"Great Inflation and Central Bank independence in Japan"[1]

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Abstract: Japan suffered a very high inflation rate in 1973-74. The CPI inflation rate rose to near 30% in 1974. It is commonly argued that the oil crisis is the culprit to blame for the 1973-74 high inflation. However, the inflation rate had already exceeded 10%, a few months before the onset of the oil crisis in October 1973. In fact, the inflationary environment of 1973-74 was largely a consequence of monetary policy mistakes in 1972-73. 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 the result of poor judgment by the Bank of Japan, pressure from the government to lower the interest rate to avoid yen appreciation, and the lack of institutional independence of the central bank. Contrary to what one might conjecture, the Bank of Japan came out of the Great Inflation of 1973 with a stronger voice. The Bank has argued that its recommendation to tighten monetary policy should not be overruled or the inflation would be repeated. By this logic the Bank of Japan obtained *de facto* independence 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. The modified monthly Taylor rule regression shows that the interest rate in the 1972-75 period was way too low, by as much as 25 percentage point in 1973.

Key words: inflation, central bank independence; the Bank of Japan; oil crisis
JEL: E43, E52, E58

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1. Introduction

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

The Bank of Japan was born in 1882, only after the new Meiji government experimented unsuccessfully a transplanting of the national banking system (without a central bank) from the United States. The government, after some unpleasant inflation under the national banking system, decided to adopt the central banking system modeled after the Belgium central bank. During more than 125 years of its uninterrupted history, the Bank of Japan saw three episodes of high inflation, defined by more than 20 percent of CPI inflation rate: (1) 1917-1919, the WW I years; (2) 1945-49, immediately after the end of WW II; and (3) 1973-74, the first oil crisis. The first episode reflected the export boom during WW I. The second episode, when prices increased more than 200 times in a few years, was a result of the devastation of productive capacity and deficit financing cum monetization, immediately after WW II. So the 1973-74 was the only example of high inflation not related to a war that Japan was involved

The main focus of this paper is to examine the third episode of high inflation, when the CPI inflation rate remained above 10 percent from May 1973 to September 1975, with a spike up to 23 percent in 1974. (The inflation rate is defined as the percentage increase of CPI over the same months of the preceding year.)

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

Reasons for the great inflation of 1973-74 are the followings. 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 resistance against 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 pressure for

appreciation prompted interventions by the monetary authorities in terms of selling yen, which added yen liquidity to the market, promoting inflation. Politicians also voiced their dislike of yen appreciation, and some of them were calling for stopping yen appreciation at any cost. The Bank lowered the official discount rate (ODR)—that was the policy rate then—in June 1972, when recovery in output had already become obvious. Third, Mr. Kakuei Tanaka became Prime Minister (PM) in July 1972, advocating large fiscal spending. There was strong pressure from his government to keep the interest rate from rising. It was a regular practice in the 1960s and 1970s that any interest rate change was subject to preliminary discussion with and a tacit approval of the government and Prime Minister, before actually being decided in the Monetary Policy Committee. The Monetary Policy Committee was not functioning as an independent decision making body at all.

With political pressure, it was not until April 1973 that the ODR was raised. By that time, the CPI inflation rate was exceeding 9%. The first three, out of five, interest rate hikes in 1973 were too little and too late. By the time of the oil price hike of October 1973, the fight against inflation had been already lost. Both headline and core CPI inflation rates rose above 20% by the beginning of 1974.

A panic-like chaos resulting from high inflation in 1974 finally convinced the Bank and politicians to apply strong tightening.[2] The ODR was raised from 4.25% to 9%, in five steps, in 1973. However, the interest rate level stayed well <u>below</u> the inflation rate throughout this episode. The real interest rate, measured by the difference between ODR and CPI headline inflation rate, was on average minus 5.6% in 1973, and minus 14.1% in 1974.[3] Disinflation in 1974 was accompanied by a sharp output decline, a great sacrifice. The negative growth rate of 1974 was the first since 1950.

There are three possible hypotheses to explain the Bank's soft stance toward inflation. The first hypothesis is that the Bank of Japan did not know that the inflationary pressure was building in the economy. Examination of a memoire and the Bank historical archives reveal that this was probably not the case. The second hypothesis is that the

[2] Wholesalers were believed to have bought and hoarded goods. Consumers also bought in bulk to guard themselves from future inflation. These actions shrank supply quickly and contributed to further price increases. One widely reported story was that toilet papers would be missing from store shelves, and that consumers in a panic rushed to supermarkets to purchase toilet paper—clearing the store selves indeed.

[3] Even when the overnight call rate was used instead of ODR, the real interest rate was minus 4.4% in 1973 and minus 10.6% in 1974.

Bank of Japan knew that the inflationary risk was rising, but did not seek tightening in time because of a fear of being turned down. The third hypothesis is that although the Bank of Japan knew of the risk and attempted to tighten, the tightening proposal was rejected by the government. The relationship with the government (esp. Prime Ministers as well as Finance Ministers) in 1972-73 holds a clue. A close examination of the events reveals that the truth is somewhere between the second and third hypothesis.

After the 1973-74 episode of high inflation that at least partly was due to a mistake of the Bank of Japan, one might think that the Bank of Japan would have been discredited. On the contrary, the Bank came out of the episode with a stronger voice. The Bank has argued that if its recommendation to tighten monetary policy was to be overruled, the tragic experiences of 1972-73 would be repeated. With this logic, the Bank of Japan obtained *de facto* independence. The ODR was raised much earlier in 1979-80, the second oil crisis, 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—which up to that time was politically inconceivable.[4] The real interest rate remained positive in 1979-80, in contrast to being hugely negative, in 1973-74. The real interest rate measured by the difference between the ODR and CPI headline inflation rate was on average 1% in 1979 and 0.4% in 1980; while the real interest rate of the call rate was 2.2% in 1979 and 3.2% in 1980. As a result, even with sharp oil price increases in 1979-80, the inflation rate in Japan remained moderate, peaking 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 economic events and political developments as well as monetary policy actions, which resulted in Great Inflation of 1972-74. The monetary policy during this period is considered to be a mistake.[5] Section 4 describes why the Bank of Japan gained monetarist rhetoric and de facto independence after the mistake of 1972-73. Section 5 reviews no-inflation experience during the second oil crisis, 1978-80. Section 6 will be devoted to some econometric analysis to substantiate the arguments in the preceding sections. Section 7 concludes the paper.

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[4] The reason for the hesitation of ODR changes during the budget process was that it would make budget assumptions outdated, while a budge bill could not be changed easily.

[5] See Ito (1992; pp. 125-127) for an earlier description of the “mistake.”

