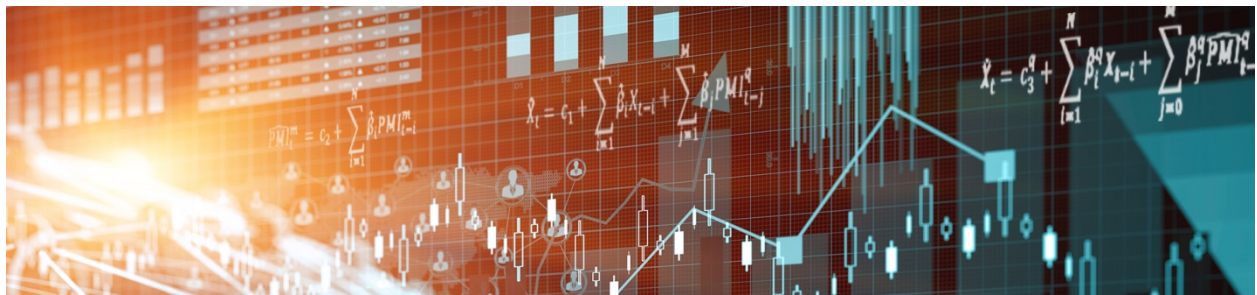


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# A Primer on Neo-Fisherian Economics



by Robert Amano, Thomas Carter and Rhys Mendes

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## **A Primer on Neo-Fisherian Economics**

**by**

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## Abstract

Conventional models imply that central banks aiming to raise inflation should lower nominal rates and thus stimulate aggregate demand. However, several economists have recently challenged this conventional wisdom in favour of an alternative “neo-Fisherian” view under which higher nominal rates might in fact lead to higher inflation. In this note, we show that a simple New Keynesian model can indeed deliver a neo-Fisherian link from higher nominal rates to higher inflation. However, the conditions under which this link emerges include a configuration of fiscal and monetary policy, which departs substantially from the configuration normally assumed in the New Keynesian literature. In particular, this configuration involves a commitment that the central bank will not respond too aggressively if inflation is off target, in the sense that policy will be set in a manner inconsistent with the Taylor principle. Active use of inflation to manage real government debt would also be needed. We identify significant challenges associated with both these conditions and argue that they militate against policies that aim to exploit the neo-Fisherian mechanism.

*Bank topics: Central bank research; Economic models; Inflation and prices; Interest rates; Monetary policy framework; Transmission of monetary policy*  
*JEL codes: E4; E5*

## Résumé

Dans les modèles traditionnels, les banques centrales qui entendent faire augmenter l’inflation doivent abaisser les taux d’intérêt nominaux, ce qui stimule la demande globale. Or, plusieurs économistes ont récemment remis en question cette conception généralement admise, en mettant en avant le point de vue dit « néo-fishérien » selon lequel une hausse des taux nominaux pourrait en fait provoquer une élévation du taux d’inflation. Dans la présente note, nous montrons qu’un modèle de type nouveau keynésien simple permet effectivement de relier la progression des taux d’intérêt nominaux à celle de l’inflation. Parmi les conditions d’apparition de ce lien, on trouve cependant une configuration de politiques budgétaire et monétaire sensiblement différente de celle habituellement postulée par les nouveaux keynésiens. Dans cette configuration, la banque centrale s’engage à ne pas réagir trop vigoureusement si l’inflation s’écarte de la cible, en ce sens que sa politique monétaire sera établie de manière incompatible avec le principe de Taylor. Cette configuration suppose aussi le recours actif à l’inflation comme instrument de gestion de la valeur réelle de la dette de l’État. Nous relevons d’importantes difficultés associées à ces deux conditions et faisons

valoir qu'elles plaident contre la mise en œuvre de politiques qui viseraient à exploiter le mécanisme néo-fishérien.

