

Adoption of Inflation Targeting: Impact on the Stability of Financial Markets

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Recently, inflation targeting has been adopted in many countries and the number of the adoption countries has been increasing since the beginning of the 1990s. The pros and cons of this policy have been discussed a lot as deflation has had a negative impact on economies, especially developed ones; however, almost all of the studies have focused on inflation rate or economic growth. This paper examines whether or not adoption of inflation targeting has contributed to financial stability. Empirical results show that adoption of inflation targeting has promoted the stability of financial markets; however, it has not promoted the evaluation of central banks.

JEL Classifications: F33; E58

Keywords: central bank; financial market stability; inflation targeting; monetary policy

1. Introduction

Since the beginning of the 1990s, many countries have adopted inflation targeting as their central banks' policy framework for the conduct of monetary policy. It has been said that countries that have adopted inflation targeting have gained good economic performance, including low inflation and stable economic

growth (Kurihara, 2012; Cespedes et al., 2014).

Price stability is one of the most important issues for economic policymakers, especially those in central banks. Inflation targeting received much attention from researchers as this approach is related to price stability both directly and strongly. Other targeting or instruments, including monetary targeting and exchange rate targeting, are employed to achieve price stability in many countries. Among these instruments, inflation targeting has been used most often, especially in recent years.

The increased focus on inflation stabilization might have contributed to the reduction of inflation rates from the high rates experienced in the 1970s and 1980s, especially in developing countries. However, the situation has changed since the beginning of 2000s. Deflation in some developed countries has become a serious issue. Worldwide financial shocks hit the world economy and infected many countries. Policymakers have tried to combat the situation; however, most developed countries suffered deflation and recession despite aggressive monetary and fiscal policy. In February, 1999, the Bank of Japan (BOJ), the Japanese central bank, adopted the zero interest rate policy, which was unprecedented all over the world, to combat deflationary pressure and to boost the economy. In 2000, after a long trial under the zero interest rate policy in Japan, the policy was rescinded, as the economic situation displayed signs of recovery. However, as Japan did not recover completely, the BOJ changed its stance and conducted a more drastic monetary policy: quantitative monetary easing. In the United States, the Federal Reserve Bank's (FRB's) first quantitative easing, which began in 2008 and ended in the first quarter of 2010, consisted of purchases of agency debt, agency mortgage-backed securities, and longer term treasury securities. The FRB made the decision to purchase treasury securities commonly known as QE2. Moreover, QE3 was announced in 2012. The FRB decided to start open-ended bond purchases of mortgage-backed securities. Later, the FRB announced that it would likely maintain the federal funds rate near zero at least through 2015. However, the FRB started to raise the interest rate as it judged that serious recession has ended. On the other hand, recession in developing countries has negatively impacted the world economy. The recession in some newly industrializing economies, including oil-exporting countries, began to hit the world economies. In such situations, inflation targeting,

instead of decreased inflation rates, has been used to combat the recession.

In general, inflation targeting is a policy by which central banks set the target rate publicly for inflation; monetary policy is then carried out according to this target (Fountas et al., 2002; Kurihara, 2003). In the past, this framework has been used to combat high inflation rate; however, this policy has begun to be employed to combat deflation and recession.

With inflation targeting, central banks are responsible for the achievement of a publicly announced objective for the inflation rate. Recently, about 30 central banks all over the world adopted this framework for the conduct of monetary policy, which has proven effective in most cases (Svensson and Woodford, 2005). Mishkin (2001) noted that countries that conduct inflation targeting have achieved a significant reduction in both the rate of inflation and inflation expectations beyond that which would likely have occurred in the absence of inflation targeting. Recently, Abo-Zaid and Tuzemen (2012), de Mendonça and Souza (2012), O'Sullivan and Tomljanovich (2012), Tas (2012), Willard (2012), Tolulope and Ajilore (2013), and Berument and Froyen (2015) showed that inflation targeting helps to attain lower inflation volatility.

Other positive effects can be obtained from the introduction of inflation targeting. 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 inflation targeting, market participants can judge the performance of central banks. Second, clarification and increased transparency of central banks' goals guarantees accountability for the target and independence from the government for financial market participants. Third, this approach confers stability of the expected inflation rate (de Mendonça and Souza, 2012; Baxa et al., 2014; Siddig and Grethe, 2014; Creel and Hubert, 2015). Targeting locks in expectations of low inflation, which reduces the inflationary effects of macroeconomic shocks (Svensson, 1997; Mishra and Mishra, 2012).

