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Abstract

This paper investigates asset-price-targeting monetary policy in a New Keynesian model with money illusion. Money illusion is introduced as misperceptions of current and expected future inflation. We derive a necessary and sufficient condition for equilibrium determinacy and express it as an extended Taylor principle. In the benchmark case, a policy response to asset prices may weaken determinacy. With current inflation misperception, however, higher inflation can raise dividends and asset prices, making asset-price targeting stabilizing. The results show that the effects of asset-price targeting depend on both nominal rigidities and inflation perceptions.

Keywords: Money Illusion; inflation misperceptions; asset prices; monetary policy

JEL Classifications: E31, E32, E52, D84

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1 Introduction

Should monetary policy respond to asset prices? This question has long been debated in monetary economics. In a New Keynesian model with nominal rigidities, Carlstrom and Fuerst (2007) argue that monetary policy should not respond to asset prices. In their model, a permanent increase in inflation lowers dividends and asset prices, so a policy response to asset prices offsets the central bank's response to inflation and may weaken equilibrium determinacy.

This paper reconsiders this issue in the presence of money illusion, a classic idea emphasized by Fisher (1928). We model money illusion as misperceptions of current and expected future inflation, following Nutahara and Shirai (2026) and Nutahara (2026). Current inflation misperception changes the perceived real wage, while expected future inflation misperception changes the perceived real interest rate.

Using a simple New Keynesian model with asset prices, we derive a necessary and sufficient condition for equilibrium determinacy. The condition can be written as an extended Taylor principle. Our main result is that money illusion changes the role of asset-price targeting. If current inflation misperception is sufficiently strong, higher inflation raises dividends and asset prices, so a policy response to asset prices supports equilibrium determinacy. These results suggest that the effects of monetary policy responses to asset prices depend not only on nominal rigidities, but also on how households perceive inflation.

The remainder of the paper is organized as follows. Section 2 develops the model. Section 3 presents the main determinacy result and its economic interpretation. Section 4 concludes.

2 The Model

2.1 Main Idea: Money illusion as inflation misperceptions

We consider a representative-household New Keynesian model in which households are subject to money illusion. Money illusion is introduced as inflation misperceptions as in Nutahara and Shirai (2026) and Nutahara (2026). There are two channels: misperception of current inflation and misperception of expected future inflation.

Households observe the previous-period price level P_{t-1}. They misperceive the current gross inflation rate

$$\Pi_t \equiv \frac{P_t}{P_{t-1}} \tag{1}$$

as

$$\Pi_t^{MI} = (\Pi^*)^{\psi_c} \Pi_t^{1-\psi_c}, \tag{2}$$

where $\psi_c \in [0,1]$ measures the degree of current-inflation misperception and Π^* denotes steady-state gross inflation. The perceived current price level is

$$P_t^{MI} = P_{t-1}\Pi_t^{MI}. \tag{3}$$

The perceived real wage is

$$\left(\frac{W_t}{P_t}\right)^{MI} = \frac{W_t}{P_t^{MI}} = \frac{W_t}{P_t}\left(\frac{\Pi_t}{\Pi^*}\right)^{\psi_c}, \tag{4}$$

where W_t is the nominal wage.

Households also misperceive expected future inflation according to

$$E_t\Pi_{t+1}^{MI} = (\Pi^*)^{\psi_f}\left(E_t\Pi_{t+1}\right)^{1-\psi_f}, \tag{5}$$

where $\psi_f \in [0,1]$ measures the degree of expected-future-inflation misperception. The perceived ex ante real gross interest rate is

$$\left(\frac{R_t^n}{E_t\Pi_{t+1}}\right)^{MI} = \frac{R_t^n}{E_t\Pi_{t+1}^{MI}} = \frac{R_t^n}{E_t\Pi_{t+1}}\left(\frac{E_t\Pi_{t+1}}{\Pi^*}\right)^{\psi_f}, \tag{6}$$

where R_t^n is the gross nominal interest rate.