*Sujets : Recherches menées par des banques centrales; Modèles économiques; Inflation et prix; Taux d'intérêt; Cadre de la politique monétaire; Transmission de la politique monétaire*

*Codes JEL : E4; E5*

## Summary

- Conventional macroeconomic models imply that central banks aiming to raise inflation should lower nominal interest rates and thus stimulate aggregate demand.
- In contrast, neo-Fisherians argue that higher inflation can be achieved through higher nominal rates. The intuition for this possibility is based on the Fisher relation that equates nominal rates with the sum of real rates and expected inflation, along with an assumption that real rates are determined by factors outside policy-makers' control in the long run.
- We find that a simple New Keynesian model is indeed able to deliver a positive link between nominal rates and inflation. However, this requires two substantial departures from the policy framework normally assumed in the New Keynesian literature: (i) active use of inflation to manage the real value of the government's debt; and (ii) suspension of the Taylor principle, meaning that the central bank commits to not responding too aggressively to off-target inflation.
- Roughly speaking, the mechanism through which (i) and (ii) give rise to neo-Fisherian effects is as follows:
  - An increase in nominal rates tends to reduce the real present value of the government's future primary surpluses, all else being equal. So, if fiscal authorities abstain from adjusting surpluses in response to higher nominal rates (or actively target lower surpluses), then higher inflation will be needed to bring the real value of government debt down to a sustainable level.
  - However, the central bank must be prepared to accommodate higher inflation, rather than responding in the way that the Taylor principle would normally require.
- The neo-Fisherian mechanism thus depends on an unorthodox configuration of fiscal and monetary policy. In particular, since the mechanism depends on how the government adjusts surpluses in response to higher nominal rates, it effectively assigns control over nominal prices to fiscal policy. This would raise a host of political-economic concerns. It would also create a potential for the perception that the government is trying to inflate its debts away, along with some danger to the central bank's long-run credibility.
- Despite the coherence and theoretical appeal of the neo-Fisherian mechanism, the practical challenges identified above militate against policies that aim to exploit this mechanism.

# 1. Introduction

Conventional macroeconomic models imply that central banks aiming to raise inflation should lower nominal rates and thus stimulate aggregate demand through higher spending and borrowing. This understanding informed central banks' decisions to push nominal rates close to their effective lower bound in the years following the 2008–09 financial crisis, when inflation persistently fell below target in most developed economies. However, this conventional wisdom has recently been challenged by several prominent economists, most notably including John Cochrane (Hoover Institution) and James Bullard (Federal Reserve Bank of St. Louis),<sup>1</sup> who argue that inflation may have been low *precisely because* nominal rates had themselves been low. The intuition for this possibility comes from the Fisher equation:

$$i_t = r_t + E_t \pi_{t+1}, \quad (1)$$

where  $i_t$  and  $r_t$  respectively denote nominal and real interest rates, while  $E_t \pi_{t+1}$  denotes expected inflation. Assuming that real rates are pinned down by factors outside policy-makers' control in the long run (e.g., productivity growth), this equation encodes a long-run positive relation between nominal rates and expected inflation. On the basis of this relation, some economists have suggested that a commitment to keep nominal rates relatively high for an extended period of time could help to achieve higher inflation. According to this “neo-Fisherian” view, central banks' recent experiments operating near the effective lower bound may have been counterproductive as a strategy for raising inflation.<sup>2</sup>

In this note, we show that a simple New Keynesian model can indeed deliver a positive link between nominal rates and inflation. However, the conditions under which this link emerges include a configuration of fiscal and monetary policy that departs substantially from the configuration normally assumed in the New Keynesian literature. In particular, this configuration involves a commitment that the central bank will not respond too aggressively if inflation is off target, in the sense that policy would be set in a manner inconsistent with the Taylor principle. Active use of inflation to manage real government debt would also be needed. Significant challenges would be associated with implementing this alternate policy configuration in a credible manner.

The remainder of this note is organized as follows. Section 2 and Section 3 identify the conditions under which inflation and nominal rates may be positively linked in the context of a simple New Keynesian model. Section 4 then presents concerns regarding policies that aim to exploit this possibility. Section 5 concludes.

