Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

NIHON'S FINANCIAL SENTINELS: EXAMINING THE ROLE OF CENTRAL BANK CREDIBILITY IN JAPAN

Masato Kazuki Tanaka
Aichi University, Department of Economics

Abstract
This study investigates the impact of the Bank of Japan's (BOJ) credibility on the Japanese economy. Following the burst of the so-called bubble economy in the early 1990s, Japan faced severe economic challenges. Despite implementing unprecedented zero-interest policies to combat deflation and stimulate the economy, the BOJ's efforts proved ineffective. The mid-1990s saw the Asian currency crisis further exacerbating Japan's economic woes. In 2001, the BOJ pioneered the quantitative easing policy, a novel approach globally. This monetary authority continued to employ quantitative and qualitative monetary easing measures, including negative interest rates akin to the European Central Bank.
Japan's debt-to-GDP ratio, among developed nations, reached alarming levels, leading to heavy reliance on monetary policies due to the deterioration of fiscal conditions. The adoption of inflation targeting, a framework embraced by approximately 30 central banks worldwide, offered potential benefits, including improved market transparency, enhanced accountability, and stability of expected inflation rates.
This study underscores the critical role of central bank credibility in macroeconomic stabilization and economic performance. While studies on the relationship between credibility and economic performance have been explored in developing economies, research in developed economies, including Japan, is still in its nascent stages. Recognizing the importance of market credibility in monetary policy is essential for achieving economic stability.

Keywords: BOJ credibility, Japanese economy, monetary policy, inflation targeting, central bank credibility.

1. Introduction

This study examines how the BOJ's credibility effects the Japanese economy. In Japan, after the so-called bubble economy, namely stock and land prices enormous rising, burst at the beginning of the 1990s, serious economic conditions occurred. Confronted with prolonged severe economic conditions, the BOJ conducted a zero interest policy, which was unprecedented all over the world to combat deflation and to boost the economy. However, this was ineffective. During the middle of the 1990s, an Asian currency crisis occurred and hit the economy. In 2001, the BOJ introduced a new monetary policy, the quantitative easing policy, for the first time in the world. The BOJ also conducted a comprehensive monetary easing policy and conducted quantitative and qualitative monetary easing

continuously. Minus interest rate to banks such as enactedby the European Central Bank (ECB) has been adopted. On the other hand, the Japanese debt ratio against GDP has become the worst among developed economies. Fiscal conditions in Japan have become worse and a large accumulation of debt has occurred, which has prompted heavy dependence on monetary policy. Aggressive fiscal policy has become impossible as income from taxes has not increased.

Approximately 30 central banks all over the world recently adopted inflation targeting for the conduct of monetary policy. The BOJ also introduced this framework, which may provide many benefits. First, with the conduction of this framework, market participants can accurately and clearly judge the performance of the central banks. Credibility is strongly related with this issue. Second, the clarification of central banks' goals maintains accountability for the target rate of inflation. Accountability has become more important for the issue of communication between the central banks and markets. Finally, this framework gives stability of the expected inflation rate. Expectationsalso play important roles and are related to credibility. The credibility of the central bank's inflation targeting regarding macroeconomic stabilization is important (see De Mendonça and Souza, 2010; Chu and Sek, 2012; Gerlach andTillmann, 2012).

Adequate monetary policy with credibility can generally be expected to improve economic performance. Central banks should understand the transmission mechanism of monetary policy as thoroughly as possible because it could stabilize the economy. However, monetary policy, especially from the view of market credibility, has been mostly ignored. Recently, some studies about the relationship between credibility and economic performance have been examined for the cases of some developing economies, however, research of such studies from the developed economies including Japan has only recently begun.

The relationship between central banks' transparency and the effectiveness of monetary policy has been discussed for other countries or districts. For example, de Mendonça and Fiho (2007) showed that central banks with greater transparency cause decreases in inflation rates and interest rates. Hoeberichts, Tesfaselassie, and Eijffinger (2009) indicated that transparency of the central banks' forecasting raises stabilization of the economy. Like these studies, for central bank transparency, most studies have showed that larger transparency has a high performance that lowers inflation expectations and also lowers long-term interest rates for developing economies. The focus has been mainly given to developing economies.

