HAS INFLATION TARGETING BEEN EFFECTIVE?

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Abstract

Inflation targeting has been introduced and conducted in many countries. The number of countries implementing this policy has been increasing rapidly from the 1990s. The pros and cons of adopting this policy have been discussed recently. Generally, countries that have conducted inflation targeting have showed good economic performance. However, it should be noted that countries that have not conducted it have also showed such good performance in the 1990s. This paper has two purposes. One is to analyze why countries adopt inflation targeting. It shows that the openness of the economy, the central bank's independence, and the fiscal surplus correlate negatively with adopting inflation targeting. Past inflation is not a motivation for introducing inflation targeting. The other is to compare the targeting countries to non-targeting countries in inflation and output. It shows that inflation targeting countries have successfully introduced the policy from the view of reducing inflation rates and also reducing macroeconomic shocks. There is, however, plenty of room for discussion concerning the role of central banks. The one and common role of all central banks is to achieve stable and low inflation rate. However, no consensus has been reached regarding other roles, especially for economic growth or its stability.

1. INTRODUCTION

Since the 1990s, about thirty countries have adopted inflation targeting as their framework of conducting monetary policy. Countries that have adopted inflation targeting have generally showed good economic

performance, including low inflation and stable economic growth.

Price stability is one of the most important assignments for policy makers, especially those in central banks, regardless of whether or not inflation targeting is adopted. Several instruments, including inflation targeting, monetary targeting, and exchange rate targeting, are used to achieve price stability in many countries worldwide. Among these tools, inflation targeting has been used recently in many countries. This paper discusses why countries adopt inflation targeting and how countries have attained economic performance by introducing inflation targeting.

This paper answers these two questions "directly" as possible as I can. It is structured as follows; Section 2 explains the recent trend and innovation of inflation targeting. In section 3, theoretical view and empirical method, to examine why inflation targeting has introduced and how inflation targeting has contributed to inflation, are provided. Section 4 shows the empirical results and analyzes them. Finally, this paper ends with a brief summary.

2. WHAT IS INFLATION TARGETING?

In general, inflation targeting is a practice in which central banks publicly set the target rate for inflation; monetary policy is then carried out according to this target (Fountas, Karanasos, and Kim, 2002).

It has not been long since inflation targeting was first adopted as a monetary strategy. The United States has not adopted it yet, although the US Congress discussed it, especially in 2002. The Bank of Japan also does not have a policy of inflation targeting. The ECB does not admit the existence of inflation. However, inflation targeting might be substantially adopted.

In conducting inflation targeting, central banks are responsible for achieving a publicly announced objective for the inflation rate. Recently,

about thirty central banks all over the world adopted this framework for the conducting of monetary policy and these have proven to be effective means in most cases (Svensson and Woodford, 2005). Mishkin (2001) mentions that inflation targeting countries seem to have significantly reduced both the rate of inflation and inflation expectations beyond that which would likely have occurred in the absence of inflation targeting.

There is much merit in introducing inflation targeting besides that. First, the realization of the central bank's goal of price stability might not be judged accurately in the absence of clear standards. By introducing targeting, markets can judge the accomplishment of central banks accurately. Second, making the goals of the central banks clearer and making them more transparent guarantee accountability for the target and independence from the government. Third, this approach brings stability of the expected inflation rate. Targeting locks in expectations of low inflation, which reduces the inflationary impact of macroeconomic shocks (Svensson, 1997)[1]. Finally, inflation itself of countries that have introduced it has been reduced as mentioned before.

On the other hand, a lot of critical perspectives have been presented. First, as controlling inflation through money supply growth or exchange rate may be less effective, the credibility of a commitment to inflation targeting may be unstable. Second, if the market participants believe and credit the target, there would be some possibility that long-term interest rate rises largely, for example. Third, achieving the accomplishment of the targeting may be attained at the sacrifice of other important economic situations. Fourth, suitable inflation (CPI or PPI, for example) cannot be founded and decided easily either. Finally, from the 1990s, because market authorities have no effective measures against deflation, introducing inflation targeting under such situation would lose credibility for conducting policies. Moreover, there is no previous case in which a central bank introduced it under deflation.

