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Monetary Policy, Deflation, and Economic History: Lessons for the Bank of Japan

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Abstract

The paper discusses Bank of Japan policy during the 1990s, especially the late 1990s, in the context of the historical experiences of the United States, Sweden, and Japan in the 1930s. Sharp differences exist between Japan in the 1990s and the 1930s environment; however, this paper takes the position there are qualitative similarities that cannot be ignored in terms of financial distress, downward price trends, debate over appropriate central bank policy, and how legal independence may constrain appropriate central bank policy. The paper reviews the evolution of views about policy targets from the 1930s to the present to show how price stability reemerged as the primary policy target. Evidence on the success central banks have achieved in achieving price stability is reviewed. The evidence shows that claims central banks have overemphasized controlling inflation at the expense of deflation, is incorrect with the exception of Japan. The paper reviews the role of the Federal Reserve in the 1930s to show that failure to prevent deflation during the critical 1929-1933 period had adverse impacts on the economy and resulted in rending the Federal Reserve de facto dependent on the government despite its legal independence. The paper then considers the experiences of Japan and Sweden in the 1930s to provide counter examples to how the U.S. economy might have responded to central bank policy designed to prevent deflation. In both cases, policies explicitly designed to reverse the downward movement in prices reduced the economic and financial distress in those countries compared to the United States. The paper draws implications from the historical record for Bank of Japan policy and suggests that more aggressive action would have been appropriate in the 1990s and that further institutional change toward inflation targeting should be considered.

Key words: Bank of Japan; central bank independence; deflation; Federal Reserve; Great Depression period; inflation; inflation targeting; Riksbank

JEL Classification Code: E52, E65, N00

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by

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1. Introduction

Japan's economic and financial distress in the 1990s is unprecedented among the industrial economies in the postwar period. First, the economic and financial distress that started in 1990 followed a postwar record of stability and growth impressive by any standard[1]. Second, the economic and financial distress in the 1990s has been pervasive and reached crisis proportions in late 1997 when Japan came close to a deflationary spiral and the financial system was on the verge of insolvency. Japan's macroeconomic performance brought comparisons with the 1930s and rekindled old debates about the effectiveness of monetary policy, deflation, and liquidity traps. Third, institutional and attitudinal reform in the 1990s has been unprecedented in postwar Japan. The "new" Bank of Japan was established in 1997 with enhanced legal independence from the Ministry of Finance. The "new" financial regulatory and supervisory regime was established in the second half of the 1990s by a series of institutional changes. The role

[1] Cargill, Hutchison, and Ito (1997) review Japan's financial and monetary policies from the end of W.W. II to November 1996. In a forthcoming book, they focus on financial and central bank policy from November 1996 to the end of 1999.

of the Ministry of Finance was reduced, the Deposit Insurance Corporation was restructured, the Financial Supervisory Agency and Financial Reconstruction Commission were established, and new guidelines were adopted for dealing with troubled financial institutions referred to as Prompt Corrective Action.

The economic and financial landscape changed significantly in the 1990s and in the process, Bank of Japan policy has been a prominent and much debated feature. The Bank of Japan's May 1989 decision to raise the discount rate was criticized as coming too late. The Bank's focus on limiting yen appreciation in the second half of the 1980s accommodated asset inflation and made it difficult to achieve a soft landing in 1989. The Bank of Japan was criticized for overly tight policy in the first half of the 1990s. Once policy shifted to ease after 1994, the Bank of Japan was criticized for not more aggressively increasing monetary growth and preventing a slow downward drift in prices over the decade (Alexander, 1999; Bernanke, 2000; Cargill, Hutchison, and Ito, 2000; Ito, 1999; Krugman, 1999; Meltzer, 1999; Posen, 1998 and 1999; and, Weinstein, 2000)[2]. Critics argued Bank of Japan policy should have adopted a more aggressive policy in the 1990s, especially in the latter part of the 1990s, to achieve a low, but positive, inflation rate. The deflation process prolonged Japan's recovery by deteriorating balance sheets and postponing spending and borrowing[3]. Some critics argued for additional institutional change in the form of an inflation-targeting policy framework. The majority of critics

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[2] McKinnon (1999) has been one of the few observers to agree with the Bank of Japan's policy stance.

[3] The critics have not ignored non-monetary policy problems such as policy failures by the Ministry of Finance, both in regard to failing to resolve financial distress and the decision to raise the consumption tax in 1997, as contributing the Japan’s poor macroeconomic performance in the 1990s.

argued for more aggressive policy and the need to consider policy channels not tied to the bank finance model such as open market operations in government securities.

Bank of Japan policies have been defended in technical papers by staff economists expressing their unofficial views and statements of official Bank of Japan policy made by the Governor, Deputy Governors, and Board members. The defense of Bank of Japan policy has emphasized three issues. First, targeting interbank rates to almost zero is the most appropriate policy to prevent deflation and in the current situation, is an "extremely accommodative policy" according to Governor Hayami in a speech on March 21, 2000. Even at a zero interest rate target, financial institutions have not subscribed to the full amount of funds offered by the Bank of Japan. The zero rate policy provides the Bank of Japan at any time with the ability to supply any increase in demand for liquidity or excess reserves on the part of banks. The Bank of Japan further argues that interest rates are the proper focus of policy. According to Deputy Governor Yamaguchi in a speech on October 19,1999, "it is generally known that when an economy is susceptible to financial shocks, including a financial system crisis, financial conditions can better be gauged by interest rates rather than quantity." Second, a more explicit inflation policy or "reflation" would not stimulate the economy. According to Governor Hayami in his March 21, 2000 speech, "inflation is no solution to economic problems" because it would not have the intended positive effect. Interest rates would increase by the expected inflation and hence leave the real rate unchanged and in addition, inflation would generate uncertainty and interest rates would likely increase by more than the expected inflation. Third, staff economists have emphasized that balance sheet constraints and concerns over fiscal responsibility limit the ability of the Bank of Japan to

pursue nonstandard open market operation in government bonds (Okina, 1999a and 1999b and Fujiki, Okina, and Shiratsuka, 2000). In any event, these policies are not required since the zero interest rate policy is appropriate for the current situation since there is no clear evidence of serious deflation. If the economy experienced a clear deflation process on a par with what happened in the 1930's, aggressive and non-traditional policies would be adopted.