Romer and Romer (2000) and Spyromitros and Tuysuz (2012) found that communication between central banks and markets influences inflation rates and plays a large role in the transmission of monetary policy to output. Horváth andKaras (2013) showed that short-run interest rates rise if the central banks' communicates when economic conditions are not good.

Credibility measures may be divided into two main categories according to Levieuge, Lucotte, and Ringuedé (2018). The first is based on the Bomfim and Rudebusch (2000) methodology, which consists of assessing the weight attached by the private sector to the inflation target when forming their inflation expectations. To this point, if the latter are made according to the target, central banks are esteemed to be credible. The second category of central bank credibility measures denotes the diffirence between

inflation expectations of the private sector and the inflation target. The well-known measure of Cecchetti and Krause (2002) defines credibility as an inverse function of this gap. Such an index has been extended by De Mendonça and De Guimaráes e Souza (2009), which changed the inflation target point into a target range and considered the loss of credibility for negative deviations.

Amisano and Tronzano (2010) indicated that credibility reverses both anti-inflationary and anti-deflationary credibility in some cases. Moreria (2013) found that apositive inflation shock causes an increase of the expected inflation and a decrease of the central bank's credibility. Bordo and Siklos (2017) indicated that financial crises reduce central bank credibility and central banks with strong institutional features tend to perform policies better from the experiences of 2007/2008 financial crisis.

It appears that the relationship between market credibility and real economies has not been fully discussed, especially for developed economies, and no consensushas been reached. Sager and Taylor (2004) and Jansen and de Haan (2005) showed that efforts to talk up the Euro area has not been successful. Evans and Speight (2011) and Rosa (2013) also indicated no significant reaction for the case of ECB (European Central Bank). Kurihara (2013) also showed that exchange rates have been impacted by the conduct of monetary policy in some cases. However, few studies have analyzed the relationship between central bank credibility and stock prices. This situation does not seem unnatural as the goals of many central banks do not include manipulation of stock prices; however, the movements of these variables are not and should not be ignored by central banks at all. Papadamou, Sidiropoulos, and Spyromitros (2014) found that a higher credibility is associated with lower interest rates, higher effective exchange rates, and an effect on the economies. Bordo and Siklos (2015) suggested that credibility changes over time and frequent and can be significant. Nevertheless, no robust empirical connection between the size of an economic shock and loss of credibility has been found. Levieugeet al. (2018) indicated the existence of a negative effect on the volatility of the short-term interest rate and credibility. Tatiwa, Chagas, and Ferreira (2018) found that there is no unemploymentinflation trade off when there is a high central bank credibility.

The purpose of this study is to use the index of central bank credibility to empirically assess the effect of credibility on interest rate, stock price, and price for the case of Japan.This study is structured as follows. Section 2 presents a theoretical view to support the empirical analyses. In section 3, empirical analyses are conducted to examine the relationship between BOJ's credibility and financial markets. Interest rate, stock price, and inflation rate are used for empirical estimation with considering the market credibility. Finally, this article ends with a brief summary.

2. Theoretical Analyses

Credibility has been a critical issue in modern central banking and economy. Blinder (2000) showed that credibility is difficult to measure. In a prior work, Blinder (1998) indicated that differences in views between practitioners and academics stem from the fact that the former have a definition of credibility in mind that differs from that formalized within the traditional time-consistency literature originating from Kydland and Prescott (1977). Kurihara, Morikawa, and Takaya (2012) also found that economic

Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

independence of the central bank is more important than political independence. There are a lot of indexes to measure the credibility. This paper defines credibility (CRED) as equation (1).

$$CRED = \frac{1}{exp(2\% - inflation\ rate\ (\%))} \quad (1)$$

If the market credibility is high, this score is high. The BOJ set the inflation target rate as 2%, however, it has not been achieved at all since, and the index is different from other previous studies. Deflation is taken into account in this study.