3. THEORETICAL BACKGROUND AND EMPIRICAL METHOD

3.1 *Theoretical Background*

3.1.1 *Deterministic Elements of Inflation Targeting*

It is important to investigate whether structural differences exist between countries that are using inflation targeting and those pursuing other policy frameworks. To explore these potential differences, this paper uses a probit model in which the dependent variable is a dummy that uses the value of one for those countries that use inflation targeting and zero for those countries that do not. This paper's analysis uses four variables, shown below, to judge which factors affect the probability that inflation targeting policies are adopted.

Past inflation: Past inflation may have positive effects when adopting inflation targeting. It seems to be one of the incentives to introduce inflation targeting.

Openness of the economy: Inflation is affected by many factors from abroad and from within a nation. Countries that are affected by external factors may not see any merit in adopting inflation targeting. Also, if the real exchange rate depreciated, for example, the more open the economy is, the more harmful the depreciation would be, as an effect of rising import prices. In such a case, policy makers have a disincentive to allow inflation. For policy makers, it would be better if the inflation rate were more flexible. Making the rate of inflation flexible allows change in the exchange rate in a desirable direction. However, when the inflation rate is high, it is unclear whether or not this concept is applicable. The answer depends on the econometric analysis in this paper.

Central bank independence: Price stability is the ultimate goal of almost all the central banks. If inflation targeting is conducted under such circumstances, other strategies often arise because of political reasons. In

such cases, the independence of central banks may be compromised. In fact, this threat to independence is the reason that other measures instead of inflation targeting are used. The central bank independence variable functions as a negative coefficient in relation to inflation targeting.

Fiscal surplus: Inflation targeting is effective in maintaining fiscal discipline, which is considered to be important for economic growth. It is therefore assumed that a negative influence affects inflation targeting.

The equation estimates is as follows:

$$\text{Inflation Targeting} = \alpha\,\text{Past inflation} + \beta\,\text{Openness of the economy} + \gamma\,\text{Fiscal surplus} + \delta\,\text{Central Bank independence} + \varepsilon_t \quad (1)$$

3.1.2 *Effects of Inflation Targeting on Macro Economy*

As Rotemberg and Woodford (1997) and Svensson (1999) mentioned, the loss function of central banks can be expressed as follows (2):

$$L = (\pi_t - \pi^*)^2 + \lambda (y_t - y^*)^2 \quad (2)$$

π is an inflation rate, π^* is a targeting inflation rate, y is an output (log of GDP), y^* is a potential output (log of its value), and $(y_t - y^*)$ means GDP gap. Central banks would like to minimize this loss function.

π_t can be expressed as follows (3):

$$\pi_t = \pi^e_t + \rho (y_t - y^*) + \varepsilon_t \quad \rho > 0 \quad (3)$$

ε means an 'inflation shock' or some kinds of shock.

Private sectors form π^e without knowing its value ε, on the other hand, central banks can observe ε and after knowing it, they decide their monetary policy.

The most suitable inflation rate π^*_t is as follows (4):

$$\pi^{e}_{t} = [(1/(\rho^{2}+\lambda)][\rho^{2}\pi^{*}+\lambda(\pi^{e}_{t}+\varepsilon_{t})] \quad (4)$$

This model shows that central banks should know that the most suitable inflation rate is a weighted average of π^{*} and $\pi^{e}_{t}+\varepsilon_{t}$. The important thing is that the most suitable inflation rate contains not only the term π^{*}, but also the term $\pi^{e}_{t}+\varepsilon_{t}$. This paper takes into account this fact and performs empirical estimation.

This paper adopts a simple method to estimate the effect of inflation targeting. The regression equation is as the equation (5);

$$\text{Inflation} - \text{Inflation}_{\text{average}} = \alpha + \beta\,\text{Targeting} + \gamma\,\text{Inflation}_{\text{average}} + \varepsilon_{t} \quad (5)$$

where Inflation is a country's value of inflation rate in each period. $\text{Inflation}_{\text{average}}$ is an average inflation for the whole period. The term 'Targeting' is a dummy variable equal to 1 when the country adopts inflation targeting, otherwise 0. The coefficient β is meant to measure the effect of targeting on the left-side variable.

$\text{Inflation}_{\text{average}}$ is sometimes substantially different from the real value. Average inflation is sometimes higher for inflation targeting countries. A switch to targeting was the most attractive way for countries with poor performance. If inflation targeting countries are poor initial performances, they will improve more than non-targeting countries. Some such cases occur when inflation targeting does not affect performances[2].

For inflation, inflation persistence should also be noted. This paper uses a fourth-order autoregressive model, AR(4), for quarterly inflation. Using these average coefficients, impulse response functions which show the effects of inflation shocks on future inflation are also computed.