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<sup>1</sup> See Bullard (2015) and Cochrane (2016). See also Schmitt-Grohé and Uribe (2014, 2016).

<sup>2</sup> The term “neo-Fisherian” is sometimes used in a related literature emphasizing the potential for multiple steady states in models that include an effective lower bound. This is because these models often admit two rates of inflation at which the Fisher equation can hold in the long run: one at target and one near the effective lower bound. We view this as a conceptually distinct issue and will not tackle it in this note. See Bullard (2010) for an overview.

## 2. A Simple New Keynesian Model

We tackle the neo-Fisherian hypothesis using a simple New Keynesian model consisting of the usual aggregate demand equation and New Keynesian Phillips curve,<sup>3</sup> along with a monetary policy rule of the form

$$i_t = \phi_0 + \phi_\pi(\pi_t - \pi^*) + \epsilon_t, \quad (2)$$

where  $\pi^*$  denotes the central bank's inflation target. In this context,  $\epsilon_t > 0$  corresponds to a scenario in which the central bank sets nominal rates higher than its policy rule would normally require. We thus compare the case where the central bank sets  $\epsilon_t > 0$  for an extended period with the case where the central bank maintains  $\epsilon_t = 0$  constantly.

Does a policy deviation of this sort raise or lower inflation? It turns out that the answer hinges in part on the parameter  $\phi_\pi$ , which governs the central bank's responsiveness to off-target inflation. Suppose, for example, that  $\phi_\pi > 1$ , meaning that the central bank has committed to respond quite aggressively when inflation is off target. This is the standard case on which the New Keynesian literature normally focuses. It corresponds to the famous Taylor principle, which stipulates that nominal rates should adjust more than one-for-one with inflation. In this case, our model unambiguously predicts that higher nominal rates should exert the conventional disinflationary effect. **Chart 1** illustrates this effect, assuming that the deviation to higher nominal rates is announced at  $t = 0$  and then persists for 12 quarters. In this chart, we see that inflation is lower in each period of the deviation and then reverts to its initial level. The neo-Fisherian hypothesis thus fails when monetary policy obeys the Taylor principle.

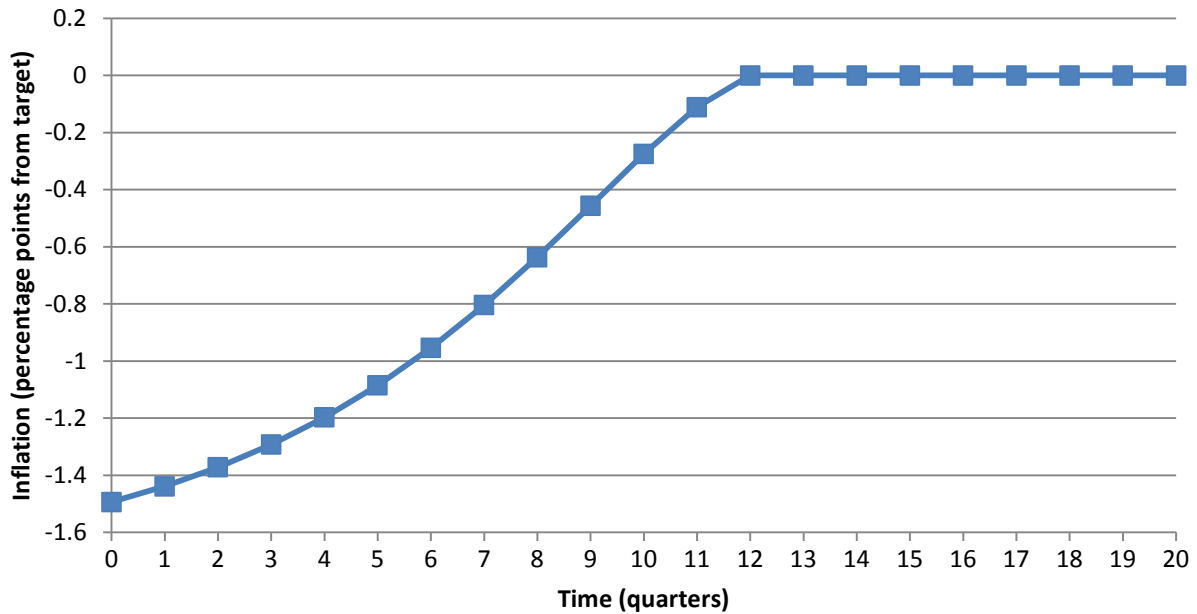
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<sup>3</sup> The aggregate demand equation captures households' tendency to increase demand when facing low real interest rates. It reads as  $x_t = E_t x_{t+1} - \sigma r_t$ , where  $x_t$  and  $E_t x_{t+1}$  respectively denote present and expected future output gaps. The Phillips curve, on the other hand, captures firms' price-setting behaviour. More specifically, it captures their tendencies to set high nominal prices when facing high demand and/or expecting high future inflation; the latter tendency arises in anticipation of the possibility that future inflation may erode future real prices, since nominal prices are assumed to be sticky. Formally,  $\pi_t = \kappa x_t + \beta E_t \pi_{t+1}$ .