2. Long History

The yen, as the currency of Japan, was introduced in 1871, and the Bank of Japan was established in 1882. There have been three episodes of very high inflation, the inflation rate exceeding 20 percent. Figure 1 shows the CPI inflation rate from 1880 to 2007 for Japan. The highest inflation rate during the 125 year history was recorded immediately after the WW II. The inflation rate reached Very high inflation rates were observed during WW I 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. The only episode of high inflation during 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 as the US dollar. Hence, the exchange rate was 1 yen for 1 dollar. Legally it was a 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 the depreciation of silver against gold. By 1895, 1 US dollar was worth 2 yen. During the *de facto* silver convertible years, 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 the CPI and 2.1% in terms of the WPI. The highest inflation rates were 14.5% for CPI in 1880 (in the wake of the Seinan War), 9.0% in WPI in 1896 (in the wake of the Sino-Japan War). In 1880, the inflation rate was high due to the government paying for its deficits that had been caused by fighting and defeating the rebel in the South (Seinan War). This inflation pushed the move toward establishing the Bank of Japan in 1882. The WPI inflation rate of Japan in 1896 was high in the wake of the Sino-Japan war of 1894-95. 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 a 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, so that the real bilateral exchange rate was stable.

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 the 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, the timing of getting back to the gold standard was put off until January 1930. The timing of restoring gold standard turned out to be the 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 to became half of the gold standard rats, that is, four yen per US dollar. The rapid depreciation is partly due to a rapid adjustment to the level that would restore export competitiveness in the wake of European devaluation that preceded Japan's devaluation by several months, and partly due to large fiscal stimulus and an increase in imports. (See Ito, Okina, and Teranishi (1993) for events in detail for the fast depreciation period in 1931-33.)

Before WW II, the yen depreciated vis-à-vis the US dollar over the years, with the change of the nominal yen/dollar rate reflecting 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 Forces. Within several years, the price level reached almost one hundred times its prewar level. The new yen/dollar rate was fixed in 1949 at 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 the WPI rather than the CPI.) With it, a strong fiscal and monetary tightening, known as the Dodge Plan, was introduced by the order of the Allied Forces. The hyper inflation stopped suddenly. This may be an early example of an 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. Since significant capital controls existed, monetary policy did have some degree of freedom (that is, the interest rate in Japan could be different from that in 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. The rate of 360 yen/dollar was maintained from 1949 until August 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, the Japanese rate was almost double 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, the main monetary policy instrument was the official discount rate (ODR), supplemented by 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 “window guidance.” Private-sector corporations were not allowed to borrow from abroad or had deposits abroad. All export earning in US dollar and other foreign currencies had to be converted into yen and importers had to obtain 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 gradually in the 1970s and the 1980s. (See Ito (1992: p.320) for chronology of capital control deregulations, 1979-1986; and finally almost all controls were lifted in the “Big Bang” of 1996.)

3. Great Inflation of 1973-74

3.1. Transition from the Bretton Woods to Free Floating

The collapse of the Bretton-Woods regime in August 1971 suddenly freed the Bank of Japan from conducting monetary policy solely to maintain the balance of payments by controlling domestic demands. Theoretically the exchange rate could 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 in December 1971 to a new parity with a narrow band with fluctuation plus/minus 2.25%. 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, a 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 in Japan as a dangerously appreciated yen level. The 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, monetary policy and fiscal policy were conducted to stimulate the domestic economy so that imports would increase and the trade surpluses would come down. Even if inflation would result from increasing domestic demand, that would not be a problem, politicians insisted. Political pressure to keep monetary policy relaxed was strong, but no dissenting voice from the Bank of Japan was heard in 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 close to zero. 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. According to Nakagawa (1981), this rate cut was first planned in April, but delayed for political reasons. This will be explained in detail below. By the time of implementation, it was way behind the curve, since the WPI inflation rate started to increase and industrial production started to show signs of recovery.

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

The fact that the inflation rate rose sharply and exceeded 10% by summer 1973 and there were some signs already a year earlier, the interest rate cut of June 1972 was a mistake. By the same reasoning, the absence of monetary tightening until the CPI inflation rate nearing 10% in April 1973 showed that the Bank was too slow to respond. Reasons for this mistake based on political economy are presented below.

Figure 2 (above) also shows that after the Middle East Crisis of October 1973, both the CPI and WPI inflation rates increased sharply. The WPI inflation rate rose to near 35%, and CPI near 25% by spring 1974. This was the greatest peace time inflation for Japan. Due to a very high inflation rate, wages rose sharply in 1974 as well as 1973, in order to compensate for an increase in living costs. Companies were enjoying profits from the demand stimulation of 1972 and 1973 (until the oil price shock, starting in October 1973). The inflation spiral was in place from mid-1973 to 1974. Oil prices tripled from July 1973 to January 1974, with the selective embargo by OPEC countries. The sharp increase in imported oil prices aggravated the already-high-and-increasing inflation rate.

While the CPI inflation rate above 20% was very high, the industrial production growth rate turned negative in 1974, as shown in Figure 3. The real GDP growth rate became negative for the first time since 1955, when GDP statistics became available. Table 3 shows GDP changes, quarter to quarter annualized rates, and year-on-year growth rates.

Table 4 shows the GDP growth rates. The year 1974 was typical of stagflation—with a very high inflation rate with negative growth in output.

Table 3 (above) and vertical lines in Figure 2 (above) show the timing of the monetary policy actions. The interest rate (ODR) was raised five times in the nine month 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 the 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 the hyper inflation period of 1974. There are at a maximum a 5% point difference between Core and Core-Core, which 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 fell below 5% in the spring of 1975, and by the end of 1975, the CPI inflation rate fell 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 had shown signs of recovery, and prices, particularly the WPI, also showed the sign of recovery.

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

In April 1972, lowering the ODR was considered as a part of an anti-yen appreciation package of the government. Inside the BOJ, opinions were divided into two camps, one favoring lowering the ODR and the other considering the rate cut unnecessary. Governor Sasaki maintained to the press that it was not necessary. On May 10, Governor Sasaki met Prime Minister Sato, and the Governor was asked to consider lowering the ODR. On May 11, Governor Sasaki mentioned that the ODR would be lowered on the condition that the bank deposit rates will be lowered. Inside the Bank,

the proposal by the Governor to lower the rate, although with one technical condition, was considered to be a surprise turnaround of his position. (See BOJ (1986, p.381) for events on May 10 and 11.)

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

This episode reveals three problems. First, the 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. The 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 for the interest rate cut, since between April and June, economic activity picked up considerably. He, however, thinks that once the political process−forcing the Postal Saving System to lower the deposit rate−had gone through the cycle, it was difficult to scrap it (Nakagawa (1981)).

3.4. Why tightening did not come earlier

With the government and the Bank of Japan pressing for domestic demand stimulation—again to avoid appreciation of the yen—in the first half of 1972, the wish was granted. In the second half of 1972, the economy was growing full steam. The GDP growth rate was increasing in the 9% to 10% range in the second half of 1972, and rose above 10% in 1973 (recall Table 3); industrial production was increasing in the 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 would 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 actual and potential political pressure. The economy indeed became 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 the Liberal Democratic Party—hence automatically guaranteed to become Prime Minister—on the platform of "Reconstruction of the Japanese Archipelago"—large public works to build a network of road and railroad infrastructure. He announced an additional fiscal spending program in August. In October a supplementary budget and a second additional plan for a fiscal investment program was announced. He was very popular among the voters. It was clear that he would be 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 even the appearance of a policy change, 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.