Output persistence is also calculated. The method is the same with inflation persistence.

3.2 *Data and Empirical Method*

For inflation rate, consumer price index (CPI) is used. The ratio of the amount of trade volume (export plus import) to the GDP is used for openness of the economy in the equation (1). Also in the equation, central bank's independence index is from Cukierman, Miller, and Neyapti (2002).

The sample period starts with all members of the OECD as of 1985 except Luxembourg. Fifteen of the OECD countries in the sample have adopted inflation targeting: Australia (1994:Q4), Canada (1992:Q1), Finland (1994:Q1), Hungary (2002:Q1), Iceland (2001:Q1), Korea (1998:Q1), Mexico (1999:Q1), New Zealand (1990:Q3), Norway (2001:Q1), Poland (1998:Q1), Spain (1994:Q1), Sweden (1993:Q1)[3], Switzerland (2000:Q1), Turkey (2003:Q1), and the United Kingdom (1993:Q1)[4]. For each country, this paper defines the beginning of targeting as the first full quarter in which a specific inflation target or target range was in effect, and the target had been announced publicly. This paper compares the inflation 'targeters' to the other 'non-targeters'. The sample period ends with the recent 2005Q4. Finally, All the data is I(0)[5].

4. RESULTS AND IMPLICATIONS

4.1 *Deterministic Elements of Inflation Targeting*

The result is almost as expected. The result of the equation (1) is as follows:

Inflation Targeting = -20.55 + 1.44Past inflation - 0.07Openness
(-28.92) (1.03) (-18.56)
- 1.89Central Bank independence - 2.82Fiscal surplus
(-3.45) (-6.05)
adj.R^2:0.60 F-statistic:144.18

The results show that the openness of the economy, the central bank's

independence, and the fiscal surplus correlate negatively with adopting inflation targeting.

The coefficient of past inflation is positive as expected. However, it is not significant. Recently, as inflation rate all over the world has not been high, it may not be a strong incentive to introduce inflation targeting especially for OECD countries. The coefficient of openness of the economy against inflation targeting is negative and significant. Economic activity has been globalizing and its effect appears on the result. The independence of central banks exerts a negative influence on adopting inflation targeting. The coefficient of fiscal surplus is also negative, as expected.

4.2 *Outcome of adopting inflation targeting*

Is the outcome of adopting inflation targeting effective? The results are interesting and contain some important information. The result of the equation (5) is as follows:

$$\text{Inflation} - \text{Inflation}_{\text{average}} = \underset{(1.28)}{0.24} - \underset{(-7.80)}{1.04}\ \text{Targeting} + \underset{(3.13)}{0.13}\ \text{Inflation}_{\text{average}}$$

adj.R^2: 0.59 F-statistic: 115.78

The result is clear. The regression shows that the inflation targeting effect is negative and statistically significant. This is a positive finding about inflation targeting. Inflation targeting has not been introduced for past inflation rate, however, it reduces inflation rate. This result tells us that not only inflation rate itself but also other factors should be noticed.

The persistence of inflation movements is analyzed through the AR model. Using the AR model, I have computed impulse response functions for targeting and non-targeting countries. The results are in Figure 1a (targeting case) and 1b (non-targeting case). It is also clear that the inflation persistence has decreased over time for both cases, but it disappears larger in the short run in the case of inflation targeting countries.

This paper's purpose is to investigate the effect of inflation targeting

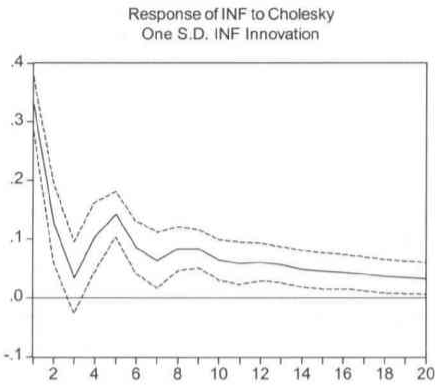

Figure 1a Inflation Persistence: Targeting Countries

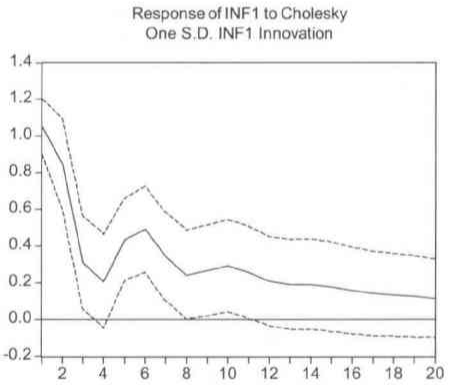

Figure 1b Inflation Persistence: Non-Targeting Countries

on inflation. However, the persistence of output is also examined. Some central banks see not only the stability of inflation rate but also output. As the equation (5) shows, the error term plays an important factor in determining its adequate inflation rate. The results are in Figure 2a (targeting case) and 2b (non-targeting case).

