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Misperceptions about Monetary Policy and a Self-Confirming Inflation Trap: Can Opposition to Interest Rate Hikes Prolong Inflation?

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Abstract: This paper develops a simple dynamic model to examine how the public misperception that "higher interest rates increase inflation" may constrain monetary policy and, as a result, actually prolong inflation. Under the standard monetary policy transmission mechanism, an increase in the policy interest rate reduces future inflation. However, when a central bank raises interest rates in response to high inflation, the public observes a positive association between high interest rates and high inflation. If individuals confuse the central bank's policy response with the causal effect of monetary policy, they may form the mistaken belief that interest rate hikes increase inflation. This paper considers an environment in which such a misperception strengthens public opposition to rate hikes and thereby weakens the effective degree of monetary tightening. The analysis shows that when the misperception exceeds a critical threshold, inflation no longer declines and may instead persist or increase. Moreover, if persistent inflation reinforces the initial misperception, the economy may fall into a self-confirming monetary policy trap.

Keywords: Inflation, Monetary Policy, Public Beliefs, Misperception, Adaptive Learning, Self-Confirming Trap

INTRODUCTION

Raising interest rate is a primary instrument used by central banks to control inflation. Under the standard monetary policy transmission mechanism, higher interest rates weaken aggregate demand and ultimately reduce inflation. Yet the effectiveness of monetary policy may depend not only on this structural mechanism but also on how the public understands it.

A growing literature shows that household beliefs about inflation differ substantially from standard full-information models. Households are often poorly informed and rely on personal experiences when forming inflation expectations (Coibion and Gorodnichenko, 2015; Malmendier and Nagel, 2016; D'Acunto et al., 2021). Shiller (1997) documents substantial differences between economists and the general public in their perceptions of inflation. More recently, Binetti, Nuzzi and Stantcheva (2024) show that many individuals misunderstand the causes of inflation and appropriate policy responses. Of particular relevance to this paper, a widespread misconception is that inflation rises following increases in interest rates.

Why might individuals form such a belief?

One possibility is that the public confuses a central bank's policy reaction with the causal effect of monetary policy. Central banks typically raise interest rates when inflation is high. However, if inflation remains high despite such interest rate hikes, it is likely that the public observe that higher interest rates are followed by persistently high inflation, and interpret this positive association as a causal relationship. It happens therefore that individuals mistakenly conclude that higher interest rates increase inflation, even though the true causal effect of monetary tightening is to reduce inflation.

This idea is related to the literature on learning and modeling misspecification. Agents update perceived laws of motion using observed data without knowing the true structure of the economy (Evans and Honkapohja, 2001). Personal experience affects inflation expectations (Malmendier and Nagel, 2016), and agents converge to systematically incorrect beliefs when their subjective models omit important features of the true data-generating process (Esponda and Pouzo, 2016). Such beliefs nevertheless appear consistent with realized observations, as in the literature on self-confirming equilibrium (Fudenberg and Levine, 1993).

The present paper integrates these ideas with the literature on political pressure and central bank communication, which analyzes how public beliefs can distort monetary policy (Rogoff, 1985; Cukierman, Webb and Neyapti, 1992; Alesina and Summers, 1993; Binder (2021)), and how the central bank should communicate with public (Blinder et al., 2008; Coibion, Gorodnichenko and Weber, 2022).

The present paper derives a critical level of misperception above which inflation ceases to decline and identifies conditions under which adaptive learning drives beliefs beyond this threshold. The suggests that central banks should explicitly distinguish a policy reaction from a policy effect. It is not sufficient simply to state that higher interest rates reduce inflation. Central banks also need to explain that interest rates are high because inflation was already high, and that inflation would have been even higher without the interest rate increase.

To formalize this mechanism, the paper develops a simple two-variable dynamic model of inflation and public beliefs. The public learns using a misspecified model that omits inflation persistence and constrains monetary tightening. The key novelty is that the public's mistaken belief does not merely distort private decisions or expectations. It changes the policy environment, and hence the data-generating process, from which the public subsequently learns. A false belief may therefore alter monetary policy in a way that makes observed outcomes increasingly consistent with the belief itself. The economy may fall into what this paper calls a self-confirming monetary policy trap.