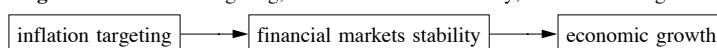
On the other hand, the research includes many critical views of inflation targeting. First, because the control of inflation using money stock or exchange rate may be less effective, trust in a commitment to inflation targeting may be unstable. Second, if market participants believe and credit the target, there is some possibility

of increases in long-term interest rates and resultant dampening of economic growth, for example. Third, targeting may be attained at the sacrifice of other important economic factors. Fourth, suitable inflation (e.g., CPI or PPI) cannot be easily decided. For example, Kelikume and Evans (2015) showed that inflation targeting is less desirable than exchange rate targeting. Ginindza and Maasoumi (2013) showed positive and negative effects on reduction in variability as a result of inflation targeting. Ayisi (2013) and Carrasco and Ferreiro (2013) showed that there are no significant effects on economic growth from inflation targeting. In general, the effects of inflation seem unclear in developing countries (see, for example, Petreski, 2012).

This paper examines whether or not adoption of inflation targeting has contributed to financial stability. Some recent papers have discussed the effectiveness of inflation targeting from the perspective of realized inflation rate or economic growth. However, few papers have examined the relationship between inflation targeting and financial stability. Although the theme seems to be narrow, *a black box* exists in the relationship between inflation targeting and inflation (volatility) or the relationship between inflation targeting and economic growth. There is some possibility that some important factors exist that link inflation targeting and economic growth. Financial market stability is one of the candidates as shown in **Figure 1**.

Section 2 presents a theoretical view and an empirical method for the examination of the relationship. Section 3 shows the empirical results and analyzes them. Finally, this paper ends with a brief summary.

Figure 1. Inflation targeting, financial markets stability, and economic growth



2. Theoretical Background and Empirical Method

2.1. Theoretical background

Many studies have evaluated inflation targeting since the adoption of this policy

in some countries. Much dispute has occurred since then. Akdoan (2012) showed that central banks could have a stronger bias toward overshooting rather than undershooting the inflation target. Salle et al. (2013) found that the credibility of central bank's inflation targeting promotes macroeconomic stabilization. Alpanda and Honig (2014) showed large effects in emerging economies with low central bank independence. Ayres et al. (2014) indicated that inflation targeting reduces inflation without impacting GDP. Neuenkirch and Tillmann (2014) showed that deterioration in credibility (*ceteris paribus*) forces central banks to undertake larger interest rate steps. Poon and Lee (2014) found that inflation targeting countries experience lower exchange rate volatility in ASEAN. Samarina and de Hann (2014) found that factors that lead to the adoption of inflation targeting differ between OECD and non-OECD countries.

This paper investigates whether inflation targeting boosts financial markets stability and what other factors influence the stability of financial markets. This analysis uses four variables, shown below, to judge which factors affect financial market stability:

- *Inflation targeting*: The adoption of inflation targeting may have positive correlation with financial markets stability and seems to be one of the incentives to introduce inflation targeting (see, e.g., Bleich et al., 2012).
- *Openness of the economy*: It may be that high openness of the economy causes instability of financial markets (see, e.g., de Mondonca and da Silva, 2014). However, influences from abroad sometimes absorb serious shocks of the country. The econometric analysis in this paper may provide an answer.
- *Fiscal debt*: It is assumed that negative influences affect the stability of financial markets (see, e.g., Lucotte, 2013; Kadria and Ben, 2014; Minea and Tapsoba, 2014; Schabert and Van Wijnbergen, 2014).
- *Exchange rate stability*: Exchange rate direction influences different outcomes in each economy; however, this stability is important to the stability of financial markets as a whole (see, e.g., Pontines and Siregar, 2012; Kim, 2014).

The equation is estimated is as follows:

$$\begin{aligned} \text{Financial markets stability} = & \alpha \text{Inflation targeting} + \beta \text{Openness of the economy} \\ & + \gamma \text{Fiscal debt} + \eta \text{Exchange rate stability} \end{aligned} \quad (1)$$

2.2. Data and empirical method

This study uses interest rate spread for financial market stability, which is the dependent variable. Four variables are used as independent variables. First is whether or not the country has adopted inflation targeting (1 or 0). Second, the ratio of the amount of trade volume (export plus import) to the GDP is used for openness of the economy. Third, the ratio of fiscal debt to GDP is used. Finally, exchange rate stability indicates the variability of each currency to SDR. All of the data are from IMD (World Competitiveness Yearbook 2015).

The sample includes all members of the IMD's list for 1996 through 2014. Sixty-five countries in the sample have adopted inflation targeting; however, some data are excluded for estimation because of the lack of data. Inflation targeting countries are judged according to IMF figures (Jahan, 2012). In some cases, the adoption time of inflation targeting is different.