3. Empirical Analyses

Credibility is calculated using equation (1) in the previous section. Credibility is used for explanation variables and is regressed by this credibility and the other macroeconomic variables. The dependent variable are interest rate, stock price, and consumer price. Ordinary least squares (OLS) and generalized method of moments (GMM) are employed for estimation. GMM is a robust estimator in that, unlike maximum likelihood estimation, GMM does not need information about the distribution of the disturbances. Hansen's J-statistics test is used to check whether or not the model's moment coincides with the data. In the context, when there are more moment conditions than parameters to be estimated, this chi-square test can be used. The estimated equation is equation (2).

$$At = c + a1At\text{-}1 + a2iAt\text{-}2 + \varepsilon t \quad (2)$$

"A" in equation (2) denotes macroeconomic variables, interest rate, stock price, and consumer price. εt represents the innovations of the short-term interest rate at time t with a zero mean and time varying variance ht. More precisely, we suppose that$\varepsilon t = zt\sqrt{ht}$, with zt representing a standardized white noise residual. Finally, t denotes time. The sample period is from 1990 to June 2018, and monthly data are used for estimation. First of all, unite root tests are performed then an Augmented Dickey-Fuller (ADF) test is used. Table 1 shows that all of the variables have no unit roots at least at the 5% level.

Table 1. Augmented Dickey-Fuller (ADF) Test

	t-statistic	Probability
Interest	-7.9688	0.000
Price	-5.5661	0.000
Stock	-2.8901	0.0475

The empirical regressions of equation (1) are reported in Tables 2, 3, 4.

Table 2. Regression results: interest rate

	(1)	(2)	(3)	(4)
C	0.0580***	0.0402**	0.0231	0.0209
	(3.6329)	(2.0570)	(0.9324)	(0.6929)
interest(-1)	0.3854***	0.3324**	0.2133	0.1673
	(4.0477)	(2.2182)	(1.1641)	(0.7377)
interest (-2)		0.2011*	0.1468	0.1076
		(1.8776)	(0.8604)	(0.6178)
interest (-3)			0.3364**	0.4021*
			(2.2320)	(2.0448)

Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

interest (-4)				0.0399 (0.2160)
Adj.R2	0.2634	0.2688	0.2665	0.1937
F-statistic	16.3840	7.2512	4.2701	2.3820
Probability	0.0002	0.0025	0.0149	0.0878
D.W.	1.9608	2.3887	2.2995	2.1971

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

Table 3. Regression results: stock price

	(1)	(2)	(3)	(4)
C	0.8863	1.1039	1.4661	1.6921
	(0.6768)	(0.8339)	(1.1142)	(1.2654)
Stock(-1)	0.9316***	1.0546***	1.0290***	1.0008***
	(19.8214)	(8.4842)	(8.3708)	(7.9162)
Stock (-2)		-0.1331	0.1006	0.1155
		(-1.0688)	(0.5679)	(0.6493)
Stock (-3)			-0.2264*	-0.1035
			(0.0728)	(-0.5816)
Stock (-4)				-0.1220
				(-0.9640)
Adj.R2	0.8539	0.8586	0.8593	0.8591
F-statistic	392.8895	197.4401	137.4466	103.2037
Probability	0.0000	0.0000	0.0000	0.0000
D.W.	1.6905	1.9960	1.9656	1.9472

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

Table 4. Regression results: price

	(1)	(2)	(3)	(4)
C	0.0187	0.0158	0.0154	0.0134
	(0.6748)	(0.5963)	(0.5789)	(0.5443)
Price(-1)	0.9739***	1.2853***	1.2578***	1.2257***
	(33.8938)	(10.8838)	(10.0723)	(10.6092)
Price (-2)		-0.3218***	-0.2098	-0.2959
		(-2.7112)	(-1.0527)	(-1.5959)
Price (-3)			-0.0880	0.4190**
			(-0.7014)	(2.2597)
Price (-4)				-0.4061***
				(-3.5000)
Adj.R2	0.9448	0.9496	0.9492	0.9568
F-statistic	1148.795	633.3425	419.0923	372.6346

Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

Probability	0.0000	0.0000	0.0000	0.0000
D.W.	1.3430	1.9977	2.0141	1.9483

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

From Table 2 to Table 4, the equation lag is selected. The lag is selected by its significance of each variable and Akaike criterion. According to these results, one equation is selected, and credibility is included in the selected equation (2).The empirical results are shown in Tables5 and 6.