On 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 (the end of the Smithsonian).

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

Eight months of selecting a pro-spending Prime Minister, the dissolution of the Diet, and the budget process in the Diet explains the tardy implementation of the 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 preferred 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 prevent the trade surplus from increasing—is inflation. Of course, inflation carries high costs of adjustment and distortions, and is an inferior policy compared to appreciation of the nominal exchange rate. But, this view was not shared among politicians at the time.

The step of the April 1973 rate hike, 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. With the news of the Middle East War breaking out on October 6, 1973, the inflation rate was already at a dangerously high level, the CPI at 15%, the WPI at 20%. 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 points 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 at the time. 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 a political push for stimulus. Again, it was still in the budget process, which was the politically sensitive time of the year to change the interest rate, so that the 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. the 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 the 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 a 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 a 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 and too late tightening that started in April 1973. Possible reasons for the mistake are as follows:

(a) Was the Bank of Japan targeting price stability?

(b) Did the Bank of Japan fail to forecast the 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 price stability as priority number one;

(b) Yes, the Bank of Japan knew 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 was at around 0%. The ODR was lowered four times between October 1970 and July 1971, in the hope of stimulating domestic demand further and averting an 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 pressure for strong yen appreciation pressure by heavy intervention. However, they underestimated the strength of the Japanese manufacturing industries. By putting a policy objective to moderate 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 the Minister of Finance. On the other hand, the interest rate was supposed to be decided by the Monetary Policy Committee (MPC) of the Bank of Japan that includes appointments from outside the Bank. Theoretically, the MPC can make interest rate decisions which may be opposed by the government. The Government has the 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 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 the 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 in the absence of independence? Without independence, the Governor could be replaced at will of the government. So can 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 lowering the deposit rate. Increasing the interest rate of course was much harder. Could the Governor put his job on the line to disagree the government? Maybe that was not the Japanese style.

4. Monetarist Rhetoric for Independence

One lesson that the Bank of Japan learned from the mistake of creating high inflation in 1973–74 was to enhance *de facto* independence. To develop more theoretical underpinning for controlling inflation was one, and to assert the danger of inflation, when met with pressure from the government, was another. If the future inflation can be credibly warned with some indicators, that would be persuasive.

The Bank of Japan published a study in 1975 on the importance of monetary aggregate, M2+CD, in predicting future inflation and output, and announced a new monetary policy procedure in 1978.[6] Beginning in July 1978, the Bank of Japan had made it a regular procedure to announce a "forecast" of the growth rate of the average outstanding balance of money (M2+CD) relative to the same period in the previous year, at the beginning of the quarter. For example, the forecast for monetary growth in the first quarter of 1985 over the first quarter of 1984 was announced at the beginning of the first quarter of 1985. There are two important features for this procedure. First, the forecast included the will of the Bank of Japan: "… the policy actions of the Bank of Japan iself are included in the determination of these forecasts, and in this sense the forecasts represent increases in the money supply that the Bank of Japan is willing to permit." (Suzuki, (1987; p.331)) Second, three quarters, out of four, are already history

[6] See Bank of Japan, (1975, 1988) for their description of the procedure and assessments.

in the announced annual growth rate. The forecast represents an average of three quarters' realized monetary growth and current quarter's projected monetary growth. Therefore, the will to change in money is concentrated on the current quarter.

If the monetary growth rate is an indicator for warning future inflation, monetarism rhetoric can be used in the debate against those who argue otherwise. Although the Bank of Japan did not seem to use actively the monetarism rhetoric against political pressure, the monetary indicator may have contributed to confidence among the Bank economists internally.

At the time, a monetarist thinking had a strong influence among central bank researchers as well as academics. The Bank of Japan must have thought that there was a high correlation between M2＋CD and future nominal GNP. In addition, the Bank may have believed that it can easily control M2＋CD via monetary policy instruments. Thus, using M2+CD as an intermediate target, the Bank could target low inflation rate and full-employment output at the same time.

The new procedure had rhetoric of distinct monetarism flavor. In fact, Milton Friedman (1985a) later praised that the Bank of Japan followed monetarist rule that he had advocated.[7] By keeping the monetary growth rate steady, say at *k*%, then output would be stabilized and the inflation rate would be kept low (near *k*%). The Bank of Japan has been least monetarist central bank in its rhetoric, the most monetarist in its policy. It has also achieved the best results. However, Suzuki (1985) was more cautious. He branded Japanese monetary policy of the time as "eclectic gradualism," which is a position between Keynesian fine tuning and a monetarist *k*%-growth rule.

A decade later, Suzuki (1985a) observed that the money-supply growth rate was gradually reduced, so was the nominal-GNP growth rate—but without interfering with the real-GNP growth rate; moreover, fluctuations in the money supply have decreased.[8] This means that the gradual decrease in the money-supply growth rate reduced inflation without reducing economic growth, that is, no tradeoff between inflation and potential growth.

Was the successful Bank of Japan policy a k% rule? According to Ito (1989), the Bank of Japan did not practice the *k*%-growth rule preached by monetarists in the following details of implementation. If the k% rule had been implemented, then higher-than-forecasted growth in money should have been followed by lower-than-trend growth in money, to maintain the long-run growth rate of *k*% by offsetting the upward

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[7] Milton Friedman (1985b) was more critical of the Federal Reserve under Chairman Paul Volcker in its implementation of 1979 policy to target the growth rate of monetary aggregate (M1) in an attempt to fight inflation.

[8] See also Cargill, Hutchison, and Ito (1997: ch. 3) for the updated discussion.

deviation.

However, it was found that when the actual monetary growth rate deviated from its forecast rate, the target rate of the following period (quarter) was most likely to be adjusted toward the actual growth rate. That is, if the actual growth rate was higher than the target rate in quarter *T*, the target rate of quarter $T + 1$ was higher than the target rate in quarter *T*. In addition, the target was unbiased in the sense that the mean of the forecast error was zero—the "forecasts" were rational expectations.

The observed facts are not consistent with monetarist practice. If the *k*% rule had been taken seriously, the target rate for quarter $T + 1$ should move in the opposite direction of the deviation so that *k*% growth in the money stock could be maintained in the long run. That is, if the actual rate was higher than the target rate in quarter *T*, then the target rate of quarter $T + 1$ should be *lower* than the target rate in quarter *T*, in order to compensate for the unexpected increase.

Thus, despite praise from monetarists, the monetary policy of the Bank of Japan cannot be judged to have been practicing monetarism as defined by the *k*% rule. However, it is conceivable that the monetary growth emphasis from 1978 to mid-1980s gave some weapon of rhetoric in fighting against pressure from the government.

The emphasis on monetary growth rate was terminated after 1987 when the growth rate was much higher than forecasts consistently, most likely from the instability of money demand due to rapid financial liberalization at the time.