The remainder of the paper is organized as follows. Section 2 presents the basic model and Sections 3 derives the critical misperception threshold, taking public beliefs as an exogenous variable. Sections 4 endogenize public beliefs through adaptive learning and Sections 5 characterize the self-confirming monetary policy trap. Section 6 provides a numerical example. Section 7 concludes the paper.

THE BASIC MODEL

Let π_t denote the inflation rate in period t and i_t the policy interest rate. Inflation dynamics are given by

$$\pi_{t+1} = \rho\pi_t - \alpha i_t. \quad (1)$$

We assume that ρ >1 and α >0. The parameter ρ represents the persistence of inflation. Because ρ >1, inflation persists or increases in the absence of sufficiently strong monetary tightening. At the same time, since

$$\frac{\partial \pi_{t+1}}{\partial i_t} = -\alpha < 0, \quad (2)$$

the true causal effect of an increase in the policy interest rate is clearly disinflationary.

Suppose first that there is no public opposition to monetary tightening, so that the central bank sets the policy interest rate in proportion to the inflation rate:

$$i_t = \varphi\pi_t, \quad (3)$$

where φ (> 0) represents the strength of the central bank's policy response to inflation. Substituting (3) into (1) yields

$$\pi_{t+1} = (\rho - \alpha\varphi)\pi_t. \quad (4)$$

We assume that

$$0 < \rho - \alpha\varphi < 1. \quad (5)$$

so that π_t converges to zero. Thus, if the central bank can fully implement the desired degree of monetary tightening, inflation converges to zero over time.

Next, we assume that the policy interest rate the central bank actually implemens is given by

$$i_t = \left[\frac{\varphi}{1 + \kappa b_t}\right]\pi_t, \quad (6)$$

where κ (>0) represents the strength of the influence of public opinion and b_t (> 0) represents the strength of the public misperception that an increase in the policy interest rate worsens inflation. A larger b_t implies that the public more strongly believes that higher interest rates increase inflation.

If $b_t = 0$, (6) becomes (3). Thus, in the absence of public misperceptions, the central bank can fully implement its desired monetary policy. By contrast, since

$$\frac{\partial i_t}{\partial b_t} = -\frac{\varphi\kappa\pi_t}{(1 + \kappa b_t)^2} < 0, \quad (7)$$

the stronger the public misperception about monetary policy, the weaker the monetary tightening actually implemented.

We assume that this misperception arises because individuals confuse the central bank's policy response with the causal effect of monetary policy. For example, suppose that the central bank follows (3). In this case, high inflation and high policy interest rates are observed simultaneously. Consequently, $Cov(i_t, \pi_t) > 0$ holds, which means that the public incorrectly infer that high interest rates leads to high inflation. In other words, individuals confuse the central bank's policy reaction with the policy effect of monetary tightening.

INFLATION DYNAMICS UNDER MISPERCEPTION

Substituting (6) into (1) yields the actual inflation dynamics as

$$\pi_{t+1} = \left[\rho - \frac{\alpha\varphi}{1 + \kappa b_t}\right]\pi_t. \tag{8}$$

Define the inflation growth coefficient as

$$g(b_t) = \rho - \frac{\alpha\varphi}{1 + \kappa b_t}, \tag{9}$$

and differentiating (9) with respect to b_t gives

$$g'(b_t) = \frac{\alpha\varphi\kappa}{(1 + \kappa b_t)^2} > 0. \tag{10}$$

Thus, we see that stronger public misperceptions increase the persistence of inflation.

From (18), we see that the inflation increases, *i.e.*, $\pi_{t+1} > \pi_t$, if

$$\rho - \frac{\alpha\varphi}{1 + \kappa b_t} > 1, \tag{11}$$

which is equivalent to

$$b_t > \left(\frac{1}{\kappa}\right)\left[\frac{\alpha\varphi}{\rho - 1} - 1\right]. \tag{12}$$

If we define the critical level of misperception as

$$\bar{b} = \left(\frac{1}{\kappa}\right)\left[\frac{\alpha\varphi}{\rho - 1} - 1\right], \tag{13}$$

we have the following proposition.

Proposition 1. The Misperception Threshold

Inflation increases ($\pi_{t+1} > \pi_t$) if the public misperception about monetary policy satisfies $b_t > \bar{b}$, while inflation declines ($\pi_{t+1} < \pi_t$) if $b_t < \bar{b}$.