The three-equation system consisting of these two relations, along with the monetary policy rule (2), has become a workhorse model for academics and policy-makers. See Part 1 of Woodford (2003) for a canonical treatment, although he considers a more general case that allows for shocks in the aggregate demand equation.

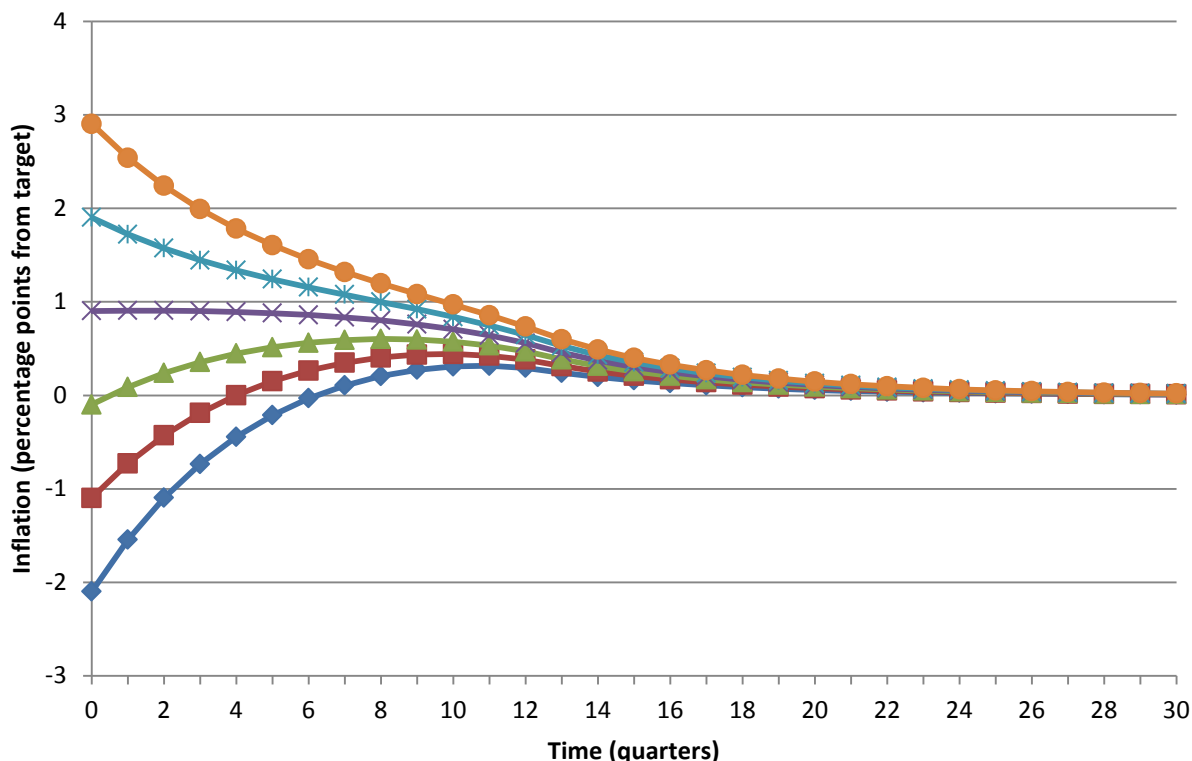


Chart 1: Unique time path for inflation when the Taylor principle holds (assuming  $\varepsilon_t = 1$  percentage point for 12 quarters, beginning at  $t = 0$ )