5. No Great Inflation in 1979-80

5.1. Overview

Another oil crisis came at the end of the 1970s. If the oil crisis was a culprit of the 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 fallen slowly to the five percent level by end 1997. 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. This was 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 high inflation experience of 1973-74. The Bank convinced the Ministry and politicians of the importance of timely monetary policy actions. Many scholars including Cargill, Hutchison and Ito (1997) describe 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.

5.2. 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 early 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 lags in the monetary policy process. The WPI rose sharply from March to May, 1979, mainly due to energy prices. 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 real activity was 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 judgment, 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; the 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 activity was considered to be strong. The government, especially the Ministry of Finance, was cautious, and argued that the timing could be August or September. However, Governor Morinaga had got a nod from Prime Minister on its personal relationship, and won the debate against the Ministries.

The government still insisted that "in order to suppress aggregate demand" was inappropriate for the reason of the 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 many seats. Mr Ohira remained as Prime Minister, but only after a fierce fight and split voting in the House of Representatives (the so-called 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 it on November 2.

5.3. Interest rate hike in February and March 1980

After the 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 the oil market conditions continued to tighten. On December 27, Afghanistan was invaded by the Soviets. As the political events multiply, the oil prices continue to rise.

Domestic output activity was 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 the time of the budget process in the Diet. The interest rate hike was opposed by the Ministry of Finance on grounds of timing. The BOJ argued against the MOF with the logic that the missed opportunity would result in a repeat of the high inflation of 1973-74.

Governor Maekawa met Prime Minister Ohira in early February and requested an ODR hike. Prime Miniter Ohira promised a reply within a week. Prime Miniter Ohira gave a go-ahead in the replay. 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 in 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 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 the Prime Minister for early actions on monetary tightening. Raising ODR, twice, during the budget process was a strong indication that BOJ had achieved *de facto* independence. However, still it relied on the understanding of the Prime Minister, and the trust between Governor and the Prime Minister, rather than a legal framework. Credibility and *de facto* independence seem to be subject to who is Governor and who is Prime Minister. This precarious relationship would continue until the revision of the Bank of Japan law in 1998.

6. Econometric Analysis

6.1 Purpose

In the narrative, it was established that the Bank of Japan made a mistake prior to and during the first oil crisis, while the Bank skillfully managed the second oil crisis. In this section, econometric analysis will be employed to quantify this narrative. A modified Taylor rule equation during a period when the Bank of Japan was considered to be successful will be estimated, and the fitted values with estimated coefficients from well-run period will be applied to presumed-mistake periods. [9]

The Taylor rule (and its variants) should be used with care when it is used more than just to describe the response function of the central bank and to put normative interpretation.[10] If it were to be used in the normative spin, it is absolutely important to find a time period when conducts and consequences of monetary policy conduct and consequences are impeccable.

In the Japan's case, after the mistake of 1972-74, the Bank of Japan gained de facto independence by reminding the government of the sorry episode in 1972-73.[11] The Bank of Japan successfully lowered the inflation rate from 10 percent in 1975 to 2

[9] 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.

[10] Taylor (2009, FAQ section) insists that the Taylor rule is normative from the beginning. Others, including Orphanides (2003a,b,c), Clarida, Gali, and Gertler (1998, 1999) and Ito and Mishkin(2006) are rather cautious on the normative interpretation.

[11] See Cargill, Hutchison and Ito(1997) for such an interpretation.

percent in early-1980s.[12] Once the inflation rate was brought down to the level near 2%, the monetary policy entered a happy state of maintaining low and stable inflation rate. Monetary policy during the economic boom toward the end of the 1980s was a bit controversial in retrospect, because it allowed an asset price bubble to form, which later burst. However, in the sense of CPI price stability, the second half of the 1980s had a good performance. In the 1990s, there is some question raised by several authors whether loosening of monetary policy after the bubble burst, 1991-92, was quick enough to prevent a sharp decline in output after 1993.[13] However, the Bank of Japan had controlled the interest rate in an attempt of stabilizing inflation and output until the financial system falls into a serious crisis, with some failure of medium size regional bank, and the official discount rate being lowered to 0.5% in September 1995. Soon after the interest rate was lowered to 0.5% in September 1995, the Bank of Japan lost a grip on the inflation rate, partly due to the zero bound of the nominal interest rate and partly due to near deflation.

With the above discussions in mind, we take the period from January 1982 to December 1995 as a benchmark period that can be regarded as a successful period in CPI inflation stability. The benchmark Taylor rule will be estimated for this period.

After examining the estimated coefficients and the deviations of fitted value from actual value within the sample, the out-of-sample backcasting will be conducted to see whether the Bank of Japan would have behaved differently in the 1970s. In particular, the mistake of monetary policy creating the Great Inflation of 1972-74 will be examined in light of the estimated Taylor rule of 1982-95. This exercise will answer the following question: Suppose that the Bank of Japan in 1972-74 (the "mistake" years) had reacted to macro variables in the manner they had in 1982-95. How much the counterfactual interest rate would have been hiked compared to the actual interest rate. If it could be shown that the counterfactual interest rate would have been much higher than actual, then the prudent Bank of Japan a la 1982-95 would have mitigated the inflation problem in 1972-74.

The typical Taylor rule equation is as follows:

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[12] See, for example, Friedman (1985) and Ito (1992: ch. 5).

[13] See Ahearne (2002), Ito and Mishkin (2006), Jinushi, et al. (2000), Kuttner and Posen (2004) for the discussion of Japan's monetary policy in the early to mid-1990s.

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

Where i_t denotes the nominal policy interest rate; r^f the natural real interest rate; π^* the target inflation rate; π_t is the inflation rate; $y_t - y^*$ is the output gap. In the original Taylor (1993), both β were assumed to be 0.5, and r^f .and π^* were both assumed to be 2. Here, as in the literature β will be estimated using data in the benchmark period. In the implementation of estimating this equation, the following specification is used.

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

The left hand side becomes the real interest rate at time t. There are several departures from the usual Taylor rule regression in the literature. First, since the decision making is done on a monthly basis (rarely two policy rate changes in the same month), a monthly model is highly recommended. GDP gap will not be available on the monthly basis, so that the industrial production will be used as a measure of output. The industrial production gap will defined and used in place of GDP. Second, efforts will be made to obtain data that were available at the time of decision making, although the data used in the regression are not exactly the real time data. Third, since the equilibrium real rate r^f is difficult to calculate, the equilibrium nominal rate is to be estimated as a constant term of in the model.

6.2 Data

Several variables have to be carefully defined for the Taylor-rule type econometric application. First, the output gap (output deviation from its potential) and inflation gap (inflation deviation from its target) have to be defined in the spirit of "real time data", that is data that were known at the time of policy was decided. (The importance of using real time data are emphasized by Orphanides (2003, a, b, c).) For example, use of the original data at time t should be used instead of later revisions, including base year change or preliminary to final. Second, any detrending or estimating a potential level should be carried out with the data only up to time t. Third, since data collection and data disclosure takes time, at the time of monetary policy meeting in month t, available data of Industrial Production and CPI are not those of month t, but either month t-1 or even t-2. Although official data may be available only for t-2, various other economic variables can be used to guess what would be announced later.[14] So, we assume that the

[14] The CPI of month t becomes available in month t+2. One option is to use the CPI inflation

data that the Bank of Japan knows at month t would be Industrial Production and CPI of month t-1.