The discussion deserves attention for at least four reasons. First, the discussion focuses on the actions of one of the more important central banks and the world's second largest economy. Second, the openness and technical nature of the discussion are unprecedented, especially when compared to some of the past debates the Federal Reserve has had with academics. Third, the context of the discussion in terms of Japan's economic and financial environment in the 1990s is unprecedented in the postwar period and reminiscent of the 1930s. Fourth, the discussion has brought important issues of central bank policy into perspective with implications beyond the Bank of Japan. The discussion has brought into focus that price stability means preventing deflation as well as preventing inflation, that central bank policy instruments may need to depart from the bank finance model to maintain price stability, and that the benefits of central bank legal independence may be over advertised.

This paper does not attempt to evaluate the current debate; rather, the paper draws on the historical experiences of the United States, Sweden, and Japan in the 1930s to draw some tentative implications for Bank of Japan policy in the 1990s. This is a hazardous undertaking, and it is only stating the obvious to stress that any implications drawn from these three historical cases are tentative at best. At a minimum, there is a

sharp structural and quantitative difference between Japan in the 1990s and the 1930s environment.

At the same time, this paper takes the position there are qualitative similarities that cannot be ignored. Both periods were characterized by financial distress in the form of insolvent financial institutions and large amounts of outstanding nominal debt. Downward price trends in both periods exasperated the problems by increasing the real debt burden, deteriorating balance sheets, postponing spending, and raising real interest rates. Central bank policy was a focal point of debate in both periods and the economy responded differently according to which central bank made a concerted effort to prevent deflation. In both periods, traditional central bank instruments tied to the bank finance model limited the willingness to adopt alternative policies to increase the monetary base. In both periods, legal independence was a constraint to adopting nonstandard policy such as aggressive open market operations, and in both periods, central banks defended their actions by stressing non-monetary structural problems, balance sheet considerations, and fiscal responsibility concerns.

The paper first reviews the development of views about policy targets from the 1930s to the present to show how price stability has reemerged as the primary policy target. The context, however, has been to define price stability as preventing inflation. The paper then presents evidence on the success central banks have achieved in this regard and places Japan's inflation record in international perspective to show that claims (Economist, 1999) central banks have overemphasized controlling inflation at the expense of deflation, is incorrect with the exception of Japan. The paper then reviews the role of the Federal Reserve in the 1930s to show that failure to prevent deflation during

the critical 1929-1933 period had adverse impacts on the economy and resulted in rending the Federal Reserve de facto dependent on the government despite its legal independence. The paper then considers the experiences of Japan and Sweden in the 1930s that provide counter examples to how the U.S. economy might have responded to central bank policy designed to prevent deflation. In both cases, policies explicitly designed to reverse the downward movement in prices reduced the economic and financial distress in those countries compared to the United States. The paper draws implications from the historical record for current Bank of Japan policy and a short concluding section ends the paper.

2. Evolution of Monetary Policy in the Postwar Period

The second half of the twentieth century witnessed four stages in the evolution of views regarding monetary policy objectives: (i) end of W.W. II to the mid 1960s; (ii) mid 1960s to the late 1970s; (iii) late 1970s to the late 1980s; and, (iv) the late 1980s to the present. While some will debate the dating of the four stages, there should be little debate over the stages themselves.

Monetary Policy is Impotent – end of W.W. II to mid 1960s: The events and interpretation of the Great Depression of the 1930s strongly influenced views about the importance of money and the ability of monetary policy to influence economic activity. The failure of the Federal Reserve to prevent the decline after 1929 and limit its severity once started, led to the conclusion that monetary policy was impotent in a deflationary

spiral and more aggressive monetary policy was like " pushing on a string."[4] This view was endorsed by the Federal Reserve during the 1930s and in the early years of the postwar period, by former Federal Reserve officials such as Goldenweiser (1951) and found its way into a large number of textbooks in the 1950s and 1960s.

Monetary Policy is Important and Should Focus on Activist Stabilization Goals – mid 1960s to late 1970s: In the 1970s money and monetary policy were again recognized as important influences on economic activity and the debate shifted to how central banks should conduct policy. Monetary policy assumed an activist role with many arguing that central banks were capable of "fine tuning" the economy based on a predictable tradeoff between inflation and employment, short and/or predictable policy lags, and detailed structural models of how monetary policy influenced the economy. Modigliani in 1977 best expressed this view, when he argued there was no longer any debate over the importance of money, but only a debate over how central banks should conduct policy. Based on the practical message in the *General Theory*, Modigliani argued " . . . that a private enterprise economy using an intangible money *needs* to be stabilized, *can* be stabilized, and therefore *should* be stabilized by appropriate monetary and fiscal policies." (Modigliani, 1977, p.1).

Monetary Policy is Neutral in the Long Run and Activist Policy is Inherently Inflationary-late 1970s to late 1980s: The ability of central banks to achieved the goals advocated by Modigliani came into doubt in the late 1970s and 1980s. High inflation

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[4] Meltzer (forthcoming, chapter 6) traces the phrase “pushing on a string” to Marriner S. Eccles, Governor of the Federal Reserve Board in 1935, who used it to summarize his views of why more aggressive monetary policy would have been futile.

rates experienced by many industrial economies during the 1970s and 1980s and the associated financial and real disruptions were attributed to activist monetary policy. There emerged a consensus that monetary policy was capable of achieving only ephemeral changes in real output and that efforts to change the actual performance of the economy from its long-run equilibrium level would fail with higher inflation as the only predictable outcome. Long and variable policy lags, lack of an exploitable and permanent tradeoff between inflation and employment, and recognition of the time-inconsistency problem led to the conclusion that the primary goal of monetary policy should be long run price stability rather than short-run stabilization.

Institutional Design of Central Banking and Price Stability-late 1980s to the present: The late 1980s to the present witnessed increasing attention devoted to institutional design of central bank policy that would best contribute to long run price stability. The emphasis however, was on preventing inflation rather than deflation. This period witnessed renewed emphasis on central bank independence based on a flurry of empirical papers showing that a statistically significantly relationship existence between high levels of central bank independence and low inflation. Interest in inflation-targeting also increased as a further means to prevent inflation. Few seriously now argue monetary policy can "fine tune" the economy and even those willing to use monetary policy to offset shocks in the short run emphasize that price stability, that is, preventing inflation, is the long-run policy target of the central bank.