Estimation was performed using panel ordinary least squared (OLS) and robust estimation. Adding to the standard OLS method, robust estimation is also used for estimation and is unlike maximum likelihood estimation. OLS estimates for regression are sensitive to the observations that do not follow the pattern of the other observations. This is not a problem if the outlier is simply an extreme observation from the tail of a normal distribution; however, if the outlier is from non-normal measurement error or some other violation of standard OLS, it compromises the validity of the regression results if a nonrobust regression method is employed.

3. Results and Implications

3.1. Deterministic elements of inflation targeting

The result is almost as expected. The result of equation (1) is as shown in Table 1.

Among the results of (a)~(d), the equations of (a) and (b) are good compared to the equations (c) and (d). It is clear that inflation targeting statistically impacts the

Table 1. Estimation results of OLS and robust estimation

Dependent Variable Estimation Method	Interest Rate Spread		Central Bank Policy	
	OLS	Robust Estimation	OLS	Robust Estimation
C	13.4709 (0.0000)	13.3746 (0.0000)	7.7006 (0.0000)	7.6591 (0.0000)
TARGETING	-20.7261 (0.0000)	-20.6673 (0.0000)	-2.5702 (0.4124)	-2.3224 (0.4679)
OPENNESS	0.0048 (0.9711)	0.0025 (0.9857)	0.08756 (0.5298)	0.0998 (0.4846)
DEBT	-0.0269 (0.2178)	-0.0256 (0.2629)	-0.0410 (0.0799)	-0.0425 (0.0632)
EXR	-8.4683 (0.0006)	-8.3905 (0.0001)	0.7524 (0.7121)	0.8779 (0.6760)
Adjusted R2/ Adjusted Rw2	0.8733	0.9050	0.5433	0.6738
F-statistic/ Rn-squared statistic	32.0244 (0.0000)	106.3389 (0.0000)	6.3546 (0.0039)	22.8085 (0.0001)
Durbin-Watson	1.6786	-	0.8770	-
Equation	(a)	(b)	(c)	(d)

stability of financial markets.

Also, exchange rate stability is negatively related with the financial stability. It is difficult to understand; however, to maintain inflation is sometimes difficult, so sometimes it may be conducted at the expense of exchange rate stability. Recent large changes in exchange rates all over the country may be reflected in these results. On the other hand, all of the cases that use central bank policy as dependent variable do not fit well.

Recently, VARs (vector autoregressions) have been used for estimation in many cases. The method here is employed to forecast systems of interrelated time series and to analyze the dynamic impact of random disturbances on the used variables. Empirical estimation and interface are complicated by the fact that endogenous variables may appear on both the left and right sides of equations. The simultaneous use of VAR can avoid these problems. The macroeconomic variables are sometimes structurally correlated with different possible lags. Therefore, a VAR model is used to examine the data to avoid this issue as shown in **Table 2**.

The impulse responses are as shown in **Figure 1**.