Since we attempt to build a monthly model, GDP cannot be used as a variable for output gap. In place of GDP, Industrial Production will be used. The base year of Industrial Production is changed every 5 years. If we had picked up data from the present data base, it would be a series of current estimation method, and different from the variable that was known at the time of decision making in the 1970s to the 1990s. Therefore, the original Industrial Production data set is collected from historical series that were available at the time of decision making.[15] For the output gap $y_t - y^*$, a deviation of the Industrial Production from its linear trend, which is known at time t, is used. [16] 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. The industrial production gap was estimated from January 1971 to December 2008.

For the inflation measure (π), the year on year change of headline-CPI is used.[17] The base year of the CPI and weights of goods and services in the consumption basket are

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rate on the right hand side the variable of two months ago. However, with information of CPI of Tokyo Area which is announced in month t+1, one can guess the national CPI with some accuracy before their disclosure. Therefore, the CPI on the right hand side is the inflation rate of t-1.

[15] Admittedly, this is not "genuine" real time data, since original documents, such as every issue of Monthly Report, of the Bank of Japan are not checked against the old data base. The minutes of the monetary policy meetings were not kept before 1998.

[16] The output gap is the residual in the log-linear trend regression using data of the preceding ten years [t-119, t]. Extract the residual at t. By multiplying by 100, the percentage deviation from the trend line is stored. Then, repeat the procedure (i.e., rolling regression) from January 1971 to December 2008.

[17] The headline inflation was most often mentioned in the 1970s, 80s and 90s. When the exit condition from quantitative easing was mentioned in March 2001, it was defined in the CPI excluding fresh food (but including energy prices). Since the 2000s are not a period for analysis in this paper, the headline CPI is used throughout this paper. Otherwise the inflation rate to be analyzed should be switched from headline inflation to CPI excluding food May 2001 with the change in the base year as well. Another potential adjustment that is ignored in this paper is the introduction of consumption tax (a form of VAT) in April 1989 and tax rate increase in April 1997. When the 3% consumption tax was introduced in April 1989, some of excise and other indirect taxes were abolished, so that the net effect on the consumer prices were much less than 3%. Ito and Mishkin (2004) argued that the year on year inflation rate due to consumption tax was 1.3% for April 1989 – March 1990, and 1.6% for April 1997 – March 1998. However, no adjustment is made in this paper for consumption tax increases, on the assumption that the Bank of Japan was alert on inflation even due to the consumption tax increases, as inflation due to consumption tax increases may trigger second round inflation.

revised every five years in Japan. As CPI of a new base year becomes available, the Bank of Japan and the government starts using the new CPI for their decision making. The real-time CPI is constructed with choosing the headline-CPI of the base year that was in place.[18]

The target inflation rate is also difficult to determine. The inflation rate during the 1960s was much higher than later period. It is assumed that the target inflation rate, π^* was 4% from January 1971 to December 1977. As the Bank of Japan became serious in lowering the inflation rate in 1978 by adopting the monetary aggregate "forecast" (see Ito (1989)), it is assumed that the target rate was gradually (1/24 percentage point a month) lowered from 4 percent in December 1977 to 2 percent by December 1981. The target inflation rate was again lowered gradually from 2 percent in December 1992 to 1 percent in December 1998, and has stayed at 1 percent since then.

6.3 Estimation

Based on the discussion above, the equation to be estimated is the following:

$$(1) \quad i_t - \pi_{t-1} = c + \beta_\pi \cdot (\pi_{t-1} - \pi_t^*) + \beta_y \cdot (y_{t-1} - y_t^*) + \varepsilon_t$$

Where the constant term c will be interpreted as the long run real interest rate. The inflation and industrial production are lagged once due to observation lag for the central bank. Since the inflation rate is defined as year-on-year, there will be serial correlation in the residuals. Generalized Methods of Moments (GMM) is used to estimate equation (1).[19]

The sample period of estimation is from January 1982 to December 1995. The choice of this time period is discussed earlier in this section.

Table 6-1 shows the estimation results. Both inflation gap and output gap have statistically significant estimates with correct sign. The magnitude of coefficients are

[18] As in Industrial Production, the what we collected from old-base-year CPI may not be genuine real-time CPI. Original documents at the time of monetary policy board meeting were not checked against our data. Minutes were not kept, and often the meeting was called suddenly. In the sense what we call real-time data here are what we believe to the best approximation of the real time data.

[19] For the instruments, c, $\pi_{t-2} - \pi^*$, $y_{t-2} - y^*$, $dyen_{t-1}$, $doil_{t-1}$ are used, where $dyen_t$ is the year-on-year change of the yen/dollar rate in month t and $doil_t$ is the year-on-year change of the oil prices in month t.

smaller than original Taylor assumption of 0.5. If the inflation rate rises 1 percentage point, the nominal interest rate rises 1.34 percentage point, since the "real" interest rate responds by 0.34 percentage point. If the output gap moves positively (over heating) by 1 percentage point, then the nominal interest rate rises by 0.127 percent, assuming no change in the inflation rate.

Figure 6-1 shows the actual and fitted values in the sample period, and their difference, the residual of the equation. The figure suggests the following interpretation, if the fitted value can be interpreted as a desirable path. The monetary policy was too tight (actual>fitted) in 1995 and 1996, while the monetary policy was too loose in 1998 and 1999. The two years of 1998 and 1999 are known to be the last stage of the real estate bubble. Several authors have suggested that the Bank of Japan made a mistake in these years allowing the bubble to form, thus the asset prices should have been included in deciding monetary policy. (See Okina and Shiratsuka (2002, 2004)) However, the Figure 6-1 suggests that even with plain CPI Taylor-rule would have flagged the too loose monetary policy in these two years.

6.4 Out of Sample Backcasting

Now that we have reasonable estimates of the modified Taylor rule for the period in which the monetary policy can be regarded as desirable on average, we can evaluate the monetary policy of other periods in question. We are particularly interested in the "mistake" in the early 1970s, when the inflation rate rose above 20 percent. Use the estimated coefficients of Table 6-1, and plug the data of 1972, then we obtain the counterfactual call rate during the period in question.[20] Figure 6-2 shows the actual and counterfactual nominal call rate. Obviously, the counterfactual nominal rate, i.e., the desirable call rate would have been much higher than the call rate. The desirable interest rate would have been around 36 percent when the actual rate was 12 percent. This exercise shows in number what we have already established in narrative. The first oil crisis was handled very badly, even before the oil price started to rise. The magnitude of the mistake was more than 20 percentage point in the call rate.

