activities were strong. In addition, Germany raised the interest rate at the end of March. The lessons



of the 1972-74 episode must have been learned and applied here.

The Economic Planning Agency disagreed with the BOJ judgement, saying there were differences between the first oil crisis and 1979: the labor market is soft; money supply growth rate is lower; corporations are cautious; utilization rate is lower; the exchange rate is floating; and the government is cautious. BOJ rebutted that it was worse due to a large amount government bonds that had been issued between 1973 and 1979; and the yen has depreciated; and oil prices started to rise early.

In July 1979, another ODR hike was realized. Nakagawa (1981: pp. 126-134) explained this hike as follows. OPEC raised the oil prices in July. At the Tokyo summit, restraining demand was agreed. Governor Morinaga met PM Ohira, the day before flying to the BIS meeting, and proposed a rate hike, and got a nod immediately. Business activities were considered to be strong. The government was cautious, and argued that the timing could be August or September. However, since Governor Morinaga had got a nod from PM and won over the government.

The government still insisted that “in order to suppress aggregate demand” was inappropriate for the reason of rate hike. The BOJ explained the action: “demand-supply became tight. ... Money supply continues to increase and money tightening is not felt. Hence, in order to avoid making imported inflation into home-made inflation, it is absolutely necessary to raise the official discount rate.” (Nakagawa p. 129) Upon agreement between MOF and BOJ, the ODR was decided to be raised on July 23, and implemented July 24.

The ODR was further raised in November 1979. WPI continued to rise (a large jump in September), the yen depreciated (223 yen/dollar at end-September end 240 yen/dollar in October. The House of Rep. election took place on October 7. The LDP lost seats by many. Mr Ohira remained as PM, but only after a fierce fight and split voting in the House of Rep. (40 day fight). The government was in chaos. The BOJ determined to raise ODR early, and this time, there was no objection from MOF, but the Bank waited until the next PM was to be determined (since there was no precedent of changing ODR during a general election or before a new cabinet is formed). The BOJ decided to raise ODR on November 1 and implemented on November 2.

#### 4.3. Interest rate hike in February and March 1980

After Nov 2 ODR hike, inflation worries continued. On Nov 4, 1979 the Iranian hostage crisis (US Embassy was attacked and diplomats were taken hostage) occurred (and hostages were not released until Jan 1981), and a sense of oil prices continued to worsen. On December 27, Afghanistan was invaded by the Soviet. As the political events multiply, the oil prices continue to rise.

Domestic output activities were increasing, and steel and utilities prices were rising. In February 1980, WPI inflation rate became near 20%. In view of these developments, newly appointed Governor Maekawa decided to raise the interest rate. However, this was time of the budget process in the Diet. The interest rate hike was opposed by the Ministry of Finance on the timing ground. The BOJ argued against the MOF with the logic that the missed opportunity would result in the hyper-inflation of 1973-74.

Governor Maekawa met Prime Minister Ohira in the early February and requested an ODR hike. PM Ohira promised a reply within a week. When a replay was returned, PM Ohira gave a go-ahead. On February 18, 1980, it was decided to raise ODR by 1%, and implemented the day later.

On March 18, the ODR was hiked again by 175 basis point. Between February and March, it was observed that CPI started to rise sharply. The government also changed the priority toward fighting inflation. The interest rate was raised to near 20 percent by Chairman Volcker in early 1980.

In the end, Japan fared well the second oil crisis. The CPI inflation rate never reached 10%, and the real interest rate measured by Call rate over the CPI inflation rate remained positive. The worst of inflation was over by the summer 1980, and the ODR was cut lowered in August and November 1980. By the end of 1980, the WPI inflation rate came down to 10%, and the CPI inflation rate decelerated to 7%.

“Lessons” of the 1973-74 were fully utilized by the BOJ to persuade MOF and Prime Minister for early actions on monetary tightening. Raising ODR, twice, during the budget process was a strong indication that BOJ achieved a *de facto* independence. However, still it relied on the understanding of Prime Minister, and the trust between Governor with Prime Minister, rather than a legal framework. Credibility and *de facto* independence seem to be subject to who is Governor and who is PM.

## 5. Econometric Analysis

So, in the narrative, it is established that the Bank of Japan made a mistake prior to and during the first oil crisis, while the Bank skillfully manage the second oil crisis. Would it be possible to quantify whether the BOJ acted differently in 1979-80 (second oil crisis) in contrast to 1973-74 (first oil crisis), given the macro environment?

One way to compare the possibly different reactions of central bank, given the economic environment is to apply the so-called Taylor rule and attempt to explain the behavioral difference.<sup>1</sup>

On the outset, there are a few caveats of the usage of the Taylor rule. The fitted value only shows the average behavior given macro variables—usually the inflation rate spread from the target and the output gap. The average value is not necessarily the optimal behavior.