3. Inflation Policy Outcomes, and Japan in International Perspective

The new emphasis on price stability has been reflected by significant reduction in the inflation rates of many industrial economies. Table 1 presents average annual inflation rates based on quarterly CPI data for 20 OECD countries for selected periods from 1975:1 to 1999:3, including Japan. In virtually every country there is a downward trend in the CPI inflation rate after 1985. The average inflation rate for the 1995:1 – 1999:3 period excluding Japan is 1.82 percent. Japan's average CPI inflation rate for the same period is 0.49 percent and is the lowest inflation rate of all the other countries and in 1999, the CPI inflation rate was negative. Figure 1 provides a broader measure of Japanese price movements the 1990s. The GDP inflation rate also shows a downward trend in prices.

Three implications can be drawn from Table 1. First, there has been a decline in the average inflation rate in most countries over the entire period. The overall average inflation rate remained at about the same high level between the 1975:1-1979:4 and 1980:1 to 1984:4 periods, but declined steadily over the next three periods. Second, the average inflation rate in the context of the well-known bias in the CPI index for all countries in Table 1, omitting Japan, still suggests a positive inflation rate of about 1 percent. This is as close to price stability as one is likely to achieve and at least on this basis, does not indicate a widespread deflation problem. Third, Japan is an outlier in two respects. Japan exhibited the lowest inflation rate of the countries listed in Table 1 in all five periods, and Japan's inflation rate in the 1995:1-1999:3 period most likely indicates

deflation considering that estimates of the CPI index bias are about 1 percent for Japan[5]. Again, this paper takes the position that the deflation experienced by Japan in terms of the CPI or GDP Deflator in the second half of the 1990s is not comparable on a quantitative basis with the deflation experienced by many countries in the 1930s. The effects of deflation and solution to deflation, however, are qualitatively similar.

4. Historical Lessons from the Great Depression: The Federal Reserve

The influence of the Great Depression on views of monetary policy and public policy cannot easily be overstated. It led to the rejection of the classical nonactivist regime of government policy and generated an extensive system of government regulation, supervision, and stabilization policy that dominated the second half of the last century. The failure of Federal Reserve policy supported a generation of economic thinking that "money was not important". On a broader scale, the Great Depression and associated monetary collapse, especially in the United States adversely impacted Germany and helped bring Hitler to power (Kindleberger, 1995).

Table 2 presents the basic real and nominal features of the U.S. economy during the 1930s. The Great Depression Period consists of four stages based on NBER cycle reference turning points: The Great Contraction period from August 1929 to March 1933; Recovery from March 1933 to May 1937; Sharp Contraction from May 1937 to June 1938; and a more substantial Recovery after June 1938. The first stage is the most critical and set the tone for the remainder of the decade. During the critical 1929-1933

[5] Shiratsuka (1999) concluded that the overall bias in the CPI was about 0.90 percentage points per year, but emphasized the tentative nature of this result given the lack of existing studies for Japan.

period, nominal GDP declined by 46 percent, real GDP declined by 29 percent, and the GDP Deflator and CPI both declined by 24 percent.

Almost from the start of the Great Depression until the early 1960s, the view was widely held that the Federal Reserve had, on balance, pursued an easy monetary policy and that only two policy errors could identified. The Federal Reserve may have overreacted to Britain's departure from gold in September 1931 when the discount rate was increased, and the doubling of reserve requirements in 1937 to eliminate excess reserves held by the banking system may have been too drastic for the conditions of the time.

The Federal Reserve view did not go unchallenged (Warburton, 1966); however, it was Friedman and Schwartz (1963) who proved persuasive, rather than Clark Warburton[6]. Friedman and Schwartz attributed the August 1929 downturn to the Federal Reserve's desire to curb the stock market boom, but more importantly, attributed the length and severity of the Great Depression to restrictive monetary policy. These policy failures during the 1929-1933 period resulted in a drastic decline in the money supply, price level, and real output.

Friedman and Schwartz have not been without critics. Some argue monetary factors were important, but not through the money supply and money demand framework used by Friedman and Schwartz; for example, Bernanke (1995) focuses on disruptions to the bank intermediation channel and Eichengreen (1995) emphasizes international

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[6] Warburton was an economist at the newly established Federal Deposit Insurance Corporation in 1934 and wrote a series of papers through the early 1950s blaming the Federal Reserve for the deflation and depression of the 1930s. Many of his more important papers are reprinted in Warburton (1966). Cargill (1979) provides a review of Warburton's work.

financial channels. In contrast, Temin (1976) minimizes monetary factors and argues that even if the Federal Reserve had adopted a more expansionary policy the course of events would have been little affected.

It has been almost four decades since Friedman and Schwartz published their challenge to the Federal Reserve view. Their major thesis stands for all practical purposes. Whaples (1995) provides some notion of the consensus on Friedman and Schwartz. Whaples surveyed a sample of economic historians and economists on a number of questions concerning economic history:

> "Through the contractionary period of the Great Depression, the Federal Reserve had ample powers to cut short the process of monetary deflation and banking collapse. Proper action would have eased the severity of the contraction and very likely would have brought it to an end at a much earlier date." (Whaples, 1995, p. 1453).

Thirty-one percent of the historians and thirty-two percent of the economists agreed with the statement while another forty-seven percent of the historians and forty-three percent of the economists agreed with provisos. Thus, only twenty-two percent of the historians and twenty-five percent of the economists disagreed with the statement[7].

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[7] Despite this consensus on a critical event in economic history, Cargill and Mayer (1999) found that a sample of major U.S. history textbooks ignored this finding. The textbooks attributed the Great Depression to the stock market crash, underconsumption, and an unequal distribution of income. It is noteworthy that Governor Eccles, as head of the Federal Reserve System, testified before a Senate committee that the economic decline was a problem of "distribution" and advocated a "more equitable distribution of wealth" to increase spending as part of the solution. (Meltzer, forthcoming, chapter 6).

There is a need to understand the policy errors of the Federal Reserve in the 1930s beyond documenting the historical record. The Federal Reserve's experience provides important lessons to central bank policy in general. It emphasizes the need to prevent deflation, emphasizes the bias central banks may have toward preventing inflation than preventing deflation, and it emphasizes the tendency of central banks to understate their power to prevent deflation. It emphasizes the tendency of central banks to become constrained by technical considerations and concern over the quality of their balance sheets. It emphasizes the limits of legal independence and the need to ensure an institutional design that does not limit the central bank's willingness to take unprecedented action in unprecedented economic circumstances.

4.1 Federal Reserve Policy

The Federal Reserve was established in 1913 and achieved considerable recognition for handling war finance during the first world war, ensuring a short and stable transition to peacetime, and for providing a stable monetary environment to support sustained economic growth in the 1920s. The CPI index was virtually constant from 1921 to 1929. Friedman and Schwartz refer to the 1921-1929 period as the "high tide" of the Federal Reserve System.