The results are clear. In inflation targeting countries persistence have

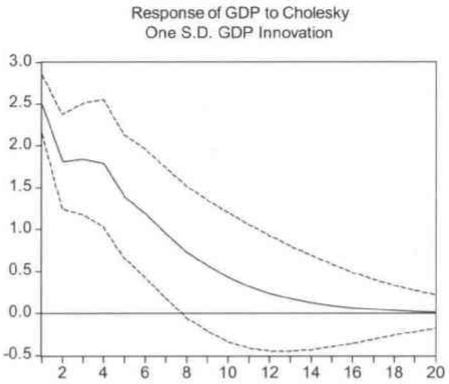

Figure 2a Output Persistence: Targeting Countries

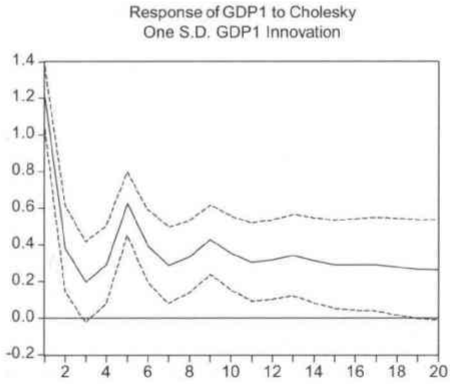

Figure 2b Output Persistence: Non-Targeting Countries

decreased more smoothly. They show better performance than non-targeting countries ones.

Finally, standard deviation of inflation rate and standard deviation of growth rate for targeting countries and non-targeting countries are calculated. Table 1 (inflation rate) and Table 2 (growth rate) are the results.

Table 1 Standard Deviation of Inflation Rate

	Before	After
Inflation targeting countries	3.54	1.80
Non- Inflation targeting countries	2.23	

Table 2 Standard Deviation of Annual Growth Rate

	Before	After
Inflation targeting countries	2.97	1.66
Non-Inflation targeting countries	1.44	

The results are not very clear. However, we can say that targeting countries have achieved good macroeconomic performance in general.

5. CONCLUSIONS

The present analysis confirmed that the openness of the economy, independence of the central bank, and fiscal surplus are negative factors in inflation targeting. However, past inflation is not a factor in introducing inflation targeting.

The 1990s were amazing in many ways. Not only the internet and cellular phones came into use but also economic conditions improved greatly all over the world (except in Japan). Growth was higher, inflation was lower, and both were stable. The situation may have occurred the results that inflation rate has not affected the deterministic elements of introducing inflation targeting.

This paper also showed that targeting countries have successfully introduced it from the view of reducing inflation rates and also reducing economic shocks. However, whether the targeting improves a country's economic performance as a whole or not is a different issue. Growth, for

example, is a typical case. Interest rates, exchange rates, stock prices, and their variability are sometimes important factors in determining economic performance and welfare. Much further research is needed for inflation targeting.

A theoretical analysis is necessary, especially from the point of view of "policy rule." Walsh (1998), Cecchetti (2000), Mishkin (2001), and Svensson (2002) provide examples. Kurihara (2003) also highlighted the Taylor Rule as a possibility. However, I want to deal with this on another occasion.

Notes

1. King (2002) showed that not only inflation rate but also its standard deviation has been more stable in recent decades in the case of the U.K. See, also Bernanke et al. (1999).
2. The error term, specific to country, is correlated with the dummy variable Targeting, however, this correlation works through the effect of the error term on Inflationaverage.
3. Sweden announced its shift on January 1993 that it aimed to limit the annual increase in the CPI from 1995 onwards to 2 percent.
4. Most countries in Europe were part of European Monetary System (EMS), and their monetary policies focused on meeting convergence criteria, including inflation rates and fixing exchange rates. However, some countries followed policies based on money supply targets.
5. ADF test for unit root test was performed for all the variables (rates). They are significant at least 5% level.

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