However, in order to compare reactions to macro variable in the two oil crisis episodes, the Taylor rule approach is appropriate.

The typical Taylor rule equation is as follows:

$$i_t = r^f + \pi^* + \beta_\pi \cdot (\pi_t - \pi^*) + \beta_y \cdot y_t$$

The nominal policy interest rate ( $i$ ) is determined as a function of the equilibrium nominal rate that is the sum of the equilibrium real interest rate ( $r^f$ ) plus the target inflation rate ( $\pi^*$ ), the inflation gap that is the difference between the actual ( $\pi$ ) and target inflation rate, and the GDP gap ( $y$ ).

In order to apply the methodology to our purpose, the equation is modified as follows. First, since the decision making is done on the monthly basis (rarely two policy rate changes in the same month), we need monthly model. Instead of GDP gap, the industrial production gap is defined and used in place of  $y$ . Second, since the oil price is an important variable during this period, and it seems to have a significant pass-through to the domestic prices, the oil price is added as an additional explanatory

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<sup>1</sup> For Taylor rule, see Clarida, Gali and Gertler (1999) and Taylor (1999) to name a few. See Jinushi, Kuroki, and Miyao (2000), Kuttner and Posen (2004), and Ahearn (2002) for application of the Taylor rule to the Japanese case.

variable. Third, since the equilibrium real rate is difficult to calculate, the equilibrium nominal rate is to be estimated in the model. The following model is estimated.

$$i_t = \alpha + \beta_\pi \cdot (\pi_t - \pi^*) + \beta_y \cdot y_t + \beta_oil Oil_t + \varepsilon_t$$

For output gap (y), a deviation of the Industrial Production from a trend will be used. For month t, the HP filter is applied from 1960m01 to month t, and extract a cyclical part of month t. Repeat the procedure from t=1965m01 to 1984m12. This is according to spirit of real time judgment, what they knew at the time of decision making. Obviously future path of industrial production is not known, the trend has to be estimated using only the past date at the time of decision making. Monthly observations from January 1965 to December 1984 are used.

For the interest rate, two possibilities exist: the call rate and the ODR. Two versions of estimations will be done.

For the inflation measure ( $\pi$ ), there are two candidates, the CPI inflation rate and the WPI inflation rate. In order to Both are defined as the percent changes from the three month before and the rate was annualized. The oil price increase (OIL) is also defined as the annualized three month change in percent.

Table 6-1 and Figure 6-1 comes from the estimation using the Call rate as the interest rate and the CPI inflation rate as the inflation measure. For Table 6-2 and Figure 6-2, the call rate and WPI inflation rate are used. For Table 6-3 and Figure 6-3, the ODR and the CPI inflation rate are used. For Table 6-4 and Figure 6-4, the ODR and the WPI are used.

The estimation shows a puzzling result in that the IP gap has a negative coefficient, contradicting theoretical prediction. Oil prices are significant with an expected sign.

Figures of all four cases show the following general patterns. First, the first actual interest rate was below “average,” suggesting unusual easing in 1971-72. Second, the actual tightening 1973 was more or less similar to an “average,” but the peak tightness in early 1974 is less than the “average,” suggesting that tightening was less severe than the average. Third, in the second oil crisis episode, actual tightening was

much more than the “average,” suggesting that reaction to the oil price and domestic price increases was much severer than the average in 1979-80, but short-lived.

However, the caution and caveats apply to the exercise in this section. First the industrial production gap has a wrong sign, and there are serial correlation in the error terms that should be addressed. Also, the flexibility of the interest rate increased over time in the sample period, so that the coefficient would be time-variant, that possibility is ignored.

So, much should be improved. But, the set of estimation results and figures shows the first test of quantitative investigation of the political economy investigations in the previous sections.

## **6. Concluding Remarks**

This paper investigated the great inflation of Japan, 1973-74, when the CPI inflation rate reached almost 30% a year, and the WPI inflation rate higher than that. The period coincided with the first oil crisis. Close examinations reveal that the major mistakes were committed before the oil crisis. Namely, easing in 1971-72 went to far, stimulating the economy too much, and tightening in 1973 came too little too late. The CPI inflation rate was already above 10% when the Middle East War broke out in October 1973. The oil price increase and the sense of panic for not obtaining the energy resources causes further increases in prices.