It should be careful in interpretation. The counterfactual call rate is not the path of desirable path. If the desirable path of 1972 had been implemented, then the actual inflation rate would have been lower, so that the interest rate in 1973 would not have

[20] One obtains counterfactual "real" interest rate by the procedure, and then by adding the interest rate, the counterfactual nominal interest rate is obtained.

been so high. The desirable rate should be interpreted as the rate that is, given the actual history up to t-1, the desirable call rate in month t.

Figure 6-3 shows the similarly generated desirable rate for the period of 1978-82, the period that encompasses the second oil crisis. This shows that the counterfactual interest rate was not much different (up to 1.5 percentage point) from the actual rate in 1979-1980, the oil crisis years. This confirms the narrative that the second oil crisis was handled much better than the first one.

7. 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 revealed 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 caused 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. The Prime Minister exerts pressure on the Bank to lower the interest rate or to prevent the interest rate hike. The timing of implementation was also influenced by the 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 budge was discussed in the Diet. The Bank gained de facto independence using the logic that without swift actions, the mistake of high inflation would be repeated. Prime Minister Ohira was also quite respectful to Governor Maekawa for the Bank's judgment and decisions.

The modified (monthly) Taylor rule was specified and estimated using the data of the period from January 1982 to December 1995, a period of relative success in achieving low and stable inflation rate. Then the estimate coefficients of the equation were applied to the data of the mistake period, 1972-1975. The desirable interest rate would have been some 20 percentage point higher than the actual rate. When the same procedure was applied to the second oil crisis period, 1978-82, then it was shown that the desirable rate would not have been much different from the actual rate. The exercise confirms the conclusion of the narrative. The mistake of Great Inflation started well before the onset of the first oil crisis, October 1973. The interest rate was way too low before October 1973 and after October 1973.