Table 5. Credibility and macroeconomic variable (OLS)

	Interest rate	Stock price	Price (A)	Price(B)
C	0.0491	0.8726	-0.3618***	-0.3310***
	(1.3301)	(0.4709)	(-4.8903)	(-4.4400)
(-1)	0.3212**	0.9314***	0.6932***	0.9049***
	(2.0456)	(19.1573)	(12.1395)	(7.0730)
(-2)	0.1937			-0.1940*
	(1.3788)			(-1.8411)
Credibility	-0.0242	0.0672	1.8405***	1.6832***
	(-0.2860)	(0.0105)	(5.4196)	(4.8889)
Adj.R2	0.2472	0.8517	0.9625	0.9627
F-statistic	4.7227	193.4687	836.0119	578.9635
Probability	0.0079	0.0000	0.0000	0.0000
D.W.	2.3662	1.6902	0.9226	1.3419

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

Table 6. Credibility and macroeconomic variable (GMM)

	Interest rate	Stock price	Price (A)	Price(B)
C	0.0314	-0.5649	-0.3281**	-0.2316*
	(1.2135)	(-0.2790)	(-2.6161)	(-1.7440)
(-1)	0.4257***	0.9101***	0.7513***	1.1453***
	(3.6414)	(19.0113)	(9.0127)	(4.9530)
(-2)	0.2168**			-0.3391*
	(2.2027)			(-1.9568)
Credibility	0.0017	4.5093	1.6310***	1.1971*
	(0.0312)	(0.7795)	(2.8228)	(1.9103)
Adj.R2	0.2260	0.8490	0.9604	0.9620
J-statistic	4.7350	8.3039	8.2770	7.5293
Probability	0.0295	0.0039	0.0040	0.0060

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

The empirical results show that greater credibility does not impact interest rates and stock prices to boost the economy, but it does influence the prices. Impulse reaction function is estimated. The results are displayed in Table 7 and Figure 1. PICE denotes price, and CREDIBILITY denotes credibility.

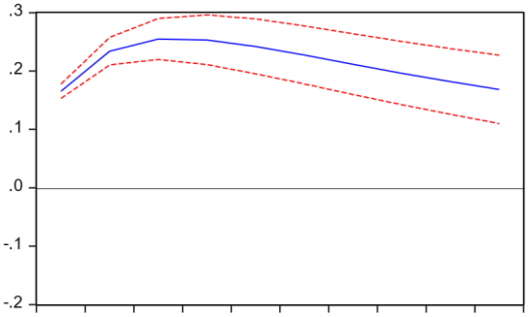
Table 7. Vector Autoregression Estimates

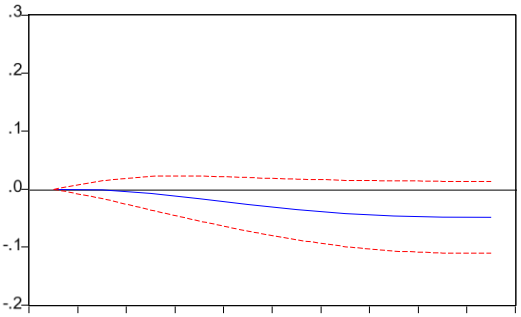
	PICE	CREDIBILITY
PICE (-1)	1.4211***	-0.0057
	(21.8451)	(-0.2223)
PICE (-2)	-0.4365***	0.0326
	(-6.7073)	(1.2544)
CREDIBILITY (-1)	-0.0202	1.3191***
	(-0.1233)	(20.0969)
CREDIBILITY (-2)	-0.0913	-
	(-0.5609)	0.4927***
		(-7.5770)
C	0.0214	0.0331***
	(1.3116)	(5.0761)
Adj.R2	0.9607	0.9113
F-statistic	2180.419	915.5515

Note. *** denotes significant at 1%, ** significant at 5%, and * significant at 10%.