The reasons for the too much easing and too little tightening from 1971 to 1973 include several political economy reasons as well as economic reasons. First, too much attention and efforts were devoted to prevent the yen appreciation under the Smithsonian regime. Some politicians openly voiced preference to inflation over nominal appreciation of the yen. Second, the Bank of Japan was not independent from the government. Prime Minister exerts pressure on the Bank to lower the interest rate or to prevent the interest rate hike. Timing of implementation was also influenced by political agenda and schedule. It was commonly thought that the interest rate cannot be changed during the budget discussion in the Diet, that is, December to March. Third, the Bank of Japan did not fight the government enough to push right decisions. Self restraints were applied not to cause conflict against the Ministry of Finance.

The second oil crisis was handled much better than the great inflation experience. The

CPI remained lower than 10%, and the real interest rate was kept positive. The interest rate was raised as soon as the WPI started to increase in 1978. The ODR was raised even when the budget was discussed in the Diet. The Bank gained de facto independence using the logic that without swift actions, the mistake of hyper inflation would be repeated. Prime Minister Ohira was also quite respecting Governor Maekawa for Bank's judgment and decisions.

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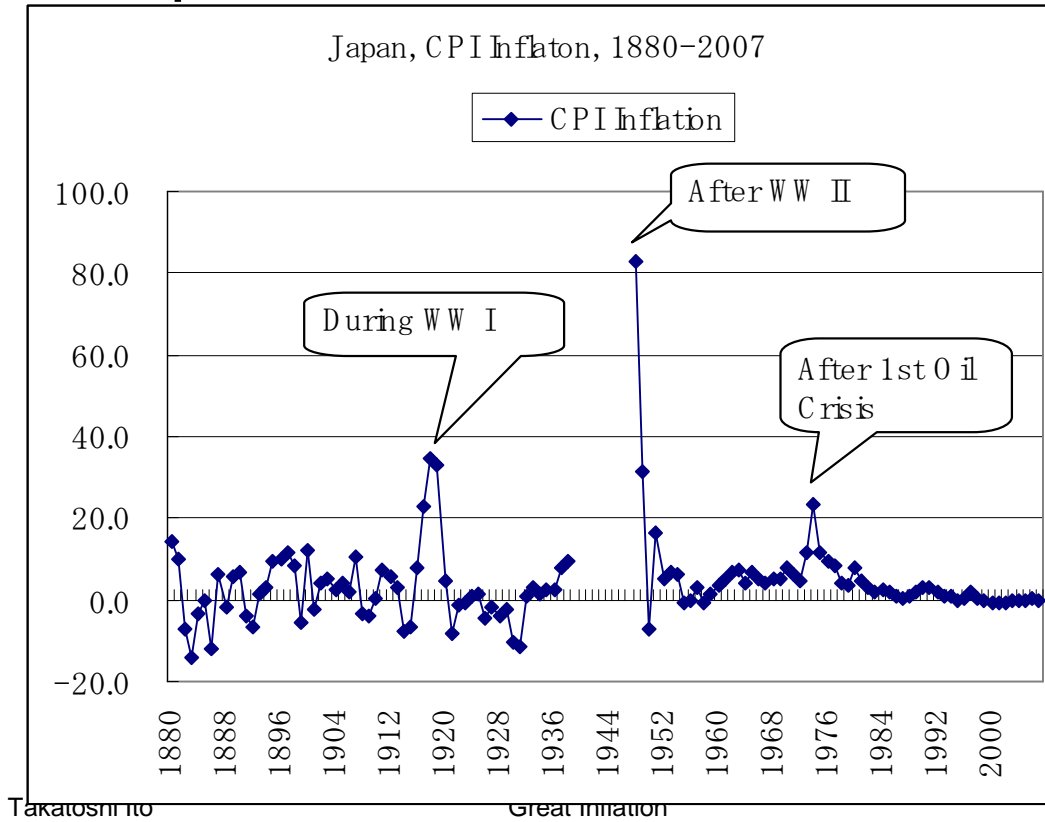
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Figure 1

# 3 episodes of over 20% inflation



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Table 1

Three episodes of high inflation		
	CPI (%)	WPI (%)
1917	22.7	25.8
1918	34.6	31.0
1919	33.0	22.5
1945	NA	51.1
1946	NA	364.5
1947	NA	195.9
1948	83.0	165.6
1949	31.7	63.3

1974	23.3	31.4

Notes: Author's calculation.