MISINFERENCE FROM OBSERVATIONAL DATA

Thus far, b_t, which represents the strength of public misperceptions about monetary policy, has been treated as an exogenous variable. We now endogenize b_t by assuming that individuals form their beliefs from the observed relationship between interest rates and inflation.

The public does not know the true inflation dynamics (1), but adopt the following simple subjective model:

$$\pi_{t+1} = b_t i_t + u_{t+1}, \tag{14}$$

where b_t here represents the perceived effect of the policy interest rate on inflation and u_{t+1} captures other factors that the public cannot explain.

If $b_t > 0$, the public believes that higher policy interest rates increase inflation; if $b_t < 0$, the public believes that higher policy interest rates reduce inflation. Since the true causal effect is $\frac{\partial \pi_{t+1}}{\partial i_t} = -\alpha < 0$, $b_t > 0$ expresses a misperception of the true effect of monetary policy.

Suppose that in each period the public updates her/his beliefs on the effect of monetary policy based on observed interest rates and subsequent inflation using the observed values of i_t and π_{t+1}. As a simple adaptive learning rule, assume

$$b_{t+1} = b_t + \lambda[\pi_{t+1} - b_t i_t], \tag{15}$$

where $\lambda\,(\in]0,1[)$ represents the speed of learning. The term $\pi_{t+1} - b_t i_t$ is the public's inflation forecast error. If actual inflation exceeds predicted inflation, $\pi_{t+1} > b_t i_t$, then $b_{t+1} > b_t$. The public effectively learns that interest rates have a stronger inflationary effect than they previously believed. Conversely, if $\pi_{t+1} < b_t i_t$, then $b_{t+1} < b_t$.

When inflation is high in period t, the central bank is likely to set a high interest rate in the same period. At the same time, because high inflation in period t tends to be followed by high inflation in period t + 1, a positive observed relationship may emerge between the interest rate in period t and the inflation rate in period t + 1.

However, this observed relationship does not represent the true causal effect of the policy interest rate. The true effect of a higher policy interest rate is to reduce inflation in the following period. Nevertheless, because the public fails to control for inflation persistence, individuals may incorrectly conclude that a higher policy interest rate causes higher inflation in the following period. We refer to this phenomenon as policy-response confusion.

The policy interest rate actually implemented by the central bank is (6), which is rewritten as

$$\pi_t = \left[\frac{1 + \kappa b_t}{\varphi}\right] i_t. \tag{16}$$

Substituting (16) into the true inflation dynamics (1) yields

$$\pi_{t+1} = \left[\frac{\rho(1 + \kappa b_t)}{\varphi} - \alpha\right] i_t. \tag{17}$$

The observed relationship between interest rates and inflation is thus

$$\frac{\pi_{t+1}}{i_t} = \frac{\rho(1 + \kappa b_t)}{\varphi} - \alpha. \tag{18}$$

By contrast, the true causal effect of monetary policy is

$$\frac{\partial \pi_{t+1}}{\partial i_t} = -\alpha < 0. \tag{19}$$

Therefore, it is possible to have $\frac{\pi_{t+1}}{i_t} > 0$ even though $\frac{\partial \pi_{t+1}}{\partial i_t} < 0$. In other words, observed association is positive, while true causal effect is negative.

Since the adaptive learning rule is (15), in a steady state in which beliefs no longer change, $b_{t+1} = b_t = b^*$, we have the relationship between π_{t+1}, i_t and b^* as

$$\frac{\pi_{t+1}}{i_t} = b^*. \tag{20}$$

Combining (20) with (18), we have

$$b^* = \frac{\rho - \alpha\varphi}{\varphi - \rho\kappa}, \tag{21}$$

where

$$\varphi > \rho\kappa. \tag{22}$$

is assumed.

Furthermore, since the benchmark assumption implies $\rho - a\varphi > 0$, we have $b^* > 0$, which leads to the following proposition.

Proposition 2. Endogenous Misperception about Monetary Policy

Suppose that the central bank's policy response is sufficiently strong relative to the political influence of public opposition, so that ($\varphi > \rho\kappa$), and that inflation remains positively persistent after monetary tightening, so that ($\rho - \alpha\varphi > 0$). Then, even though the true causal effect of an increase in the policy interest rate is disinflationary, the public endogenously forms the mistaken belief that higher interest rates increase inflation: $b^*>0$

Differentiating b^*, which is determined as (21), with respect to κ gives

$$\frac{\partial b^*}{\partial \kappa} = \frac{\rho(\rho - \alpha\varphi)}{(\varphi - \rho\kappa)^2} > 0. \tag{23}$$

Therefore, an increase in κ leads to a higher steady-state belief, b^*. Since the parameter κ represents the extent to which public beliefs constrain monetary policy, we see that the stronger the influence of public opposition on monetary policy, the stronger the long-run misperception becomes.