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

Response of PICE to PICE Response of PICE to CREDIBILITY





Response of CREDIBILITY to PICE Response of CREDIBILITY to CREDIBILITY

Research Journal of Economics and Social Science
Volume 11 Issue 4, October-December 2023
ISSN: 2995-4231
Impact Factor: 7.52
https://kloverjournals.org/journals/index.php/ess

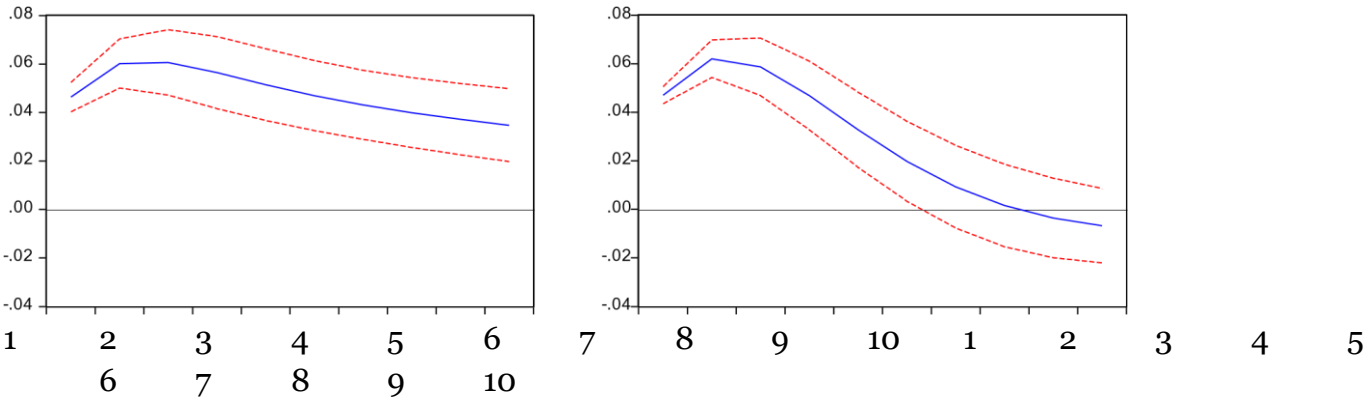


Figure 1. Impulse response

The results are clear. It should be noted that the response of credibility to price continues for over one year.

4. Conclusions

This study examined whether or not central bank credibility influences some economic variables in Japan. As the BOJ set the target inflation rate as 2%, the departure from the rate was used for credibility. The empirical results showed that the improved credibility does not impact interest rates and stock prices to boost the economy, however, the credibility influences the prices. Japan has not contested deflation as the inflation rate has not reached a 2% target, but the credibility for inflation rate itself is judged to success. It seems to be accepted in the markets. According to the results only, the monetary policy has been successful. On the other hand, the credibility itself has not been related with the overcoming deflation and attaining economic growth. It would be necessary for the financial authority to keep the credibility and to recover the economy under some severe conditions of worldwide stagnation, domestic-first policy in some countries, and wage-stagnation.

Acknowledgement

This study was supported by the Nitto Foundation.

References

Amisano, G., & Tronzano, M. (2010). Assessing central bank's credibility during the first years of the eurosystem: A Bayesian empirical investigation. *Manchester School, 78*(5), 437-459.

Blinder, A. (1998). *Central banking in theory and practice*. Cambridge, MA: MIT Press.

Blinder, A. (2000). Central bank credibility: Why do we care? How do we build it? *American Economic Review, 90*(5), 1421-1431.

Bomfim, A., & Rudebusch, G. (2000). Opportunistic and deliberate disinflation under imperfect credibility. *Journal of Money, Credit, and Banking, 32*(4), 707-721.

Bordo, M. D., & Siklos, P. L. (2015). Central bank credibility: An historical and quantitative exploration. *NBER Working Papers 20824*.

Bordo, M. D., & Siklos, P. L. (2017). Central bank credibility before and after the crisis. *Open Economies Review, 28*(1), 19-45. http://dx.doi.org/10.1007/s11079-016-9411-2

Cecchetti, S., & Krause, S. (2002). Central bank structure, policy efficiency, and macroeconomic performance: Exploring empirical relationships. *Federal Reserve Bank of St. Louis Review, 84*, 99-117.