Data Source: See Ito (1997)

Figure 2

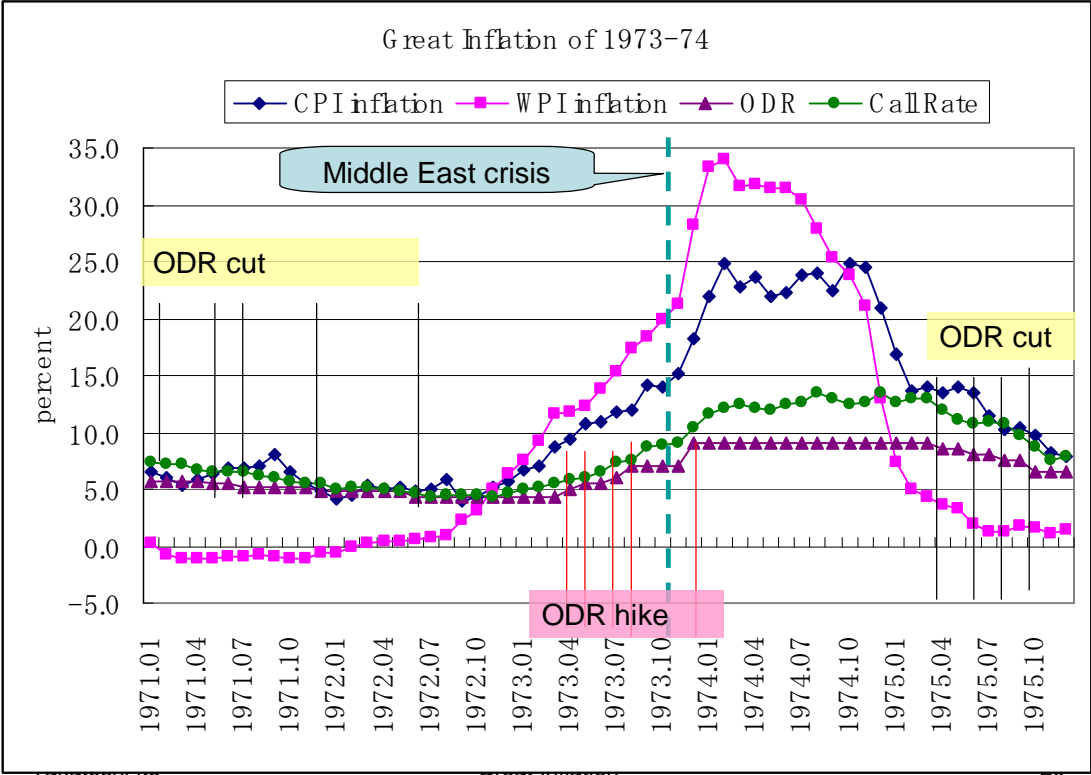


Table 2

# Signs of Inflation by mid-1972

The table tracks economic indicators from January 1972 to April 1973. Callouts highlight key trends: 'Accelerating CPI inflation' (CPI rising from 4.1 to 9.4), 'Accelerating WPI inflation' (WPI rising from -0.6 to 11.8), 'Industrial Production recovered quickly' (Industrial Production rising from 1.3 to 16.9), 'M2 growth maintained high' (M2 growth rising from 25.1 to 27.3), and 'Yen/dollar rate de facto fixed' (Yen/dollar rate staying around 300). Red circles highlight the overall upward trend in all indicators. Annotations include 'monetary policy' near the rate column, 'interest rate cut' near 1972.06, and 'interest rate hike' near 1973.04.

	CPI inflation	WPI inflation	Industrial Production	M2 growth	yen/dollar rate	monetary policy
1972.01	4.1	-0.6	1.3	25.1	312.23	
1972.02	4.5	0.0	3.0	25.3	304.98	
1972.03	5.3	0.2	3.9	26.1	302.44	
1972.04	5.0	0.4	3.8	26.2	303.56	
1972.05	5.2	0.4	8.3	25.5	304.44	
1972.06	4.8	0.6	6.5	26.6	303.68	interest rate cut
1972.07	5.0	0.7	5.9	27.1	301.11	
1972.08	5.9	0.9	8.3	26.4	301.1	
1972.09	3.9	2.2	8.1	26.9	301.1	
1972.10	4.4	3.2	10.6	27.8	301.1	
1972.11	5.1	5.0	11.4	28.5	301.1	
1972.12	5.7	6.3	14.7	26.5	301.23	
1973.01	6.7	7.6	17.1	26.1	301.96	
1973.02	7.0	9.3	16.9	26.8	279.48	
1973.03	8.7	11.6	16.5	26.9	265.26	
1973.04	9.4	11.8	16.9	27.3	265.52	interest rate hike