This result generates an important feedback mechanism. As the public's misperception becomes stronger, opposition to interest rate hikes increases, making monetary tightening weaker, which, in turn, leads to higher inflation in the following period. After observing this higher inflation, the public revises its belief upward according to (15) and reinforces the false beliefs. If actual inflation exceeds the level predicted by the public's subjective model, a positive forecast error arises, causing the public to revise its belief upward.

Consequently, a self-confirming cycle emerges. A stronger misperception increases opposition to interest rate hikes, which weakens monetary tightening and allows inflation to persist. Persistent inflation then generates positive forecast errors, leading the public to strengthen its initial misperception further.

The above discussion can be summarized as the following Proposition3.

Proposition 3. Self-Confirming Monetary Policy Trap

Suppose that the conditions of Proposition 2 hold and that the steady-state public misperception exceeds the critical level identified in Proposition 1. Then false public beliefs

alter monetary policy in a way that generates persistent inflation, and the resulting inflation reinforces the false beliefs through adaptive learning. Consequently, the economy falls into a self-confirming monetary policy trap.

NUMERICAL EXAMPLE

Consider the following parameter values, ρ = 1.1, α = 0.5, φ = 1 and κ = 0.9. In the absence of public opposition, we have, $\pi_{t+1} = 0.6\pi_t$, by substituting these values into (4). Thus, if the central bank implements sufficiently strong monetary tightening, inflation declines rapidly.

The steady-state belief is determined as $b^* = \frac{1.1 - 0.5 \times 1}{1 - 1.1 \times 0.9} = 60$ by substituting these values into (21), while the critical belief threshold for declining inflation is determined as $\bar{b} = \left(\frac{1}{0.9}\right)\left[\frac{0.5}{1.1 - 1} - 1\right] \approx 4.44$ by substituting these values into (24). Thus, we have $b^* > \bar{b}$.

The long-run belief formed by the public from the observed relationship between interest rates and inflation substantially exceeds the critical level at which monetary policy becomes too weak to stabilize inflation. So that, the self-confirming cycle emerges. A stronger misperception weakens monetary tightening, allowing inflation to persist. Persistent inflation then generates positive forecast errors, which further strengthen the initial misperception. The economy may consequently fall into a self-confirming monetary policy trap.

CONCLUSION

This paper has examined how public misperceptions about monetary policy arises endogenously and how such beliefs alter monetary policy and inflation dynamics.

An important feature of the present model is that it does not simply assume that the public holds an incorrect belief for no reason. The public updates her/his beliefs using actually observed policy interest rates and subsequent inflation rates. However, their subjective model omits the inflation persistence term contained in the true inflation dynamics.

Because of this misspecification, high future inflation generated by inflation persistence is incorrectly attributed to the effect of the policy interest rate. Thus, the mechanism developed in this paper does not rely simply on irrationality. Instead, the misperception arises through learning from observational data with a misspecified causal model.

This mechanism provides a possible theoretical explanation for the survey evidence reported by Binetti, Nuzzi and Stantcheva (2024), according to which many individuals believe that inflation increases following an increase in interest rates. Similarly, if, as Shiller (1997) suggests, the public strongly associates inflation with rising interest rates, the observed association may lead to an incorrect inference about the direction of causality.

The analysis also has implications for central bank communication. Simply stating that “Higher interest rates reduce inflation” is not sufficient. Instead, central banks need to explicitly distinguish between the policy reaction, “Interest rates are high because

inflation was already high," and the counterfactual policy effect, "Inflation would have been even higher without the rate increase."

The central result of this paper can be summarized as follows: The public rationally learns from observed data but reaches an incorrect causal conclusion because it fails to distinguish a central bank's policy reaction from the causal effect of policy. Once this misperception constrains monetary tightening, it can generate persistent inflation that confirms the public's initial belief. In this sense, public misperceptions about monetary policy are not merely a matter of insufficient financial literacy. They arises endogenously from observational learning under a misspecified causal model.

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