Optimal reputation building in the New Keynesian model

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ABSTRACT

We study the optimal committed monetary policy when the private sector has imperfect information and has to infer the central banker's ability to commit. The optimal policy is designed to influence learning and improve the central banker's reputation of being committed. The reputation building implies that when a committed central banker first takes office, he should resist the temptation to stimulate output with initially high but declining inflation; he should reverse a missed inflation target rather than accommodate it; and he should adopt a less accommodative inflation response to a cost-push shock than a full commitment solution suggests.

1. Introduction

Policy design in modern dynamic stochastic general equilibrium models with nominal frictions is typically conducted in one of two modes: the monetary authority is fully capable of commitment or completely unable to commit. In both the cases, it is implicitly assumed that the private sector knows whether policymakers are capable of commitment or not. However, the ability to commit is by nature unobservable.[1]

This paper studies optimal policy design for a committed policymaker when the private sector does not know the policymaker's ability to commit but seeks to infer it from economic data. We work with a version of the textbook New Keynesian monetary policy model in which the private sector's belief about future inflation is a key determinant of real activity and welfare. In our setup, a committed central banker faces a skeptical private sector which attaches a likelihood – an extent of credibility – to inflation being generated by his optimal plan yet also believes it may result from another plan with both inflation bias and stabilization bias as would arise if he were not able to commit.[2] The private sector updates its belief in a Bayesian fashion based on observed inflation rates which center around, but are more variable than, the central banker's policy choices due to implementation errors. This evolving belief is interpretable both as the reputation of the central banker and the

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[1] A large literature has been devoted to designing apparatus for policymakers to communicate to the private sector their ability to commit. See the works of Dixit (2001), Lohmann (1992), Herrendorf (1998), Lockwood (1997), Svensson (1997), Walsh (1995, 2002), and Woodford (2003), among many others. In practice, central banks have also provided various means for private analysts to compare inflation announcements with outcomes. Examples include inflation reports, the release of the minutes of board meetings, and the publication of the central bank's forecasts.

[2] In the literature (e.g., Gali and Gertler, 2007), inflation bias is the higher average inflation rate that arises when policy is determined without commitment capability, whereas stabilization bias is the greater extent of the variability of inflation in response to cost-push shocks such as energy price shocks.

credibility of his inflation plans. We show that the committed central banker with a poor reputation can use his policy actions to enhance his reputation and better manage the private sector's inflation expectations. This reputation-building incentive plays an important role in shaping the optimal policy in our model.

The previous literature has highlighted two effects of imperfect credibility on the optimal monetary policy when the extent of credibility is exogenous. First, imperfect credibility causes the private sector to expect a higher inflation because the alternative policy is more inflationary. Second, imperfect credibility reduces the control that a central banker has over the private sector's expectations. As a result, the optimal inflation with imperfect credibility should be higher and more accommodative of shocks in the economy. However, we show that once the private sector's learning is taken into account, the optimal policy should not only accommodate imperfect credibility but also enable the central banker to regain his reputation so that his future policy plans will be more credible.

In determining the optimal inflation plans, reputation building is thus weighed against the two other consequences of imperfect credibility. When the reputation-building effect is strong enough, it is optimal for a central banker with a lower credibility to follow a less inflationary policy. The combination of low credibility and low actual inflation means large negative inflation surprises for the private sector. Although these inflation surprises reduce output, they work to convince the private sector that the current central banker is committed. Therefore, when the long-term benefit of an improved reputation is large enough, it is optimal for the committed central banker to pay the short-term output cost in exchange for the improved reputation. A recent paper by Matthes (2015) provides empirical support for the reputation building mechanism. Using the U.S. data since 1960, he finds that the private sector increasingly believed that the monetary policy was set with commitment during the Volcker disinflation.

This tradeoff between building a reputation and accommodating imperfect credibility is also important for the central banker's optimal response to cost-push shocks and missed inflation targets. In face of a cost-push shock, a central banker with a lower credibility tends to respond more accommodatively since it is more difficult to smooth the shock's effects on inflation and output when he has limited control over inflation expectations. On the other hand, a cost-push shock also provides a good opportunity for the committed central banker to signal his type, as a central banker who cannot commit will accommodate the shock. The incentive to accelerate reputation building can dominate the accommodating effect so that a central banker with a lower credibility accommodates a cost-push shock less than one with a higher credibility.[3]

When the actual inflation misses its target by a positive surprise, it stimulates output. The committed central banker with imperfect credibility could smooth the immediate real effect by promising higher-than-average inflation in subsequent periods. The reputation-building effect, on the other hand, dictates that he generates a period of lower-than-average inflation in order to regain some of the reputation lost due to the positive surprise. When the reputation-building effect dominates, the optimal inflation response is to reverse the positive deviation from the target, shifting the optimal policy from "flexible inflation targeting" to "flexible price-level targeting".

To assess the quantitative importance of reputation building, we perform a simulation exercise to show that the inflation and the output gap exhibit significantly different statistical properties when the central banker is concerned with reputation building, especially when his credibility is low. Moreover, we find that over a large parameter space that is empirically relevant, the reputation-building effect dominates the accommodating effect in shaping the optimal policy.

This paper is by no means the first to distinguish the ability to commit from the credibility of commitment. The reputation literature on monetary policy, of which Barro (1986) and Backus and Driffill (1985a,b) are representative examples, shows that reputation can motivate a discretionary policymaker to keep inflation low. However, the committed policy is exogenous in these models.[4] Barro (1986) notes this shortcoming: "Zero inflation is optimal with the assumed cost function if commitments are not only made but are also fully believed. In the present context credibility is tempered by the possibility that the policymaker is type 2 [lacks commitment ability]. In this case the best value to commit to need no longer be zero inflation" (page 17). In response to this concern, Cukierman and Liviatan (1991) and King et al. (2008) study the optimal committed monetary policy under imperfect credibility. However, both papers adopt the Lucas–Barro–Gordon Phillips curve, instead of the forward-looking New Keynesian Phillips curve that has been widely used in the modern macro literature. In this paper, we find that incorporating this forward-looking constraint leads to a stronger reputation-building effect and, in turn, a different optimal inflation response to imperfect credibility. Our model also leads to richer equilibrium dynamics of reputation by realistically assuming that actual inflation randomly deviates from its policy target (imperfect public monitoring).[5] In Appendix A, we provide an algorithm for solving this class of models with both forward-looking constraints and imperfect public monitoring.[6]

Our results on the consequences of imperfect credibility for optimal policy design differ from those of the "loose commitment" approach originally developed by Roberds (1987) and recently extended by Schaumburg and Tambalotti

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[3] Our policy prescription that inflation should be lower on average is consistent with the literature on monetary policy delegation (Rogoff, 1985). However, delegation makes the response of inflation to cost-push shocks less variable than the socially optimal level whereas in our model, the response of inflation to cost-push shocks becomes more variable once the reputation building effect is taken into account.

[4] Two recent papers (Xandri, 2013; Hansen and McMahon, 2016) advance this literature further and emphasize the importance of signaling in monetary policy decisions. However, in both papers, the "good" type signals through other channels than varying the monetary policy and in turn the policy space is binary and exogenous. By contrast, the committed policy in our model is endogenously determined as a result of signaling by the committed type.

[5] In both Cukierman and Liviatan (1991) and King et al. (2008), the reputation either increases or drops to zero. In our model, imperfect public monitoring allows the committed central banker to spend part of his reputation capital if it is optimal to do so.

[6] Our algorithm builds on Marcet and Marimon (1998, 2011) and Khan et al. (2003).