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Great Inflation

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Figure 3

# Industrial production index

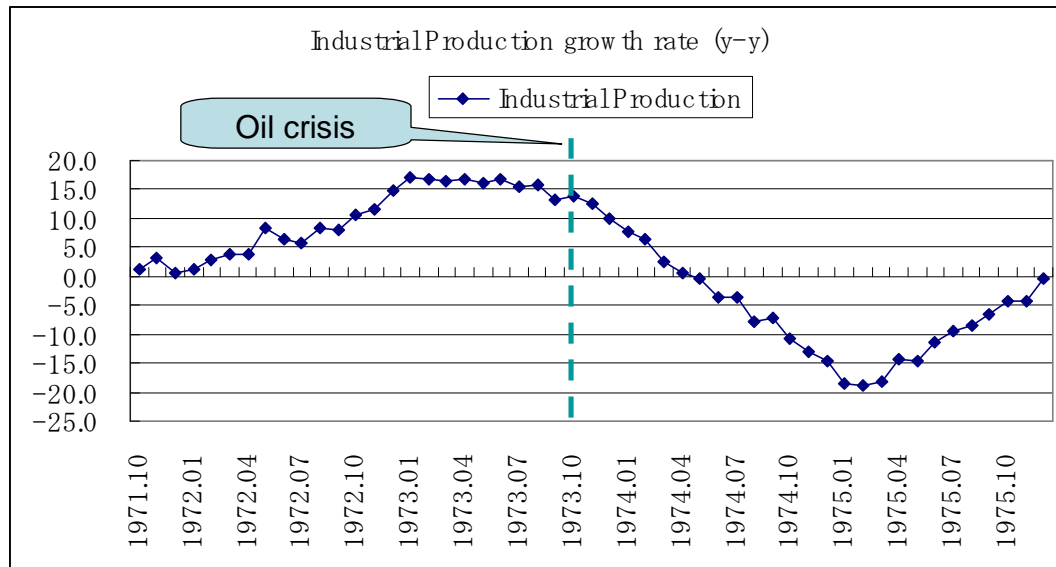


Table 3

## GDP growth rate: q-to-q & y-on-y %

	q-q	y-y
1971-I	0.9	4.8
1971-II	1.6	4.5
1971-III	1.2	3.7
1971-IV	0.9	4.6
1972-I	3.3	7.5
1972-II	1.9	7.3
1972-III	2.1	8.8
1972-IV	2.5	9.8
1973-I	3.3	10.3
1973-II	0.9	9.3
1973-III	0.3	7.6
1973-IV	1.2	5.6
1974-I	-3.4	-1.7
1974-II	0.7	-0.9
1974-III	1.3	-0.2
1974-IV	-0.5	-2.0
1975-I	0.1	1.5
1975-II	2.2	3.4
1975-III	1.1	3.0
1975-IV	1.1	4.3

} Lowering ODR  
Monetary easing

} Raising ODR  
Monetary Tightening

} Lowering ODR  
Monetary easing

Table 4

## Monetary Policy Actions

Date yyyy.mm.dd	Official Discount Rate %	
	Change	new level
1970.10.28	-0.25	6.00
1971.01.20	-0.25	5.75
1971.05.08	-0.25	5.50
1971.07.28	-0.25	5.25
1971.12.29	-0.50	4.75
1972.06.24	-0.50	4.25
1973.04.02	0.75	5.00
1973.05.30	0.50	5.50
1973.07.02	0.50	6.00
1973.08.29	1.00	7.00
1973.12.22	2.00	9.00
1975.04.16	-0.50	8.50
1975.06.07	-0.50	8.00
1975.08.13	-0.50	7.50
1975.10.24	-1.00	6.50

Was this necessary?



Were these too late?