Current inflation misperception changes the perceived real wage. Expected future inflation misperception changes the perceived real interest rate.

2.2 Household Problem

The representative household consumes C_t, supplies labor L_t, holds nominal bonds B_t, and holds shares S_t. The realized budget constraint is

$$P_tC_t + B_t + P_tQ_tS_t = W_tL_t + R_{t-1}^nB_{t-1} + P_tQ_t(D_t + S_{t-1}), \tag{7}$$

where Q_t is the asset price and D_t denotes dividends paid by firms.

Households make decisions using perceived inflation. The subjective budget constraint is

$$P_t^{MI}C_t + B_t + P_tQ_tS_t = W_tL_t + R_{t-1}^nB_{t-1} + P_t^{MI}Q_t(D_t + S_{t-1}) + \Omega_t, \tag{8}$$

where Ω_t is a valuation adjustment term. Households take Ω_t as exogenous. It does not affect the first-order conditions.

Preferences are given by

$$E_0\sum_{t=0}^{\infty}\beta^t\left[\frac{C_t^{1-\sigma}-1}{1-\sigma} - \varphi\frac{L_t^{1+\chi}}{1+\chi}\right], \tag{9}$$

where $\beta \in (0,1)$ is the discount factor, $\sigma > 0$ is relative risk aversion, and $\chi > 0$ is the inverse of the Frisch elasticity of labor supply. The optimal labor supply condition is

$$\varphi L_t^{\chi} = C_t^{-\sigma} \frac{W_t}{P_t} \left(\frac{\Pi_t}{\Pi^*} \right)^{\psi_c}. \tag{10}$$

The Euler equation for nominal bonds is

$$C_t^{-\sigma} = \beta R_t^n E_t \left[\frac{C_{t+1}^{-\sigma}}{\Pi_{t+1}^{MI}} \right]. \tag{11}$$

The Euler equation for share holdings is

$$Q_t = E_t \left[\frac{D_{t+1} + Q_{t+1}}{R_t^n / \Pi_{t+1}^{MI}} \right]. \tag{12}$$

2.3 Firms, Monetary Policy, and the Market-Clearing Condition

Intermediate-good firms produce output using labor:

$$Y_t = L_t. \tag{13}$$

Real marginal cost Z_t is

$$Z_t = \frac{W_t}{P_t}. \tag{14}$$

Under Calvo pricing, the New Keynesian Phillips curve is

$$\pi_t = \beta E_t \pi_{t+1} + \lambda z_t. \tag{15}$$

The dividend is the monopolistic profit of firms;

$$D_t = (1 - Z_t) Y_t. \tag{16}$$

The central bank sets the nominal interest rate according to

$$\log R_t^n = \log \bar{R}^n + \phi_\pi \log \Pi_t + \phi_q \log Q_t, \tag{17}$$

where $\phi_\pi \geq 0$ and $\phi_q \geq 0$ denote the policy responses to inflation and asset prices. A positive value of ϕ_q means that monetary policy responds to asset-price movements.

Finally, the resource constraint is

$$Y_t = C_t. \tag{18}$$

2.4 Linearized equilibrium system

The log-linearized equilibrium conditions are summarized as follows:

$$y_t = E_t y_{t+1} - [r_t^n - (1-\psi_f)E_t\pi_{t+1}], \tag{19}$$

$$q_t = \beta E_t q_{t+1} + (1-\beta)E_t d_{t+1} - [r_t^n - (1-\psi_f)E_t\pi_{t+1}], \tag{20}$$

$$\pi_t = \beta E_t \pi_{t+1} + \lambda z_t, \tag{21}$$

$$(\chi+\sigma)y_t = z_t + \psi_c \pi_t, \tag{22}$$

$$d_t = y_t - \frac{z_{ss}}{1-z_{ss}} z_t, \tag{23}$$

$$r_t^n = \phi_\pi \pi_t + \phi_q q_t, \tag{24}$$

where z_{ss} is the steady-state value of z_t. The first equation is the consumption-Euler equation, the second equation is the Q-Euler equation, the third equation is the New Keynesian Phillips curve, the fourth equation is the labor-supply condition, the fifth equation is the dividend equation, and the last equation is the monetary policy rule.