The Federal Reserve regarded the economic collapse that started after August 1929 and accelerated in late 1930 as the result of nonmonetary forces and beyond the influence of central bank policy. In their view, the economy was paying for the excesses of the late 1920s and the deflation and output decline was needed to purge the economy of weak and inefficient firms. The large number of bank failures in 1930 resulted from

poor management and past excessive lending in speculative equity and land markets. The Federal Reserve also adopted the popular view at the time that the depression was the result of underconsumption due to an unequal distribution of income.

The Federal Reserve's stance was that it did everything possible during the Great Contraction period to reverse the decline. It stood ready to discount eligible paper presented by member banks and the discount rate was lowered from 6 percent in early 1930 to 0.50 percent in the first part of 1931. The only departure from a policy of ease occurred when the discount rate was raised in response to Britain's abandonment of the gold standard September 1931. The Federal Reserve argued it was constrained by the real-bills doctrine embedded in the Federal Reserve Act from making more loans to member banks because there was no legitimate demand for bank credit. The Federal Reserve further argued that it was unable to conduct open market operations in any significant scale because of the "free gold problem"[8].

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[8] The Federal Reserve Act required a 40 percent reserve of gold behind Federal Reserve notes and 60 percent of either eligible paper or gold. The Federal Reserve did not possess sufficient eligible paper to meet the 60 percent reserve requirement, and as a result additional gold in excess of the 40 percent reserve had to be devoted to the note requirement. Free gold equaled total gold reserves less the amount devoted to meeting the legal reserve requirement for notes. The amount of eligible paper declined as the economy declined and outstanding Federal Reserve notes increased because of deposit withdrawals from banks and consequently, the System's stock of free gold declined. The Federal Reserve argued that if it conducted open market operations, the reserves would have been used to reduce outstanding debt to the System and thus reduce free gold even further because the reserves would be used to pay off loans rather than lend to the general public.

Friedman and Schwartz (1963, pp. 399-406) effectively show that the free gold problem was not a serious constraint, but only came into prominence as a constraint as the Federal Reserve in later years justified its actions during the early 1930s in such places as Goldenweiser (1951)

After March 1933, the economy recovered and entered an expansion phase. Real GDP and nominal GDP increased by 8.0 and 8.4 percent in 1934, respectively. Despite this rapid growth, real GDP had not yet achieved its 1929 level by 1937. In addition, the unemployment rate remained at about 20 percent and investment spending did not recover. The Federal Reserve adopted a passive policy after 1933. The money supply expanded in response to banking reforms that increased the public's deposit-currency ratio, especially the establishment of Federal Deposit Insurance, and in response to significant inflows of gold because of devaluation and capital flight from Europe.

The Federal Reserve did change policy in 1937 in response to increasing levels of excess reserves held by the banking system and their concern that this reduced the ability to control the amount of bank credit. The Federal Reserve regarded the high levels of excess reserves as proof that more aggressive monetary policy would merely be pushing on a string. As a result, the Federal Reserve doubled reserve requirements on demand and time deposits for all banks from August 15, 1936 to May 1, 1937. In response to the Federal Reserve's action, the economy experienced a sharp recession and banks actually increased the level of excess reserves by the end of 1938 (Meltzer, Chapter 6). The reserve requirement change, however, was not the only influence on the money supply since the Treasury's gold-sterilization program 1937 and 1938 contributed to the monetary contraction.

The economy recovered with a rapid increase in the growth of money after June 1938 and while the Federal Reserve reduced reserve requirements and the discount rate in 1938, the inflow of gold from Europe was the primary source of monetary and hence, economic expansion.

4.2 Failure of Federal Reserve Policy

Why did the Federal Reserve fail to conduct easy monetary policy and prevent the rapid decline in prices and real economic activity? There are several perspectives on this question, many of which have been addressed by Warburton, Friedman and Schwartz, and Meltzer.

First, the Federal Reserve failed to appreciate the effects of its policies on the money supply and the price level. Real and nominal demand fell sharply after 1929 in response to the decline in the money supply. The decline in the price level from 1929 to 1933 had major adverse effects on the economy by increasing the real burden of debt and depreciating the value of assets. The Federal Reserve conducted policy almost entirely in terms of the discount rate and associated monetary ease or restriction with the absolute level of the discount rate and other short-term interest rates. Yet real rates increased steadily as deflation accelerated.

This point cannot be overemphasized. The Federal Reserve paid virtually no attention to the money supply during the entire decade. Friedman and Schwartz (1963, p. 523) could find only one reference to the money supply in their review of discussions between 1930 and 1940 at the Federal Reserve Bank of New York's directors' meetings, as recorded in the Harrison papers.

This conclusion is verified in a letter written by Irving Fisher to Warburton in 1946. The letter refers to Fisher's inside experience with the Federal Reserve during the

1930 (Cargill, 1992)[9], and is of historical importance because it provides insight into the actual Federal Reserve thinking as recounted by a major economist of the day.

Fisher recounts to Warburton an incident in 1931 when he called on Eugene Meyer, chair of the Federal Reserve Board that clearly shows a lack of interest in the money supply.

> "I said: 'I am getting alarmed to see demand deposits diminish. It seems to me this may make great trouble.'
>
> He said: 'What did you call the figure?'
>
> Amazed, I said: 'The full name is individual deposits subject to check without notice.'
>
> He range a bell and asked his assistant to bring in the last controller's report open to the page where the figures were given for individual deposits subject to check without notice. In a few minutes the report came in and I pointed and said: 'You see that during the last several call dates there has been a continuous reduction.' He said, 'Yes, I see it.'
>
> Of course his main object should have been to see it all along and long before his attention was called to it."

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[9] Friedman and Schwartz were unaware of the letter when they wrote A Monetary History of the United States: 1867-1960 and in private correspondence with the author, Friedman indicated that had they been aware of the letter, it would have been cited in their study.

Second, the Federal Reserve was clearly aware of the decline in the price level, but did not place as high a priority on preventing deflation as they did on preventing inflation and had an asymmetrical view of their ability to prevent either. Even at the time the Federal Reserve Act was being drafted there was opposition to including any type of price level responsibility. There were several efforts during the 1930s, which the Federal Reserve opposed, to require the Federal Reserve to raise the price level to pre-1929 levels. Price stability was thus not a specific mandate in the Federal Reserve Act and in the view of the Federal Reserve, it was more important to adhere to the real bills doctrine and assume that prices would adjust accordingly. Not only was the Federal Reserve resistant to any type of price level or inflation targeting, documents suggest that the Federal Reserve confused the general price level with specific prices (Meltzer, forthcoming, chapter 6) on occasion.