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Great Depression



Figure 4

## Energy prices are only a small part of inflation in 1973-74

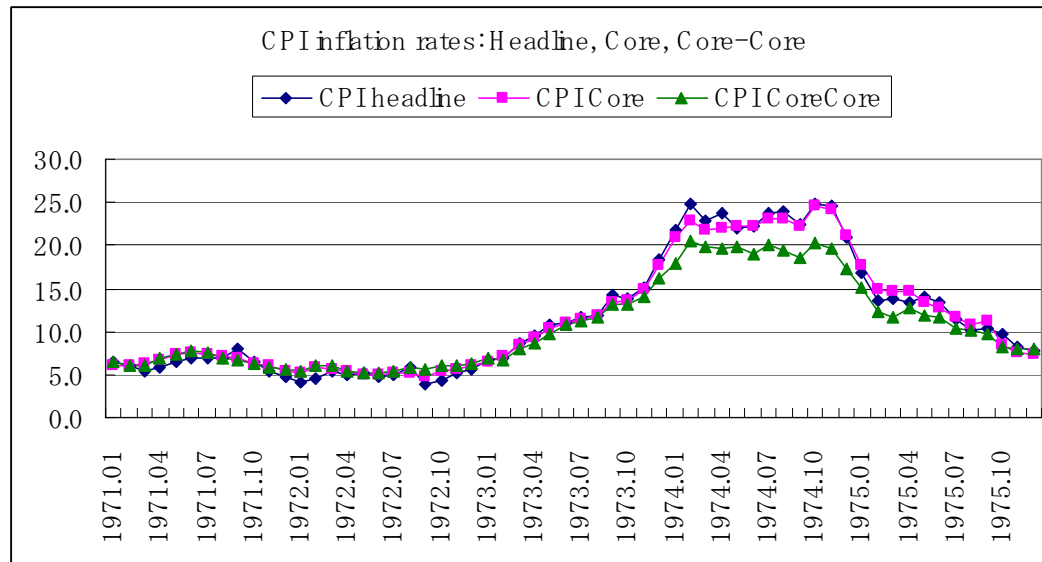


Figure 5

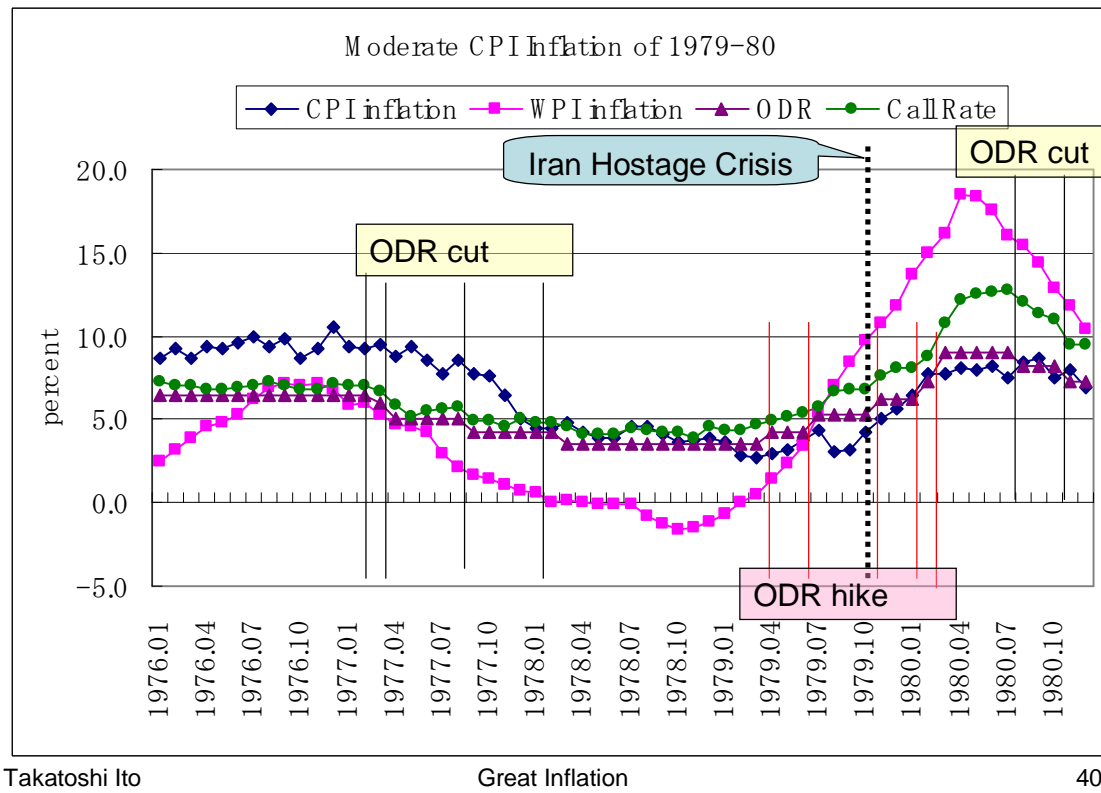


Table 5

## ODR increase in 1979-80

ODR Change (1976-80)		
	Change	New Level
1977.03.12	-0.50	6
1977.04.19	-1.00	5
1977.09.05	-0.75	4.25
1978.03.16	-0.75	3.5
1979.04.17	0.75	4.25
1979.07.24	1.00	5.25
1979.11.02	1.00	6.25
1980.02.19	1.00	7.25
1980.03.19	1.75	9
1980.08.20	-0.75	8.25
1980.11.06	-1.00	7.25

ODR increase during the budget process

Table 6-1 and Figure 6-1

Dependent Variable: CALLAV  
 Method: Least Squares  
 Date: 09/13/08 Time: 17:48  
 Sample (adjusted): 1965M 03 1984M 12  
 Included observations: 238 after adjustments  
 CALLAV=C (1)+C (2)\*(CPB(-2)-6.0)+C (3)\*PGAP(-2)+C (4)\*0 L3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (1)	7.138742	0.106466	67.05165	0
C (2)	0.119425	0.015683	7.614802	0
C (3)	-0.52917	0.055256	-9.57663	0
C (4)	0.005587	0.001635	3.417788	0.0007