Chu, J. F., & Sek, S. K. (2012) Evaluating the performance of inflation targeting, *International Journal of Economics and Finance, 4*(9), 69-86. https://doi.org/10.5539/ijef.v4n9p69

De Mendonça, H. (2007). Towards credibility from inflation targeting: The Brazilian experience. *Applied Economics, 39*(20), 2599-2615. https://doi.org/10.1080/00036840600707324

De Mendonça, H. F.,& Filho, J. S. (2007). Economics transparency and effectiveness of monetary policy. *Journal of Economic Studies, 34*(6), 497-514. https://doi.org/10.1108/01443580710830961

De Mendonça, H. F., & de Guimaráes e Souzza, G. (2009). Inflation targeting credibility and reputation: The consequences for the interest rate. *Economic Modelling, 26*(6), 1228-1238.

https://doi.org/10.1016/j.econmod.2009.05.010

De Mendonca, H. F.,& Souza, G.J. (2010). Is inflation targeting a good remedy to control inflation? *Journal of Development Economics, 98*(2), 178-191. https://doi.org/10.1016/j.jdeveco.2011.06.011

Evans, K. P.,& Speight, A. E. H. (2011). Intraday euro exchange rates and international macroeconomic announcements. *European Journal of Finance, 17*(2), 83-110. https://doi.org/10.1080/13518470903448457

Gerlach, S., & Tillmann, P. (2012). Inflation targeting and inflation persistence in Asia-Pacific. *Journal of Asian Economics, 23*(4), 360-373. https://doi.org/10.1016/j.asieco.2012.03.002

Hoeberichts, M., Tesfaselassie, M. F., & Eijffinger, S. (2009). Central bank communication and output stabilization.*Oxford Economic Papers, 61*(2), 395-411.

Horváth, R., & Karas, P. (2013). Central bank communication and interest rates: The case of the Czech National Bank.*Finanee a Urer, 63*(5), 454-464

Jansen, D. J., & de Hann, J. (2005). Talking heads: The effect of ECB statements on the euro-dollar exchange rate. *Journal of International Money and Finance, 24*, 343-361. https://doi.org/10.1016/j.jimonfin.2004.12.009

Kurihara, Y., Morikawa, K., & Takaya, S. (2012). Central bank's independence and stock prices. *Modern Economy, 3*(6), 793-797. https://doi.org/10.4236/me.2012.36101

Kurihara, Y. (2013). The effectiveness of financial policy in the Japanese financial markets. *International Journal of Economy, Management, and Social Science, 2*(5), 161-165.

Kydland, F., & Prescott, E. (1997). Rules rather than discretion: The inconsistency of optimal plans. *Journal of Political Economy, 85*(3), 473-491.

Levieuge, G., Lucotte, Y., & Ringuedé, S. (2018). Central bank credibility and the expectations channel: Evidence based on a new credibility index. *Review of World Economics, 154*, 493-535.

Moreria, R. R. (2013). Expected inflation, lagged inflation and the central bank's credibility: Time-varying and VAR analysis for the recent Brazilian case. *Empirical Economics Letters, 12*(6), 619-628.

Papadamou, S., Sidiropoulos, M., & Spyromitros, E. (2014). Determinants of central bank credibility and macroeconomic performance: Evidence from Eastern European and Latin American countries. *Eastern European Economics, 52*(4), 5-31.

Romer, D. C., & Romer, D. H. (2000). Federal reserve information and the behavior of interest rates.*American Economic Review, 90*, 429-457

Rosa, C. (2013). Market efficiency broadcasted live: ECB code words and Euro exchange rates. *Journal of Macroeconomics, 38*, 167-178. https://doi.org/10.1016/j.jmacro.2013.07.008

Sager, M. J., & Taylor, M. P. (2004). The impact of European central bank governing council announcements on the foreign exchange market: A microstructural analysis. *Journal of International Money and Finance, 23*(7-8), 10431051. https://doi.org/10.1016/j.jimonfin.2004.08.002

Spyromitros, E., & Tuysuz, S. (2012). Do monetary policy transparency, independence and credibility enhance macrofinancial stability? *International Journal of Economics and Finance, 4*(4), 44-54. https://doi.org/10.5539/ijef.v4n4p44

Tatiwa, F. R., Chagas, G, C. R., & Ferreira, A. E. (2018). Central bank credibility and inflation dynamics in Brazil. *Empirical Economics Letters, 17*(2), 235-242.