The dividend equation becomes

$$d_t = \left[\frac{1}{\chi+\sigma} - \frac{z_{ss}}{1-z_{ss}}\right] z_t + \frac{\psi_c}{\chi+\sigma}\pi_t. \tag{25}$$

The first term is the same as that of Carlstrom and Fuerst (2007), and they discuss that the coefficient of z_t is negative under realistic parameter values. In the case of our money illusion, the second term appears and it implies that inflation has a positive effect on the firm's profit and dividend. This effect comes from an increase in labor supply due to current inflation misperception.

3 Main Results on Determinacy

3.1 Necessary and sufficient condition for equilibrium determinacy

The equilibrium conditions can be reduced to a three-variable system in z_t, π_t, and q_t. Let

$$x_t = \begin{bmatrix} z_t \\ \pi_t \\ q_t \end{bmatrix}. \tag{26}$$

The system is written as

$$Ax_{t+1} = Bx_t, \tag{27}$$

where

$$A = \begin{bmatrix} \dfrac{1}{\chi+\sigma} & \dfrac{\psi_c}{\chi+\sigma} + \sigma(1-\psi_f) & 0 \\ \dfrac{1-\beta}{\chi+\sigma}\dfrac{1-(1+\chi+\sigma)z_{ss}}{1-z_{ss}} & \dfrac{1-\beta}{\chi+\sigma}\psi_c + (1-\psi_f) & \beta \\ 0 & \beta & 0 \end{bmatrix}, \tag{28}$$

and

$$B = \begin{bmatrix} \dfrac{1}{\chi+\sigma} & \sigma\phi_\pi + \dfrac{\psi_c}{\chi+\sigma} & \sigma\phi_q \\ 0 & \phi_\pi & 1+\phi_q \\ -\lambda & 1 & 0 \end{bmatrix}. \tag{29}$$

The characteristic equation is

$$f(\omega) \equiv \det(B - \omega A) = 0. \tag{30}$$

For a general value of σ, $f(\omega)$ is a cubic polynomial in ω. For equilibrium determinacy, all roots of this polynomial should be outside unit circle.

We now impose the log utility case $\sigma = 1$. In this case, it is shown that one root of the characteristic equation is $1/\beta > 1$. After multiplying the determinant by a nonzero constant, the characteristic polynomial can be written as

$$f(\omega) = \left(\omega - \frac{1}{\beta}\right) Q(\omega), \tag{31}$$

where

$$Q(\omega) = a\omega^2 + b\omega + c. \tag{32}$$

The coefficients are

$$a = \beta(1 - z_{ss}), \tag{33}$$

$$b = -\phi_q\Big[z_{ss}(1-\beta)(1+\chi) + \beta(1-z_{ss})\Big] - (1-z_{ss})\Big[(1+\beta) + \lambda\big((1+\chi)(1-\psi_f) + \psi_c\big)\Big], \tag{34}$$

$$c = (1-z_{ss})\Big\{1 + \lambda(1+\chi)\phi_\pi + \phi_q(1+\lambda\psi_c) + \lambda\psi_c\Big\}. \tag{35}$$

Our main proposition is as follows.

Proposition 1. *A necessary and sufficient condition for equilibrium determinacy is*

$$(1-z_{ss})\lambda(1+\chi)(\phi_\pi + \psi_f - 1) + \phi_q\Big[(1-\beta)\big(1-(2+\chi)z_{ss}\big) + (1-z_{ss})\lambda\psi_c\Big] > 0. \tag{36}$$

Otherwise, equilibrium indeterminacy arises.