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Figure 1

3 episodes of over 20% inflation

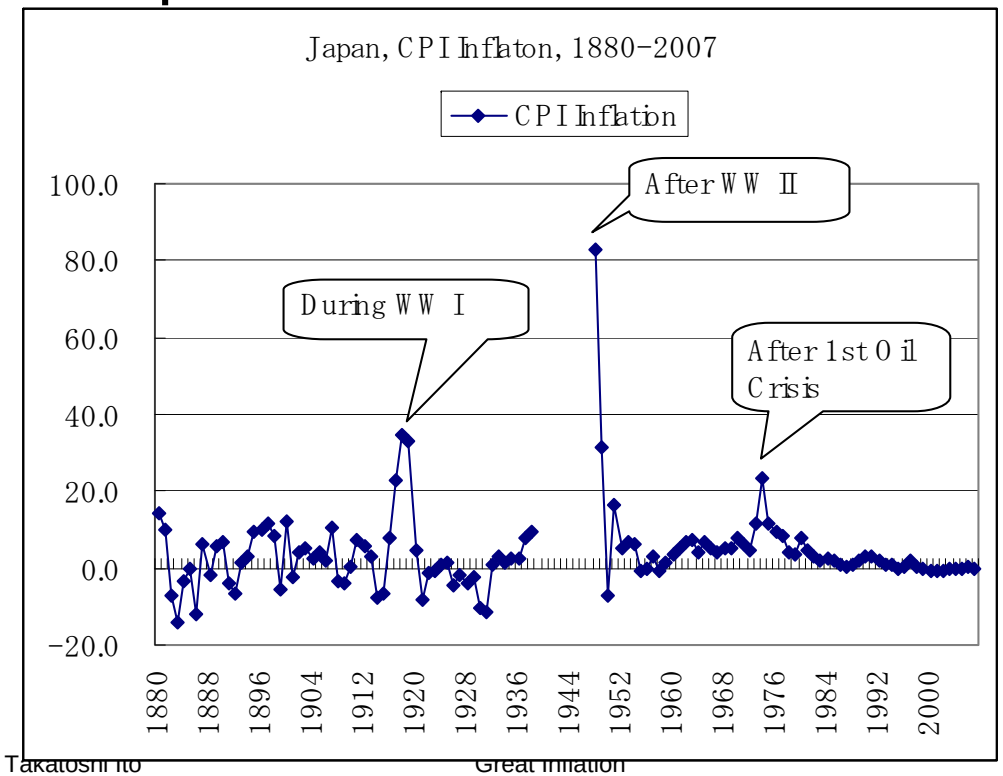


Table 1

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

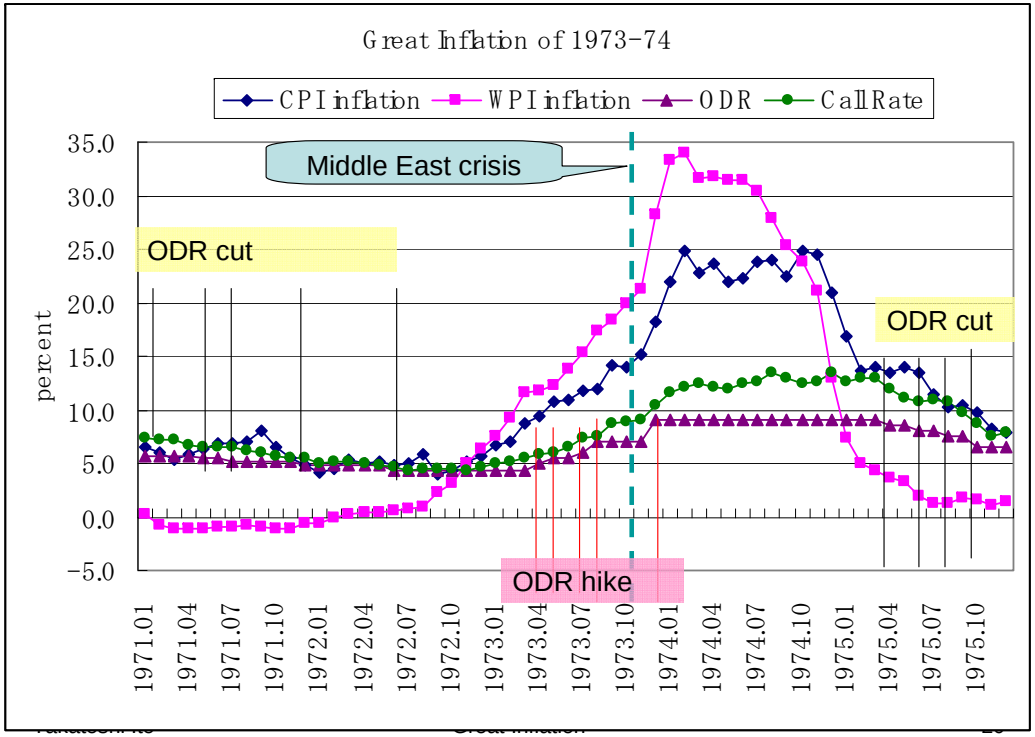
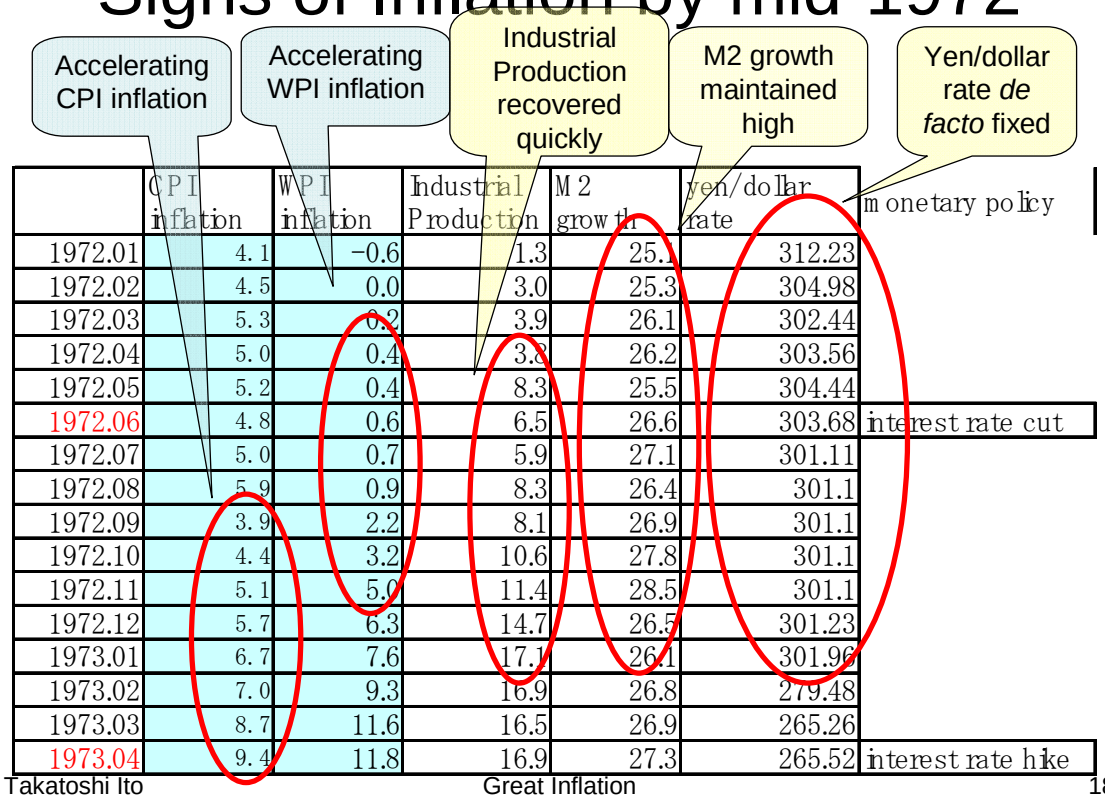

Great Inflation of 1973-74
CPI inflation
WPI inflation
ODR
CallRate
Middle East crisis
ODR cut
ODR cut
ODR hike
percent
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
1971.01
1971.04
1971.07
1971.10
1972.01
1972.04
1972.07
1972.10
1973.01
1973.04
1973.07
1973.10
1974.01
1974.04
1974.07
1974.10
1975.01
1975.04
1975.07
1975.10