This point is emphasized in Fisher's letter.

> "So you see I quite agree with you as to the fact that those who have been running the system had more power than they would admit or realize and did not understand what they were doing concerning the price level. Many of them do not know there is a distinction between a price level and a price."

Third, the Federal Reserve focused on legal and technical issues as excuses for more aggressive action, while possessing adequate powers to reverse the monetary decline at any point. The Federal Reserve Act provided the authority to purchase

government securities. In hindsight, none of the technical issues presented a serious challenge if the Federal Reserve was intent on aggressive lender of last resort policy and expanding the money supply. These were ex-post excuses for policy inaction attributable to other factors.

Fourth, the lack of any specific mandate such as price stability, made it difficult to hold the Federal Reserve accountable and permitted the Federal Reserve to pursue other agendas contrary to providing a stable financial and monetary framework. The adverse effect of the absence of explicit policy goals and/or targets is evident in the events related to policies advocated by Benjamin Strong, head of the Federal Reserve Bank of New York. Monetary policy outcomes in the late 1920s and early 1930s may have been influenced by personality clashes and disputes over turf.

Strong argued for aggressive open market operations to prevent a monetary collapse and made it clear that he would go against the Federal Reserve System if necessary to prevent such a collapse (Friedman and Schwartz, 1963, p. 412). His views were not welcomed by other Federal Reserve officials and his death in October 1928 left a power vacuum and his policies were not implemented. George Harrison, who replaced him as head of the New York Federal Reserve Bank, and his technical advisors, Carl Snyder in particular, did not have the strength to push the concept of expansionary policy on the Board. In addition, the Board and other Federal Reserve Banks had developed a dislike to Strong, which biased them against an objective analysis of his policies. According to Fisher's letter:

> "I have always believe that had Governor Strong lived, we would not have had the tragic depression following the stock market crash in 1929 or so big a crash to start with…The trouble was that those who understood these policies did not have the personalities or perhaps the courage to play the dominating part which Strong had played. He had sometimes gone down to Washington and routed members of the Federal Reserve Board out of their beds to get them to do what he wanted. They did not like being bossed by their underlings and doubtless when he died such a resentment prevented the continuation of Strong's work. Strong, before he died, told me he nearly resigned from resentment because when he was away in Europe, the Federal Reserve Board summarily dismissed or dissolved the informal and unofficial open-market committee which he had created for stabilization purposes…and immediately reconstituted the same committee officially as a committee of the Federal Reserve Board and responsible to it."

Fifth, the legal independence of the Federal Reserve may have constrained its willingness to expand the money supply in subtle ways. The Federal Reserve was under intense pressure to take a more aggressive stance to inflate the economy. Large-scale purchases of government securities would have been viewed by the Federal Reserve as an abandonment of its independence. Adoption of policies recommended by Congress and the administration might be viewed as inconsistent with the independence of the Federal Reserve. Open market purchases would be viewed as supporting the administration's

aggressive use of fiscal policies. Concerns about legal independence provided an incentive for the Federal Reserve to use the technical "free gold" problem as an excuse for not pursing aggressive open market operations. Friedman and Schwartz, however, rebuttal the Federal Reserve's use of the "free gold" argument, but an additional point can be added. If in fact the Federal Reserve really viewed it as a serious constraint, the Federal Reserve could have gone to the administration and/or Congress and easily have achieved revision of the Federal Reserve Act to change reserve requirements on Federal Reserve notes. Fear that such an action would make the Federal Reserve appear dependent on the government may have been a constraint.

The irony was that the Federal Reserve for all practical purposes became de facto dependent on the government. After 1933, the Federal Reserve became passive in the face of Treasury actions to increase the price level (not sterilizing gold inflows encourage by devaluation) and after W.W. II, the Federal Reserve, was required to support prices of government securities until 1953.

Sixth, the Federal Reserve was excessively concerned about the quality of its balance sheet as well as technical and legal limitations to more aggressive action. Adherence to the real bills doctrine was frequently cited as a constraint; however, even after the real bills constraint was removed, the Federal Reserve did not expand credit. The Federal Reserve consistently emphasized credit quality concerns. The decision to raise reserve requirements in 1937 was based on the view that the excess reserves were undesired and reflected the lack of quality credit demand by the public. Monetary growth after 1933 was almost entirely the result of administration policy and events in Europe that resulted in gold inflows and expanded the monetary base and money supply.

4.3 What Was the Appropriate Policy?

The evidence is clear that Federal Reserve policies during the Great Depression, especially during the critical Great Contraction phase, were inappropriate in two respects.

First, the Federal Reserve should have aggressively injected reserves via its lender of last resort function to reverse the bank runs. Instead, the currency-deposit ratio increased significantly and combined with a decline in the monetary base, contributed to a 25 percent decline in the money supply from 1929 to 1933 and associated declines in the price level.

Second, the Federal Reserve should have provided whatever liquidity was needed to reverse the rapid fall in prices after 1929. It had the power to prevent the money supply from declining and there is no evidence that past relationships between money and prices had disappeared in the 1930s. The rising real value of debt caused widespread bankruptcies, which in turn deteriorated the quality of bank balance sheets and contributed to the collapse of the banking system. The deflation also raised the real hourly wage rate since nominal wages fell less than prices.

Support that these policies would have been appropriate comes from two then-contemporary experiences that provide the basis for a counterfactual scenario of how events might have unfolded in the United States had the Federal Reserve pursued a expansionary policy to end deflation in the early stages of the decline. Sweden and to a lesser extent, Japan provide counterexamples to the policies followed in the United States. Sweden and Japan's experience in the 1930s have been investigated by Berg and Jonung (1999) and Patrick (1975), respectively.

Sweden is the most important of the two cases because Sweden's central bank explicitly adopted an inflation target, adapted policy to achieve the target, and achieved identifiable policy outcomes. In addition, Sweden attracted the attention of Fisher, who ended his letter to Warburton by referring to Sweden as an example of how monetary policy should have been conducted in the United States during the 1930s.

> "It is interesting to note that Sweden sent representatives over to learn from Strong the use of the open-market operation for stabilizing the price level and they officially adopted it, with success, in Sweden …"

5. Historical Case Studies: Sweden and Japan[10]

Swedish Price-Level Targeting in the 1930s: The evidence is clear that had the Federal Reserve pursued an inflation policy rather than permit deflation, the economy would have positively responded and the course of the Great Depression would be much different than what actually occurred. Even at the time, there was evidence that an inflation policy would have had a positive effect on the economy. The response of output to the open market operations conducted by the Federal Reserve in 1932 supports this view. More important, the then-current response of Sweden's economy to dramatically different policies followed by the Riksbank, suggest that had the Federal Reserve focused on price stability the course of the depression would have been much different.