Table 2. Results of VAR

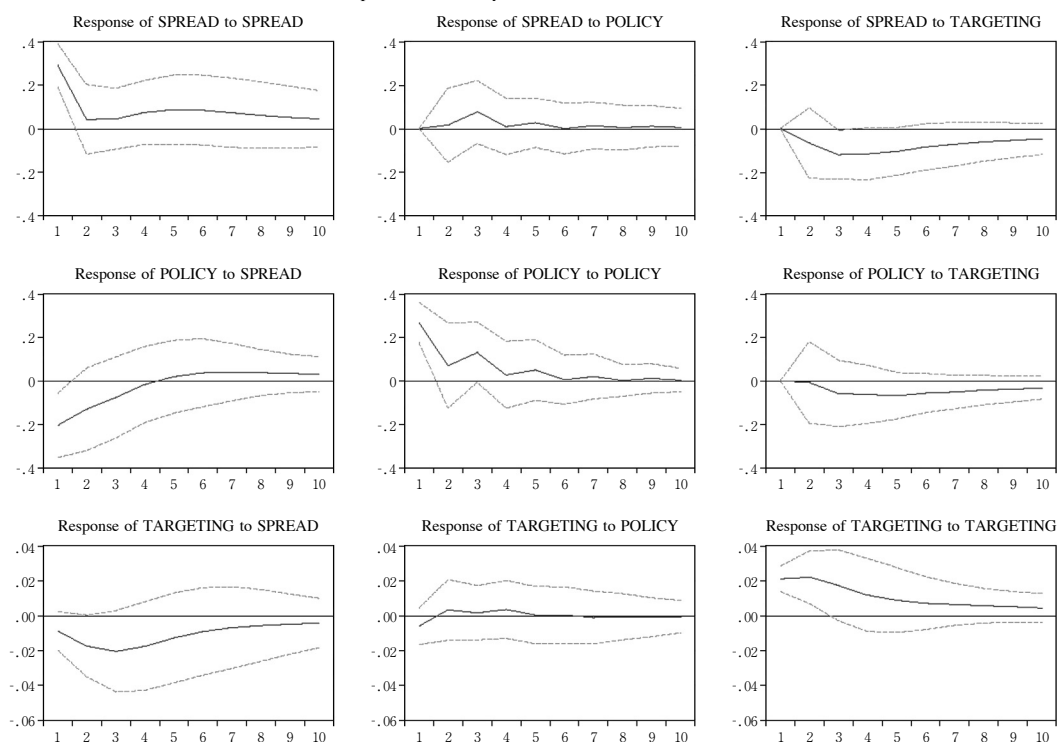
	SPREAD	TARGETING	OPENNESS	DEBT	EXR
SPREAD (-1)	0.3602 (0.3541) [1.0172]	-0.0608 (0.0300) [-2.022]	1.7009 (0.5682) [2.9931]	4.4735 (4.3783) [1.0217]	0.1353 (0.0721) [1.8755]
SPREAD (-2)	0.2314 (0.2374) [0.9747]	0.0027 (0.0201) [0.1381]	0.9047 (0.3811) [2.3737]	2.8251 (2.9364) [0.9620]	-0.0109 (0.0483) [-0.2264]
TARGETING (-1)	-0.5903 (9.2145) [-0.0640]	-0.2868 (0.7829) [-0.3663]	5.0440 (14.7880) [0.3410]	-82.0151 (113.9350) [-0.7198]	0.4774 (1.8773) [0.2543]
TARGETING (-2)	1.8841 (5.3096) [0.3548]	-0.0767 (0.4511) [-0.1700]	18.4048 (8.5212) [2.1598]	113.0637 (65.6525) [1.7221]	0.0131 (1.0817) [0.0121]
OPENNESS (-1)	-0.3306 (0.1756) [-1.8826]	0.0054 (0.0149) [0.3643]	-0.3549 (0.2818) [-1.2591]	-4.0918 (2.1716) [-1.8841]	-0.0073 (0.0357) [-0.2052]
OPENNESS (-2)	0.0339 (0.1435) [0.2363]	0.0125 (0.0122) [1.0258]	0.3737 (0.2304) [1.6218]	2.0313 (1.7754) [1.1441]	-0.0368 (0.0292) [-1.2583]
DEBT (-1)	-0.0217 (0.0314) [-0.6913]	0.0017 (0.0026) [0.6516]	0.1027 (0.0503) [2.0396]	1.4880 (0.3882) [3.8327]	-0.0028 (0.0064) [-0.4470]
DEBT (-2)	-0.0061 (0.0456) [-0.1343]	-0.0069 (0.0038) [-1.7988]	-0.0306 (0.0732) [-0.4187]	-0.2363 (0.5644) [-0.4187]	0.0108 (0.0093) [1.1629]
EXR (-1)	-1.2331 (3.9616) [-0.3112]	-0.4101 (0.3366) [-1.2185]	-3.2034 (6.3578) [-0.5038]	-35.040 (48.984) [-0.7153]	0.4324 (0.8071) [0.5357]
EXR (-2)	2.6594 (2.1797) [1.2200]	-0.0859 (0.1852) [-0.4642]	7.6330 (3.4981) [2.1820]	25.0750 (26.9519) [0.9303]	-0.0490 (0.4440) [-0.1104]
C	2.1394 (5.2558) [0.4070]	0.9776 (0.4465) [2.1891]	-20.677 (8.4349) [-2.4513]	-43.189 (64.9873) [-0.6645]	-0.8352 (1.0708) [-0.7799]
Adj. R-squared	0.9325	0.9536	0.6492	0.8299	0.8760
F-statistic	23.1319	33.9243	3.9615	8.8103	12.3061

Note. Standard errors in () and t-statistics in [].

The results are not so good; however, the effects of inflation targeting on financial markets are quite well.

Figure 1. Impulse response of each variable

Response to Cholesky One S.D. Innovations ± 2 S.E.



4. Conclusions

This paper examined empirically whether or not adoption of inflation targeting has contributed to the stability of financial markets. Data on financial market stability, central bank policy data, and macroeconomic data and two empirical methods were used for estimation. Empirical results show that adoption of inflation targeting has promoted the stability of financial markets; however, it has not promoted the evaluation of central banks.

In many countries, especially in developing ones, introduction of inflation targeting is intended to boost the economy under recession. It is important to examine these issues; however, it is also important to see the stability of financial markets stability as related to the sound growth of the economies. Moreover, the relationship between inflation targeting and sound economic growth is not clear.

There may be some possibility that some important factors exist between inflation targeting and economic growth. The stability of financial markets is one of the candidates.

Further study is necessary to examine the effects of inflation targeting on the economies. There would be a large room for the analysis.

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