



Is forward-looking inflation targeting destabilizing? The role of policy's response to current output under endogenous investment

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ABSTRACT

We show that, with endogenous investment, virtually all monetary policy rules that set a nominal interest rate in response solely to expected future inflation induce real indeterminacy in models with (i) staggered prices, (ii) staggered prices and staggered wages, and (iii) staggered prices, staggered wages, and firm-specific capital. In (i), policy's response to current output can help significantly in ensuring determinacy with an infinite labor supply elasticity, but little with empirically plausible labor supply elasticity. In (ii), responding to output always helps a great deal, though under low price stickiness and without capital adjustment cost it may call for a moderate response to output in order to ensure determinacy for a wide range of response to inflation. In (iii), even a tiny response to output can always render equilibrium determinate for a wide range of response to inflation.

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1. Introduction

In recent years, explicit inflation-forecast targeting, which takes the form of forward-looking interest rate feedback rules that set a short-term nominal interest rate in response to the forecasted value of future inflation, has become a popular framework for conducting monetary policy at central banks around the world. This practice began in New Zealand in 1990 and, within a decade, spread to other industrial countries.¹ Since 1997, a number of emerging market and transition countries have adopted such a policy.² Many more are moving toward this direction.³ In a sense, forward-looking inflation targeting has become a defining characteristic of monetary policymaking worldwide.

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¹ Among these countries are Canada, the United Kingdom, Australia, Finland, Sweden, Spain, Switzerland, Iceland, and Norway, all of which publish their inflation forecasts (Finland and Spain adopted the euro in 1999). The United States, the European Central Bank, and Japan are usually viewed as having followed some implicit inflation-forecast targeting procedures, where more explicit targeting has also received consideration recently. Leiderman and Svensson (1995), Bernanke and Mishkin (1997), and Bernanke et al. (1999) provide some background information and analysis.

² These include Israel (now an industrial country), the Czech Republic, Korea, Poland, Brazil, Chile, Colombia, South Africa, Thailand, Mexico, Turkey, Hungary, Peru, and Philippines, all of which but Mexico publish their inflation forecasts. See Schaechter et al. (2000), Roger and Stone (2005), and Jonas and Mishkin (2005) for more details.

³ Estimated forward-looking interest rate feedback rules explain well the behavior of interest rates in the United States, Germany, and Japan in the 1980s and 1990s. See, among others, Chinn and Dooley (1997), Clarida and Gertler (1997), Clarida et al. (1998), Orphanides (2000), Orphanides and Williams (2005), and Carare and Stone (2006).

There are many reasons for adopting an inflation-targeting rule in monetary policymaking.⁴ The point that it is the expected future inflation that needs to be targeted has been emphasized by both policymakers and researchers. Among other advantages, targeting the expected future inflation is essential for tackling the observed delay in the response of inflation and output to monetary policy actions, for anchoring private sector's inflation expectations, and for incorporating a wide variety of up-to-date information in policymaking. In this sense, forward-looking inflation targeting can be justified on the ground of both policy effectiveness and central bank accountability and credibility.⁵ This is why many researchers recommend that central banks commit to forward-looking inflation targeting rules and why many policymakers follow suit.⁶

There is yet a pitfall of forward-looking inflation targeting: it is prone to real indeterminacy of equilibrium and therefore welfare-reducing fluctuations unrelated to economic fundamentals.⁷ Some researchers argue that inflation-forecast targeting central banks can avoid such policy-induced instability by appealing to some flexible rules under which a nominal interest rate responds not only to expected future inflation but also to other endogenous variables such as current output.⁸ Their studies, however, have all abstracted from investment activity. Carlstrom and Fuerst (2005) argue that the indeterminacy problem is more severe when investment activity is taken into account.⁹ They show that essentially all strict inflation-forecast targeting rules induce real indeterminacy of equilibrium in a staggered-price model with endogenous investment. Huang and Meng (2007b) show that, although the determinacy region can be larger with greater price stickiness in such a model, the increase is almost negligible under empirically plausible calibration.¹⁰

In this paper, we first demonstrate that, with endogenous investment, virtually all monetary policy rules that set a nominal interest rate in response solely to expected future inflation induce real indeterminacy of equilibrium, not only in the standard models with staggered prices, but also in models with both staggered prices and staggered wages, as well as in recently popular models with staggered prices, staggered wages, and firm-specific capital. As we show, this conclusion holds for an empirically plausible range of price stickiness.