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[10] This section is taken from Cargill, Hutchison, and Ito (2000), which in turn, draws directly from Berg and Jonung (1999) and Patrick (1971) for the Swedish and Japanese case studies, respectively.

In contrast to the United States, Sweden left the gold standard in the fall of 1931 and adopted an explicit price level target (Berg and Jonung, 1998). This policy response came at the onset of the Great Depression with the objective of stopping price deflation unlike in the United States, when the Federal Reserve raised the discount rate in 1931 to maintain the gold standard and exasperated the decline in the price level. Abandonment of the gold standard was a signal that the government was not prepared to allow deflation and the price-level targeting framework was a signal that the government would not permit inflation to mitigate concerns that abandonment of the gold standard would eventually lead to rising prices.

Swedish consumer prices had been falling gradually, and wholesale prices sharply, since late 1928 as the workings of the inter-war gold standard transmitted deflationary pressures to Sweden. Industrial production declined by 21 percent during 1929-31 (compared to a fall of 46 percent in the United States during this period), and unemployment rose sharply. Against this background, the Swedish Minister of Finance announced in September 1931 the Riksbank was relieved of its legal obligation to convert domestic currency notes into gold upon demand and given the new objective of preserving the purchasing power of the domestic currency.

Berg and Jonung present evidence that Swedish policymakers at the time believed that an institutional commitment to price stability could act as a coordinating device and anchor expectations. To this end, key features of the program included a clear and transparent objective, communicated to the public through several channels. The Riksbank published a consumer price index as part of its monetary program but also relied on other price indices. The central bank's concern was also "underlying inflation,"

in that it emphasized the need to disregard temporary factors like seasonal effects and customs duties in evaluating the price level. The Swedish Parliament and its Banking Committee supervised and monitored the Riksbank's activities and issued regular reports. The Governor of the Riksbank was questioned annually by the Banking Committee and monitoring of the central bank was an open political process known to the public. In addition to annual examinations by the Banking Committee, two major evaluations of the Riksbank's price-targeting program were conducted in 1933 and 1937.

Sweden's price-targeting program in the 1930s was modified as economic conditions worsened. No legal backing was given to the Swedish program and, although the price-stability objective was maintained, adjustments and additional goals were added by requests from the Parliament and Minister of Finance. In particular, in 1932 the original goals was adjusted as both import prices and domestic market prices were allowed to increase. The Riksbank was also asked to keep interest rates as low as possible and to link monetary policy with fiscal policy measures to combat unemployment.

By most measures, price-level targeting in Sweden in the 1930s was an effective way to stop price deflation and mitigate the depression. CPI and WPI movements followed similar patterns, but the WPI was much more extreme. The CPI declined between 1928 and 1932-33 and then turned upwards. The WPI fell sharply from January 1928 to September 1931 and then remained roughly constant, with minor decline, until spring 1933. The WPI then began a gradual rise until 1937.

The depression in Sweden did not abruptly stop with the introduction of price-level targeting, but the output declines appear to have been mitigated and recovery enhanced by the monetary program. Swedish unemployment rose sharply in 1930-31 and

then drifted upward slightly until peaking at over 30 percent in spring 1933. Unemployment then began to fall, reaching a 15 percent level by 1937. Industrial production reached a low point in mid-1932, declining roughly 20 percent from the 1928 level. By the end of 1933, however, Swedish industrial production had recovered to the 1928 level and climbed an additional 28 percent by the end of 1934. Industrial production in the United States, by contrast, fell by almost 50 percent at its trough in 1932 and did not reach the 1928 production level again until the end of 1936.

Japan in the 1930s: Japan's experience during the worldwide depression of the 1930s was generally favorable once its temporary return to the gold standard was abandoned. The new Japanese government in July 1929 announced the decision to return to the gold standard, at the prewar par value, at the earliest possible date. Since Japan's wholesale price level was substantially above (by 65%) the prewar level and higher than that in the United States and England, a deflation was likely. Austere fiscal measures and somewhat restrictive monetary policy were adopted to reduce prices, but in early 1930, the world-wide depression and its effects on Japanese exports, resulted in output declines and rapid deflation. The continued loss of reserves forced Japan in December 1931 to abandon the gold standard.

Patrick (1971) describes what followed Japan's decision to leave the gold standard as "…one of the most successful combinations of fiscal, monetary, and foreign exchange rate policies, in an adverse international environment, that the world has ever seen." (p 256). Without the external constraint (fixed exchange rate), large-scale deficit financing and an easy monetary policy were implemented and capital controls were imposed to insulate the domestic economy. From 1931 to 1933, government spending

rose twenty-six percent and net domestic product increased at a comparable rate. Expansionary fiscal policy accommodated by monetary policy, together with exchange rate depreciation and capital controls, generated a boom in domestic demand, encouraged exports and discouraged imports. The economy once again started to grow quickly.

Most of the rise in government spending was deficit financed and, from 1932 on, the Bank of Japan underwrote the government's bond issues. It purchased outright that portion that not subscribed by the Ministry of Finance Deposit Bureau. Patrick (1971) explains how government deficit-financed spending resulted in an increase in commercial bank deposits. Banks were eager to purchase government bonds from the Bank of Japan since private lending was so limited and accounting changes were introduced that made it easier for private banks to purchase government bonds.

Japan's decision to leave the gold standard and pursue expansionary fiscal and monetary policy allowed the economy to expand vigorously through most of the 1930s. There was no commitment to price level targeting as in Sweden. But allowing the exchange rate to depreciate effectively stopped domestic deflation. After falling about 30 percent in 1930-31, wholesales prices rose 28 percent in Japan over the next two years (1932-33). As pointed out by Patrick, the expansion was the outcome of a mix of policies, including expansionary monetary policy.

The success of Japan's economic stabilization policy, however, was short lived. The inflation rate accelerated after 1935 in response to monetization of government deficits. The CPI index increased by 20.9 percent from 1935 to 1938. This might be viewed as a negative outcome of the inflationary policy in the first part of the 1930s in the since that the expansionary policies of the central bank reduced government discipline

even after the economy recovered once the government became accustomed to high rates of liquidity growth. In this regard, the Swedish case suggests that an explicit inflation policy may need to be accompanied by an institutional constraint or limit, such as an explicit inflation or price target, to ensure that the expansionary policy does not end up generating high rates of inflation once recovery is achieved.