R-squared	0.463625	Mean dependent v	7.252044
Adjusted R	0.456749	S.D. dependent va	2.174168
S.E. of reg	1.602483	Akaike info criteri	3.79765
Sum squar	600.9008	Schwarz criterion	3.856007
Log likehc	-447.92	Hannan-Quinn crit	3.821169
F-statistic	67.42075	Durbin-Watson sta	0.228732
Prob(F-st	0		

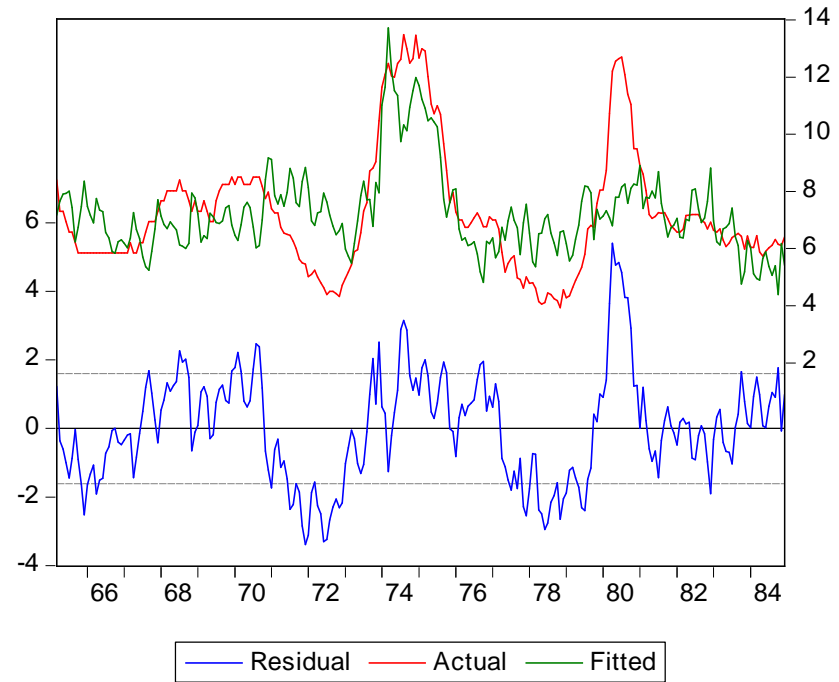


Table 6-2 and Figure 6-2

Dependent Variable: CALLAV  
 Method: Least Squares  
 Date: 09/13/08 Time: 18:08  
 Sample (adjusted): 1965M 03 1984M 12  
 Included observations: 238 after adjustments  
 CALLAV=C (1)+C (2)\*(WPB(-2)-4.0)+C (3)\*PGAP(-2)+C (4)\*0 L3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (1)	7.260367	0.099837	72.7219	0
C (2)	0.122612	0.012165	10.07894	0
C (3)	-0.62985	0.051103	-12.325	0
C (4)	-0.00146	0.001806	-0.80734	0.4203

R-squared	0.533312	Mean dependent v	7.252044
Adjusted R	0.527329	S.D. dependent va	2.174168
S.E. of reg	1.494764	Akaike info criteri	3.658478
Sum of squares	522.8308	Schwarz criterion	3.716835
Log likelihood	-431.359	Hannan-Quinn crit	3.681997
F-statistic	89.13523	Durbin-Watson sta	0.197446