Table 2

Signs of Inflation by mid-1972



	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

Figure 3

Industrial production index

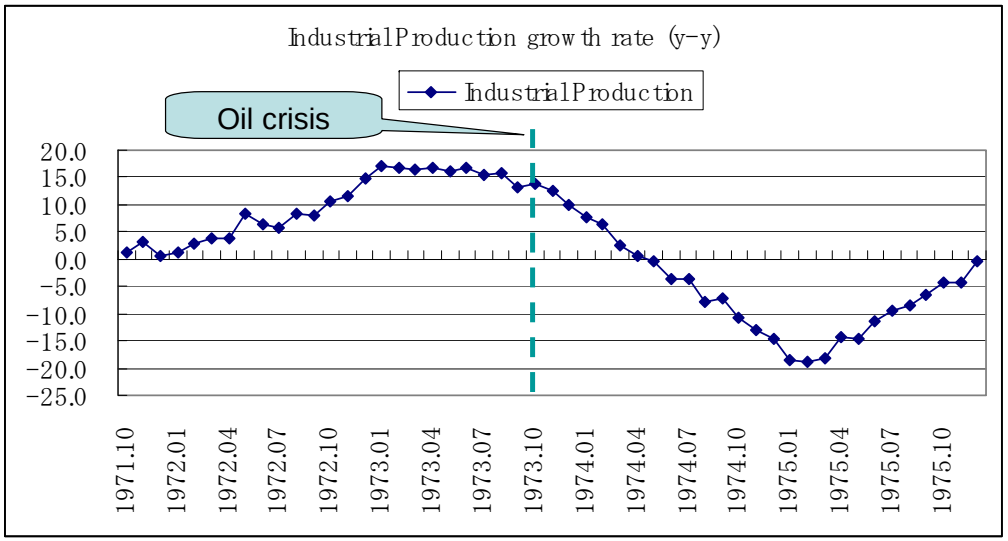


Table 3

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

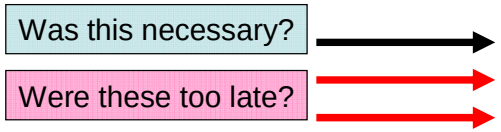
Raising ODR
Monetary Tightening

Lowering ODR
Monetary easing

Takatoshi Ito Great Inflation 13

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

Figure 4

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

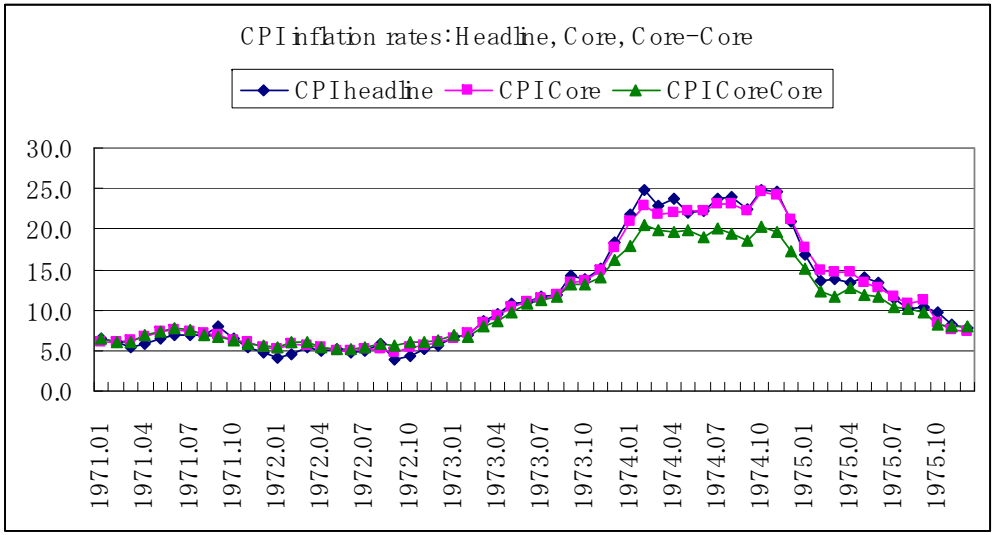


Figure 5

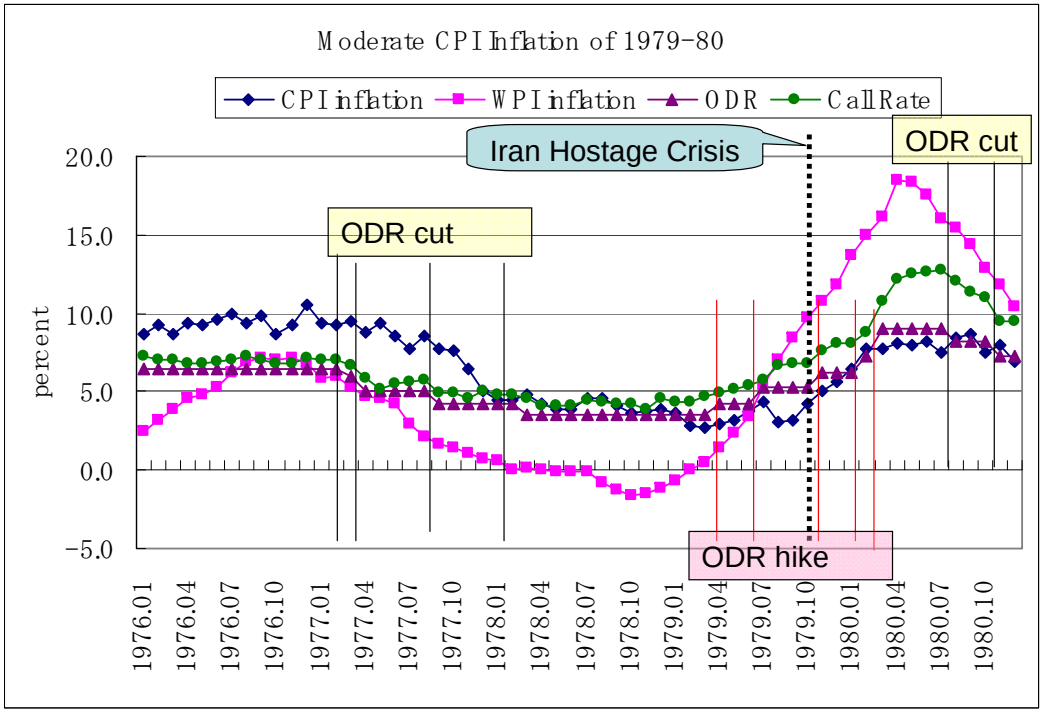

Moderate CPI Inflation of 1979-80
CPI inflation
WPI inflation
ODR
Call Rate
Iran Hostage Crisis
ODR cut
ODR cut
ODR hike
percent
20.0
15.0
10.0
5.0
0.0
-5.0
1976.01
1976.04
1976.07
1976.10
1977.01
1977.04
1977.07
1977.10
1978.01
1978.04
1978.07
1978.10
1979.01
1979.04
1979.07
1979.10
1980.01
1980.04
1980.07
1980.10

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. Monthly Taylor Rule, 1982-1995

Equation (1): Sample: 1982M01 1995M12

	Coefficient	Std. Error	t-Statistic	Prob.
C	3.723	0.130	28.54	0.000
$\pi_t - \pi_t^*$	0.336	0.165	2.03	0.044
$y_t - y_t^*$	0.127	0.021	5.97	0.000
R-squared	0.366	Mean dependent var		3.333851

Figure 6-1: Actual value, Fitted value, and residual: call – π_{t-1}

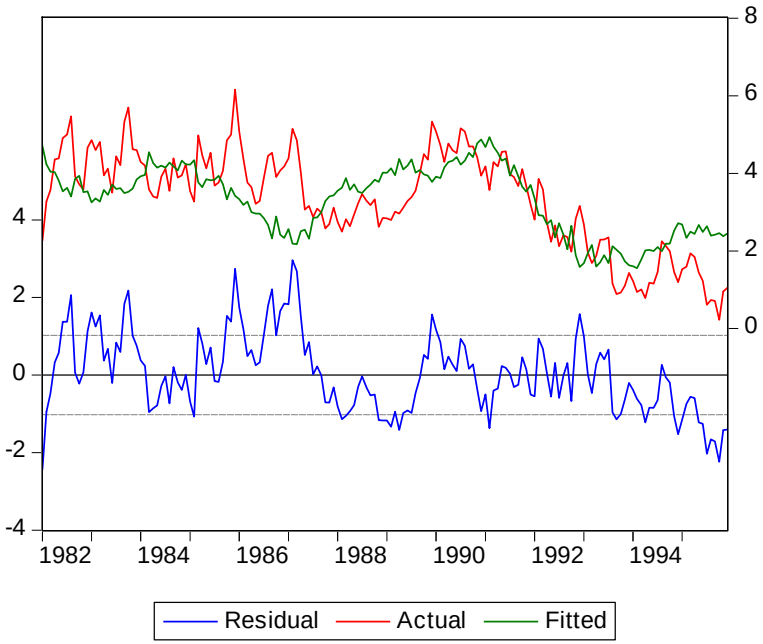


Figure 6-2: Counterfactual 1972-1975

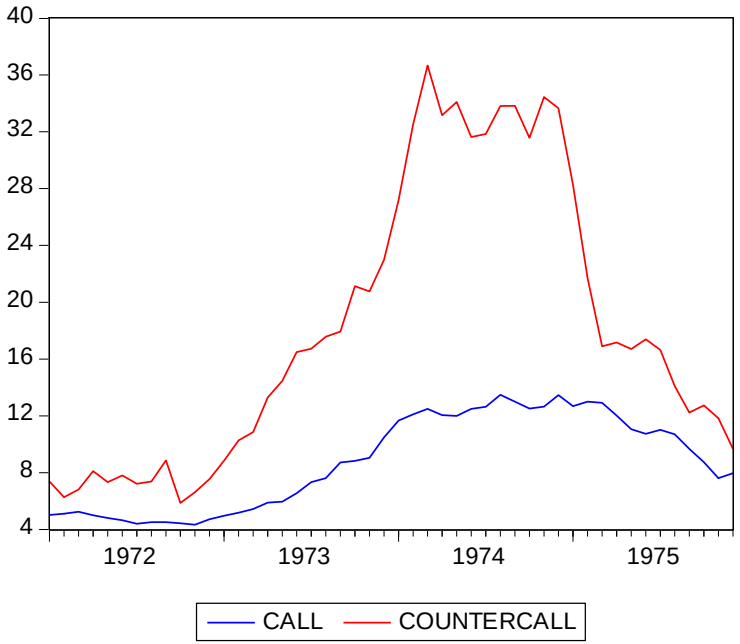


Figure 6-3: Counterfactual 1978-82