What if  $\phi_\pi < 1$  instead? In this case, the analysis is more complicated, since it is well known that the Taylor principle plays a key role in anchoring inflation expectations: if the central bank has not committed to responding aggressively when inflation is off target, then inflation expectations may become unmoored. In our model, this risk manifests itself in the form of multiple equilibria. **Chart 2** gives time paths for inflation under some of these equilibria, again assuming that the deviation to higher nominal rates is announced at  $t = 0$  and then persists for 12 quarters. Although inflation eventually converges to its initial level under all of these equilibria, we see that its short-run behaviour depends on the particular equilibrium that is selected. More specifically, high-inflation paths like that in purple could be selected, in which case the neo-Fisherian hypothesis would hold in the short run. However, low-inflation paths like that in blue could also be selected. Faced with this ambiguity, neo-Fisherians use the fiscal theory of the price level (Woodford 1995) to identify the particular equilibrium that is likely to be obtained. We discuss and apply this theory in the next section.

Chart 2: Time paths for inflation when the Taylor principle fails (assuming  $\varepsilon_t = 1$  percentage point for 12 quarters, beginning at  $t = 0$ )



### 3. Fiscal Theory and the Neo-Fisherian Mechanism

The fiscal theory begins by recognizing that the government normally faces an intertemporal budget constraint equating its real debt with the real present value of its future surpluses. In our model, this constraint reads as

$$\frac{B_{-1}}{P_0} = s_0 + \frac{s_1}{1+r_0} + \frac{s_2}{(1+r_0)(1+r_1)} + \dots = s_0 + \frac{s_1}{1+i_0-\pi_1} + \frac{s_2}{(1+i_0-\pi_1)(1+i_1-\pi_2)} + \dots, \quad (3)$$

where  $B_{-1}$  denotes the government's initial nominal debt,  $P_0$  denotes the current price level, and  $(s_0, s_1, \dots)$  denotes the stream of real primary surpluses that the government plans to achieve going forward.<sup>4</sup> In conventional models, this constraint is assumed to balance through adjustments in the surplus stream. More specifically, fiscal authorities are assumed to take nominal prices as given and then adjust surpluses to maintain intertemporal budget balance. In contrast, the fiscal theory allows the treasury to make use of nominal prices in the re-balancing process. In particular, the theory assumes that fiscal authorities choose surpluses independently and then rely on changes in the nominal price path  $(P_0, \pi_1, \pi_2, \dots)$  to balance equation (3) through their effect on real debt  $B_{-1}/P_0$ , along with the real rate at which future surpluses are discounted.

<sup>4</sup> For concreteness, we assume that the government has positive initial debt, so the present value of the stream of surpluses must also be positive.

Under the fiscal-theory view, the various paths in Chart 2 emerge as a menu from which the treasury chooses, depending on the surplus stream that it opts to target following the announcement of higher rates at  $t = 0$ . To better understand this menu, suppose that the government abstains from adjusting surpluses at  $t = 0$ , and note that higher nominal rates place downward pressure on the right-hand side of equation (3) by reducing the present value of future surpluses, all things being equal. Because the surpluses include taxes, the present value of households' future tax liabilities would also fall with the increase in nominal rates. This would trigger a wealth effect whereby households raise their spending, causing prices to rise until equation (3) comes back into balance. More generally, this mechanism tends to link higher inflation with lower surpluses. As a result, the neo-Fisherian hypothesis is more likely to hold in the short run if the government responds to higher rates by either abstaining from adjusting surpluses or actively targeting lower surpluses.