We then investigate whether letting policy respond also to current output may help ensure a unique equilibrium under endogenous investment. While Carlstrom and Fuerst (2005) suggest that such a policy is unlikely to help mitigate the indeterminacy problem in the standard models with staggered prices, Kurozumi and Zandweghe (2008) and Huang and Meng (2007b) find otherwise with an infinite elasticity of labor supply.¹¹ Here we find that, with a finite, empirically plausible labor supply elasticity, policy's response to current output helps little in ensuring determinacy. We show that this happens because a smaller labor supply elasticity (or, equivalently, a greater relative risk aversion in labor) implies a greater elasticity of wages and prices with respect to aggregate demand via a demand-income effect in the labor market, so a smaller degree of endogenous nominal stickiness, and thus a less effective stabilization policy prescribed to react to real economic activity. Consequently, the range of policy's response to expected future inflation that can render equilibrium determinate remains fairly narrow in the staggered-price models with a finite, calibrated labor supply elasticity, regardless of how aggressively the policy responds to current output.

In the models with both staggered prices and staggered wages, we find that policy's response to current output can help a great deal in stabilizing the economy, and that the determinacy region is no longer sensitive to the relative risk aversion in labor. We show that the former happens because staggered wage-setting induces a smaller elasticity of wages and prices with respect to aggregate demand via a substitution effect in the labor market through a relative-wage consideration that works against the demand-income effect, as households dislike fluctuations in hours worked. To understand the latter we show that, while a greater relative risk aversion in labor strengthens the demand-income effect, it also strengthens the substitution effect at the same time, and the two forces are essentially canceled out under our calibration. This gives rise to a larger degree of endogenous nominal stickiness, and thus a more effective stabilization policy prescribed to react to real economic activity and a greater determinacy region, regardless of the magnitude of the relative risk aversion in labor. That said, under low price stickiness without capital adjustment cost, it may call for a moderate response of policy to current output in order to ensure determinacy for a wide range of response of the policy to expected future inflation in the staggered-price\staggered-wage models. This problem disappears in the models with staggered prices, staggered wages, and firm-specific capital, where we find that even a tiny response of policy to current output can render equilibrium determinate for a wide range of response of the policy to expected future inflation, even under low price stickiness, and without capital adjustment cost.

⁴ See, among many others, Haldane (1995), Blinder et al. (2001), Svensson (2001), Fracasso et al. (2003), and Leeper (1991).

⁵ See, among others, Svensson (1997), Bernanke and Woodford (1997), Batini and Haldane (1999), Levin et al. (2003), Orphanides and Williams (2005), and Bernanke and Woodford (2005).

⁶ See, among others, Svensson (1997, 1999), Svensson and Woodford (2003), and Goodhart (2000).

⁷ See, among others, Bernanke and Woodford (1997), Clarida et al. (1998, 2000), Woodford (2000, 2003), and Carlstrom and Fuerst (2000).

⁸ See, for example, Clarida et al. (1998, 1999), Christiano and Gust (1999), Rotemberg and Woodford (1999), Woodford (1999, 2003), and Levin et al. (2003). In practice, almost all inflation targeting central banks follow such a flexible inflation-forecast targeting procedure.

⁹ See Huang and Meng (2007a) for a related study and Dupor (2001) for a continuous-time analysis.

¹⁰ The finding that under forward-looking inflation targeting determinacy is more likely to occur with greater price stickiness is in contrast to the finding by Sveen and Weinke (2005) that under current-inflation targeting determinacy is less likely to occur with greater price stickiness.

¹¹ Sveen and Weinke (2005) and Benhabib and Eusepi (2005) demonstrate under current-inflation targeting with endogenous investment that letting policy respond to current output may help mitigate the indeterminacy problem.

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