In any event, the rapid increase in government spending and monetization of government deficits in Japan in the second half of the 1930s were driven by intense war mobilization efforts. It may thus be difficult to argue that expansionary policy in the face of deflation would normally induce fiscal irresponsibility. The potential for fiscal irresponsibility does not deny the positive effects of the expansionary policy in stopping the deflation and initiating economic recovery. It only means that the inflationary policy may need to be accompanied by other considerations to prevent fiscal irresponsibility such as explicit rules limiting the ability of the central bank to purchase government bonds or central bank independence, or other institutional changes such as an inflation-target framework.

6. Implications for Bank of Japan Policy in the 1990s

The historical record suggests four implications for the current discussion over Bank of Japan policy.

Preventing Deflation is at Least as Important as Preventing Inflation: Central bank policy needs to be concerned with preventing deflation as well as with the traditional concern of preventing inflation. In fact, preventing deflation may be more important in the current environment with large amounts of nominal debt and the zero

floor on nominal interest rates. The willingness of the Federal Reserve to permit a sharp decline in the price level for a three-year period had drastic and negative consequences on the economy. In contrast, the Riksbank and the Bank of Japan followed much different policies designed to prevent deflation. The Swedish and Japanese economies did not experience the same degree of economic decline and started the recovery process sooner than in the United States in large part because of their success in reversing the deflation process. The price decline in Japan in the 1990s is not on the same par as the price declines in the United States, Japan, and Sweden in the 1930s, but nonetheless, the slow downward drift in prices in Japan has exasperated Japan's financial and economic distress. A more aggressive policy designed to generate a low but steady inflation rate, especially after 1995, would have been a preferable policy than that actually followed.

Legal Independence Has a Constraining Influence on Central Bank Policy in Certain Instances. Legal independence may not be sufficient to ensure price stability (prevent deflation as well as inflation) and under certain circumstances, may impede appropriate central bank policy. As stated in Cargill, Hutchison, and Ito (2000), central banks may find themselves in an "independence gap" in which concern with legal independence limits willingness to adopt new policies to deal with economic and financial distress. This phrase is reminiscent of an observation attributed to Samuelson that the Federal Reserve was a "prisoner of its independence"[11]. Samuelson's characterization offers an insight into the actions of the Federal Reserve in the 1930s. The Federal Reserve's reluctance to cooperate with the Treasury and resist open market operations were likely rooted in its concern with maintaining the appearance of

independence. Resistance to recommendations to adopt any type of inflation target such as discussed in Fisher's letter was also rooted in the Federal Reserve's concern with formal independence. In contrast, the willingness of the Bank of Japan and the Riksbank to adopt different policies required a more cooperative and less independent policy than acceptable to the Federal Reserve.

The Bank of Japan's current reluctance to engage in aggressive open market operations in government bonds may reflect similar attitudes of the Federal Reserve in the 1930s. The Bank of Japan dismisses this argument by emphasizing technical and balance sheet constraints to open market operations. Their argument is not without merit given the significant increase in government debt projected for the Japanese economy in the coming years (Rhee, 2000); however, the Bank of Japan did not object to the balance sheet problems generated by extensive loans to troubled financial institutions in the 1990s. The Bank of Japan would likely argue the two situations are different; that is, the social benefit of limiting systemic risk is greater than the cost of exposing the central bank to credit risk and thus, limiting systemic risk more than offsets a balance sheet problem. In contrast, the social cost of fiscal irresponsibility is so large that the Bank cannot afford to weaken its balance sheet. Nonetheless, the fact that aggressive open market operations would involve some cooperation with the government may reduce the Bank of Japan's enthusiasm for such a policy and thus, the independence "gap" argument has merit.

The rejection of an inflation-targeting framework may also be rooted in the same attitude. The Bank of Japan would not likely support such a framework aside from technical considerations. The Bank has been legally independent only since April 1, 1998

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[11] Mayer, 1990, p. 6.

and an inflation target would be viewed as a restriction on goal independence since it would require a more formal definition of price stability than contained in the Bank of Japan Law. In addition, revision of the Bank of Japan Law was the outcome of complex political maneuvering by the Ministry of Finance that had nothing to doing with correcting past Bank of Japan policy[12]. The Ministry found central bank independence a convenient way to divert attention from its failure to deal with the nonperforming loan problem.

Central Banks Have the Power to Prevent Deflation: Deflation like inflation is ultimately a monetary phenomenon and long-term downward price movements in the absence of clear and widespread shifts in productivity are the outcome of monetary policy decisions. Irrespective of technical arguments and balance sheet constraints raised by central banks, central banks possess the power to prevent long-term downward price movements. Econometric evidence (e.g., Meltzer, forthcoming) shows that the Federal Reserve had the power to stop or slow down the deflation process in the 1930s and the then-current experiences of Japan and Sweden show that the central banks had the power to stop the deflation process. Likewise, the Bank of Japan has the power to stop the slow downward drift in prices and maintain a low but positive inflation rate. The Bank of Japan is correct that further increases in liquidity through the banking system are not likely to be simulative, but open market operations would most likely increase aggregate demand and reverse the price trends exhibited in the 1990s.

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[12] Despite the political economy of central bank law reform in Japan, the Bank of Japan did achieve a significant increase in formal independence. See Cargill, Hutchison, and Ito (forthcoming) for a detailed discussion of the "old" and "new" Bank of Japan Law.

Benefits of an Inflation-Targeting Framework: Inflation targeting has been offered as an institutional reform designed to limit inflation; however, there is no inherent reason why an inflation-targeting regime would be any less successful in preventing deflation. As with Sweden in the early 1930s, the objective would be to provide a credible and transparent nominal anchor so that the private sector expected a low, but positive rate of inflation. While Japan in the 1930s did not adopt an inflation target, the end result was similar – the Bank of Japan adopted a policy of increasing the price level and rising inflationary expectations. In fact, the subsequent inflation in the second half of the 1930s might suggest that inflation targeting is a desirable approach to prevent both deflation and inflation. In contrast to either Japan or Sweden, the Federal Reserve failed to follow any type of inflation target and its policies generated expectations that it was prepared to allow a deflation process. As a result, the United States economy remained in serious recession much longer than either Sweden or Japan.