To summarize: in addition to requiring that the central bank abandon the Taylor principle, the neo-Fisherian mechanism also casts fiscal policy in an unconventional role since the government must internalize its influence on nominal prices and actively use inflation to manage the real value of its debt. More generally, our model delivers the following four predictions concerning the neo-Fisherian hypothesis:

- (i) The sign of the link between nominal rates and inflation depends on the monetary policy reaction function, specifically the parameter indexing the central bank's responsiveness to off-target inflation.
- (ii) In standard cases where this parameter satisfies the Taylor principle, higher nominal rates have an unambiguously disinflationary effect, consistent with conventional views on monetary transmission.
- (iii) In cases where the Taylor principle fails, the economy admits multiple equilibria, and some have the property that higher nominal rates are associated with higher inflation in the short run.
- (iv) However, ensuring that these equilibria are selected would require careful coordination with fiscal authorities, since their selection would ultimately depend on how the treasury adjusts surpluses in response to higher nominal rates.

## 4. Critical Assessment

Based on the above analysis, it would likely be difficult to achieve higher inflation through higher nominal rates, even though our model exhibits neo-Fisherian behaviour under certain conditions. The main problem is that these conditions include an unorthodox configuration of fiscal and monetary policy. For example, the neo-Fisherian mechanism depends critically on the way that the government adjusts surpluses in response to the announcement of higher nominal rates. As a result, control over nominal prices would effectively be assigned to fiscal policy, raising a host of political-economic concerns, including many of the issues associated with the debate on central bank independence. Active use of inflation to manage the government's real debt could also lead to the perception that the government is trying to merely inflate its debts away.

The neo-Fisherian mechanism would also entail some danger to the central bank's credibility. On this front, we note that the Taylor principle is widely viewed as a key component in inflation-targeting frameworks, in part due to its usefulness in anchoring inflation expectations (as discussed in Section 2). As a result, the

suspension of this principle, required by the neo-Fisherian mechanism, could undermine central bankers' perceived *bona fides*. Similar reputational costs could arise if private agents fail to understand that the division of labour between the central bank and government has changed, since private agents might then attribute fiscal errors to monetary policy.

Furthermore, the necessary policy changes may be difficult to communicate to the public. For this reason, it is natural to ask about what might happen if the public fails to process all of the changes in the policy environment. Put differently, it is natural to ask about what might happen if the public fails to form fully rational expectations at the time that the new policy is announced. On this front, Bullard and Mitra (2002), among others, have studied New Keynesian models in which the private sector uses learning heuristics to form expectations. One of this literature's key insights is that the Taylor principle also plays a role in facilitating the learning process: if monetary policy obeys the Taylor principle, then expectations tend to converge to the rational benchmark; otherwise, this convergence generally fails. As a result, agents' behaviour in the latter case may differ substantially from the predictions delivered by models assuming rational expectations, including those reported in our previous section. For example, Garcia-Schmidt and Woodford (2015) recently replaced rational expectations with a learning heuristic in a model otherwise similar to ours and argue that a commitment to a high nominal interest rate peg for a long period of time is likely to exert the conventional disinflationary effect in this setting.

Finally, we note that the fiscal-theory literature is still at a relatively early stage in its development. See Leeper and Leith (2016) for an overview, especially Section 6 on empirical work in this area.

## 5. Concluding Remarks

In this note, we showed that a positive link between nominal rates and inflation can emerge from a simple New Keynesian model, in contrast to conventional views on monetary transmission. However, the necessary conditions for this include two substantial departures from the policy configuration normally assumed in the New Keynesian literature: (i) active use of inflation to manage the real value of government debt, and (ii) suspension of the Taylor principle. Operating under this alternate configuration would entail significant challenges, especially from a practical political-economic perspective. Despite the neo-Fisherian mechanism's coherence and theoretical appeal, these challenges militate against policies that aim to exploit this mechanism.

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