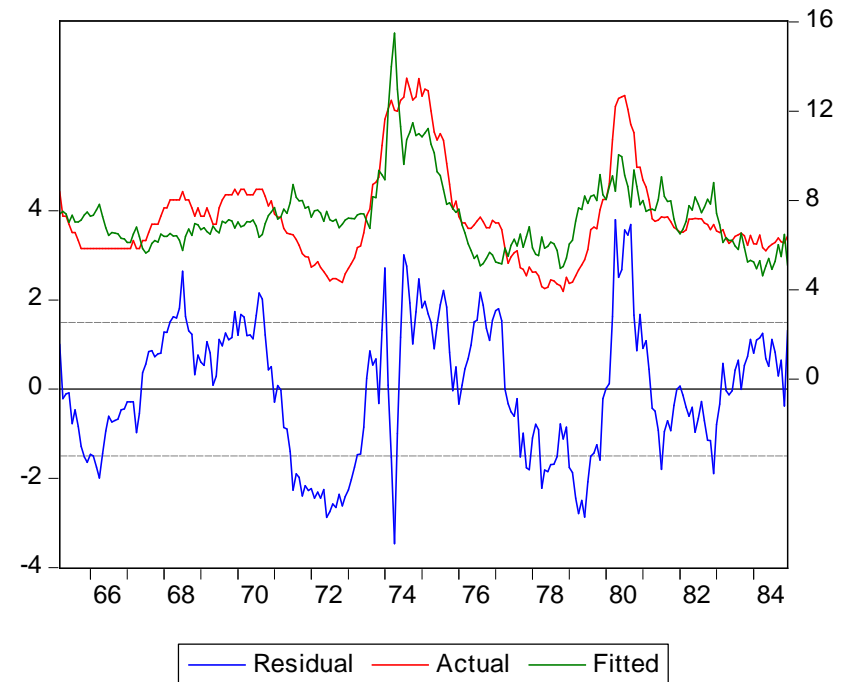


Table 6-3 and Figure 6-3

ODRCP Lag0 i65-84

Dependent Variable: ODR

Method: Least Squares

Date: 09/13/08 Time: 18:11

Sample (adjusted): 1965M 03 1984M 12

Included observations: 238 after adjustments

ODR=C (1)+C (2)\*(CPB(-2)-6.0)+C (3)\*PGAP(-2)+C (4)\*0 L3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (1)	5.847009	0.068462	85.40544	0
C (2)	0.07776	0.010085	7.710479	0
C (3)	-0.27942	0.035532	-7.86397	0
C (4)	0.003484	0.001051	3.314619	0.0011

R-squared	0.420817	Mean dependent v	5.923151
Adjusted R	0.413391	S.D. dependent va	1.345412
S.E. of reg	1.030456	Akaike info criteri	2.914544
Sum of squares	248.4704	Schwarz criterion	2.972901
Log likelihood	-342.831	Hannan-Quinn criti	2.938063
F-statistic	56.67244	Durbin-Watson sta	0.260058
Prob(F-stat)	0		

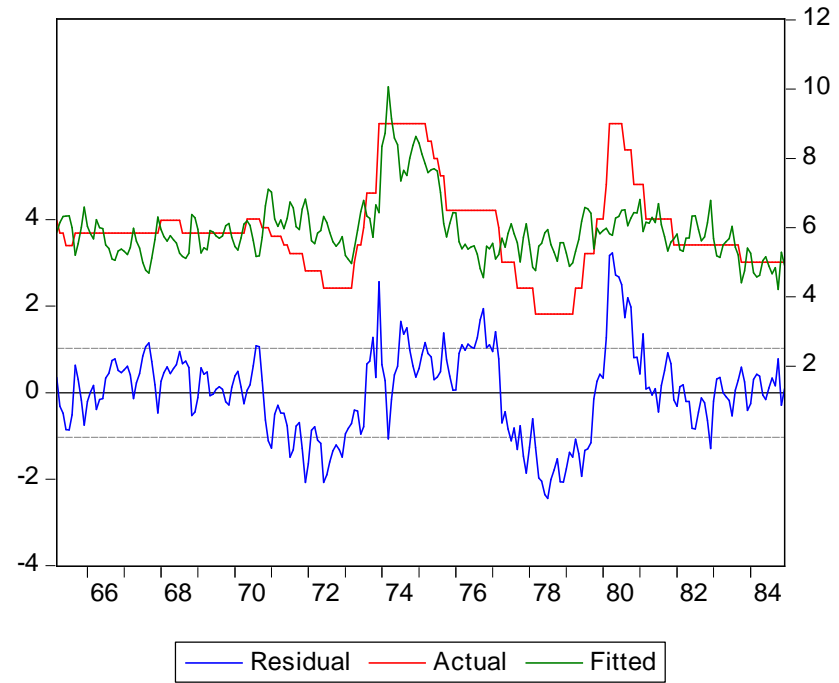


Table 6-4 and Figure 6-4

ODRWP Lag0 i65-84

Dependent Variable: ODR

Method: Least Squares

Date: 09/13/08 Time: 18:16

Sample (adjusted): 1965M 03 1984M 12

Included observations: 238 after adjustments

$$\text{ODR} = C(1) + C(2) * (\text{WPB}(-2) - 4.0) + C(3) * (\text{PGAP}(-2)) + C(4) * \text{OL3}$$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (1)	5.924316	0.064849	91.35494	0
C (2)	0.07764	0.007902	9.825484	0
C (3)	-0.3443	0.033194	-10.3722	0
C (4)	-0.00091	0.001173	-0.77533	0.4389

R-squared	0.485805	Mean dependent v	5.923151
Adjusted R	0.479213	S.D. dependent va	1.345412
S.E. of reg	0.970925	Akaike info criteri	2.795528
Sum of squares	220.5905	Schwarz criterion	2.853885
Log likelihood	-328.668	Hannan-Quinn criti	2.819047
F-statistic	73.69337	Durbin-Watson sta	0.211297
Prob(F-stat)	0		