Proof. For equilibrium determinacy, the two roots of $Q(\omega) = 0$ must lie outside the unit circle.

$$Q(\omega) = a\omega^2 + b\omega + c.$$

Using the expressions for the coefficients, we obtain

$$\begin{aligned}
Q(0) &= (1 - z_{ss})\Big\{1 + \lambda(1+\chi)\phi_\pi + \phi_q(1 + \lambda\psi_c) + \lambda\psi_c\Big\} > 0, \\
Q'(0) &= -\phi_q\Big[z_{ss}(1-\beta)(1+\chi) + \beta(1 - z_{ss})\Big] \\
&\qquad - (1 - z_{ss})\Big[(1+\beta) + \lambda\big((1+\chi)(1-\psi_f) + \psi_c\big)\Big] < 0, \\
Q'(1) &= -(1 - z_{ss})(1-\beta) - \phi_q\Big[z_{ss}(1-\beta)(1+\chi) + \beta(1 - z_{ss})\Big] \\
&\qquad - (1 - z_{ss})\lambda\big((1+\chi)(1-\psi_f) + \psi_c\big) < 0.
\end{aligned}$$

The function $Q(\omega)$ is strictly decreasing on $[0, 1]$. The two roots of $Q(\omega) = 0$ lie outside the unit circle if and only if

$$Q(1) = (1 - z_{ss})\lambda(1+\chi)(\phi_\pi + \psi_f - 1) + \phi_q\Big[(1-\beta)\big(1 - (2+\chi)z_{ss}\big) + (1 - z_{ss})\lambda\psi_c\Big] > 0.$$

□

If $\phi_q = \psi_f = 0$, Proposition 1 reduces to the well-known determinacy condition in the New Keynesian literature:

$$\phi_\pi > 1. \tag{37}$$

If $\phi_q = 0$, the condition becomes

$$\phi_\pi + \psi_f > 1. \tag{38}$$

This means that expected future inflation misperception relaxes the determinacy condition by distorting the perceived real interest rate faced by households. A similar condition is obtained in Nutahara and Shirai (2026).

3.2 Interpretation

Proposition 1 can be interpreted as an extended Taylor principle.

Suppose that a permanent one-percent increase in inflation occurs. In this case, both π_t and $E_t\pi_{t+1}$ increase by one percent. Through the New Keynesian Phillips curve, the real marginal cost increases by $\frac{1-\beta}{\lambda}$ %. The dividend is given by

$$d_t = \left[\frac{1}{1+\chi} - \frac{z_{ss}}{1 - z_{ss}}\right] z_t + \frac{\psi_c}{1+\chi}\pi_t.$$

The first term summarizes two opposing forces already present in the standard model. If inflation rises permanently, firms would like to increase their own prices, but price stickiness prevents full adjustment. As a result, markups fall below their desired level and real marginal cost rises, which lowers profits. At the same time, the rise in the real wage induced by higher marginal cost increases labor supply and output, which supports profits. Carlstrom and Fuerst (2007) show that, under standard parameter values, the negative effect through real marginal cost dominates. In that case, a permanent increase in inflation lowers dividends and asset prices. The second term appears only under money illusion. If current inflation rises, households perceive an additional increase in the real wage and expand labor supply further. This raises output and profits beyond the standard model. If this additional effect is sufficiently strong, a permanent increase in inflation can raise dividends and asset prices.

The total effect of a permanent one-percent increase in inflation on dividends is Θ percent, where

$$\begin{aligned}\Theta &= \left[\frac{1}{1+\chi} - \frac{z_{ss}}{1-z_{ss}}\right]\frac{1-\beta}{\lambda} + \frac{\psi_c}{1+\chi} \\ &= \frac{(1-\beta)\big[1-(2+\chi)z_{ss}\big] + (1-z_{ss})\lambda\psi_c}{(1-z_{ss})\lambda(1+\chi)}.\end{aligned}$$

Using this expression, the determinacy condition in Proposition 1 can be written as

$$\phi_\pi + \Theta\phi_q + \psi_f > 1. \tag{39}$$

This condition means that the overall monetary policy response to a permanent increase in inflation must exceed one. The coefficient ϕ_π captures the direct response to inflation, while asset-price targeting adds $\Theta\phi_q$. Expected future inflation misperception also helps satisfy the condition, as it raises the perceived real interest rate faced by households.