The Bank of Japan, with the exception of the early 1970s, achieved a low rate of inflation in the postwar period despite being one of the most formally dependent central banks in the world through 1998. For example, regressions between inflation and measures of central bank independence show that Japan's dependence ranking predicts inflation rates several times higher than Japan's actual inflation rate. Cargill, Hutchison, and Ito (1997), however, argue that the Bank of Japan, despite its formal dependence, had achieved a degree of de facto independence after 1975 and Cargill (1995a and 1995b) questions the reliability of the empirical studies linking inflation outcomes with measures of central bank independence. Irrespective of these issues, however, there is no doubt the Bank of Japan has operated with a low inflation policy target.

Thus, inflation targeting does not appear needed to achieve low inflation rates in Japan; however, it may be a method to prevent the type of price declines experienced in the 1990s. It would not be a panacea, however. Inflation targeting, for example, would have prevented the slow downward movement in prices in the 1990s, but it would not have prevented the excessively easy monetary policy followed in the second half of the 1980s since inflation was low during that period. This, however, is not an argument to reject inflation targeting, but only a caveat to emphasize that targeting would not eliminate all policy failures.

There are political economy considerations that inflation targeting may not be the best institutional change to recommend for the Bank of Japan at this time since significant institutional change was achieved only two years ago. Institutional change in that direction in the future, however, is worthy of consideration. Irrespective of the long-run benefits of further institutional change toward an inflation-targeting framework, the Bank of Japan has sufficient power and legal foundation to adopt a more aggressive anti-deflation policy without an explicit inflation-targeting framework. The new Bank of Japan Law clearly places responsibility on the Bank of Japan to maintain price stability. The Bank of Japan merely has to make clear to the public that price stability means preventing deflation and take appropriate steps in that direction such as open market operations in government bonds. History offers important lessons to the Bank of Japan in this regard. Failure to prevent deflation has serious consequences on the real economy and just as inflation is inherently a monetary phenomenon, deflation is an inherently monetary phenomenon. Central banks are faced with many constraints, but ultimately have the power to prevent deflation and rather than accept technical constraints as limits

to appropriate policy, central banks should find ways to work around these constraints even if it requires seeking new powers or cooperating more closely with the government. Concern with independence, however, may limit the willingness to seek such a solution and ultimately as in the case with the Federal Reserve, lead to a loss of independence.

7. Concluding Comment

There are significant differences between Japan and the situation faced by many countries in the 1930s; however, the similarities are also clear. The Bank of Japan has allowed a slow deflation process to continue. Combined with the large amount of nominal debt a more aggressive policy would have reduced the economic and financial distress that characterized the 1990s. The newly independent Bank of Japan has been open in defending its position, but on close examination, many of the arguments against more aggressive policy are reminiscent of the Federal Reserve in the 1930s. The Bank of Japan has resorted to technical constraints, concern with the quality of the their balance sheet, and concern with fiscal responsibility as arguments against more aggressive open market operations. Like the Federal Reserve, the Bank of Japan emphasizes the low interest rates and lack of legitimate demand for credit as evidence that more aggressive action is unwarranted. It is also clear that the Bank of Japan may be caught in an independence gap in the sense that the newly achieved legal independence provides an incentive for an overly conservative approach to preventing deflation. Ironically, such a policy could generate a loss in independence as evidenced by increased conflict between the Bank of Japan and the government in the summer of 2000 over the Bank of Japan's

apparent move to raise interest rates and depart from the zero-rate policy (Wall Street Journal, 2000).

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Table 1: Average CPI Inflation Rates in Industrial Countries, 1975:1 - 1999:3

	75:1 79:4	80:1 84:4	85:1 89:4	90:1 94:4	95:1 99:3
Germany	3.70	4.54	1.27	3.31	1.36
Switzerland	1.93	4.41	2.13	3.90	0.76
Austria	5.02	5.52	2.16	3.44	1.40
Denmark	9.94	9.49	4.34	2.08	2.10
United States	7.78	7.51	3.61	3.65	2.35
Canada	8.40	8.73	4.30	2.79	1.58
Ireland	13.12	14.99	3.72	2.68	1.92
Netherlands	5.96	5.05	0.70	2.83	2.05
Australia	10.72	9.02	7.82	3.05	1.97
Iceland	37.79	54.97	23.79	6.46	1.96
Sweden	9.74	10.27	5.62	5.79	0.75
Finland	10.59	9.73	4.91	3.21	1.04
United Kingdom	13.57	9.64	5.27	4.63	2.87
Italy	15.52	16.55	6.22	5.28	3.02
New Zealand	14.25	12.47	11.32	2.76	1.75
France	9.75	11.21	3.57	2.55	1.25
Spain	19.42	13.61	6.90	5.58	2.88
Norway	7.79	10.12	6.57	2.71	2.15
Belgium	6.31	7.41	2.40	2.85	1.44
Average	11.12	11.85	5.61	3.66	1.82
Japan	**6.38**	**3.92**	**1.15**	**2.01**	**0.49**

Note: Inflation rates are calculated in each quarter from the same quarter in the previous year based on OECD data for the CPI.

Table 2: U.S. Economic Performance in the 1930s

	Nominal GDP Level	Nominal GDP Change	GDP Deflator Level	GDP Deflator Change	Real GDP Level	Real GDP Change	CPI Level	CPI Change
1929	103.1		12.5		824.8		17.1	
1930	90.4	-12.3	12.1	-3.2	747.1	-9.4	16.7	-2.3
1931	75.8	-16.2	11.0	-9.1	689.1	-7.8	15.2	-9.0
1932	58.0	-23.5	9.7	-11.8	597.9	-13.2	13.7	-9.9
1933	55.6	-4.1	9.5	-2.1	585.3	-2.1	13	-5.1
1934	65.1	17.1	10.3	8.4	632.0	8.0	13.4	3.1
1935	72.3	11.1	10.6	2.9	682.1	7.9	13.7	2.2
1936	82.7	14.4	10.6	0.0	780.2	14.4	13.9	1.5
1937	90.8	9.8	11.2	5.7	810.7	3.9	14.4	3.6
1938	84.9	-6.5	10.9	-2.7	778.9	-3.9	14.1	-2.1
1939	90.8	6.9	10.8	-0.9	840.7	7.9	13.9	-1.4
1940	100.0	10.1	11.0	1.9	909.1	8.1	14	0.7

Based on data from the Economic Report of the President, Council of Economic Advisors, 1994 and Bureau of Labor Statistics, Department of Labor

Figure 1: Percentage Change in GDP Deflator from Same Quarter in Previous Year: 91:1-99:2