If $\Theta > 0$, responding to asset prices enlarges the determinacy region. If $\Theta < 0$, the central bank's response to asset prices can be a source of equilibrium indeterminacy. A larger value of ψ_c increases Θ, making the asset-price channel more likely to be stabilizing.

The sign of Θ depends on the parameter values. $\Theta > 0$ if and only if

$$\psi_c > \frac{(1-\beta)\big[(2+\chi)z_{ss} - 1\big]}{(1-z_{ss})\lambda}, \tag{40}$$

asset-price targeting is more likely to be stabilizing when λ is large, χ is small, and z_{ss} is low.

As an example with $\Theta > 0$, consider the estimated parameter values reported by Christiano et al. (2010) (Tables 2 and 3), namely $\beta = 0.999$, a Calvo price-stickiness parameter of 0.62, a price markup (the inverse of real marginal cost) of 1.2, and $\chi = 0.12$. Under these parameter values, the threshold value of ψ_c is around 0.02. Thus, even a small degree of current inflation misperception is sufficient to make asset-price targeting stabilizing. For comparison, the estimate of ψ_c reported by Nutahara and Shirai (2026) is around 0.5, although it is obtained from a different medium-scale DSGE model for the Japanese economy.

As an example with $\Theta < 0$, consider the parameter values used by Carlstrom and Fuerst (2007), with $\beta = 0.99$, $\chi = 2$, $\lambda = 0.019$, and $z_{ss} = 0.85$. Although their model uses $\sigma = 2$, the following comparison is still informative. Under this calibration, the threshold value of ψ_c is around 8.42. Since this value is far above one, we have $\Theta < 0$ for all $\psi_c \in [0, 1]$.

These examples show that the effect of asset-price targeting depends on both structural parameters and the degree of money illusion. Without current inflation misperception, Θ is negative under the calibrations considered above. Money illusion can overturn this result by raising dividends and asset prices after an increase in inflation. If prices are relatively flexible, labor supply is elastic, and current inflation misperception is sufficiently strong, Θ becomes positive, so responding to asset prices enlarges the determinacy region. If prices are very sticky, labor supply is inelastic, or money illusion is weak, Θ remains negative. In that case, a stronger policy response to asset prices may work against equilibrium determinacy and can become a source of indeterminacy.

A related mechanism appears in Carlstrom and Fuerst (2007), where sticky wages raise the real wage after a permanent increase in inflation and support output and asset prices. However, under their parameter values, this positive effect is not strong enough to overturn the negative effect of sticky prices, so Θ remains negative. Money illusion works in the same direction and makes Θ more likely to become positive.

4 Conclusion

This paper investigates asset-price-targeting monetary policy in a New Keynesian model with money illusion. Money illusion is introduced as misperceptions of current and expected future inflation. We derive a necessary and sufficient condition for equilibrium determinacy and show that it can be written as an extended Taylor principle.

The main result is that money illusion changes the role of asset-price targeting relative to the benchmark analysis of Carlstrom and Fuerst (2007). In their model, if a permanent increase in inflation reduces dividends and asset prices, a policy response to asset prices weakens the overall policy response to inflation and can be a source of equilibrium indeterminacy. With current inflation misperception, however, higher inflation raises perceived real wages, labor supply, and output. If this effect is sufficiently strong, dividends and asset prices increase, and asset-price targeting supports equilibrium determinacy.

These results imply that the effects of monetary policy responses to asset prices depend not only on nominal rigidities, but also on how households perceive inflation.

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