Communication in repeated monetary policy games

Nurlan Turdaliev *

University of Windsor, 401 Sunset Avenue, Windsor, ON, Canada N9B 3P4

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A B S T R A C T

A central bank and the public are engaged in an infinitely repeated monetary policy game with communication. For reasonable discount factors, there exists an equilibrium in which the central bank fully reveals its private information. The fully revealing equilibrium is superior to the uninformative equilibrium. The welfare gain of transparency increases with the slope of the Phillips curve, the natural rate of unemployment, and the degree of heterogeneity in the population. Transparency results in lower inflation but a higher variability of inflation.

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1. Introduction

Central bankers around the world seem to spend a considerable amount of effort on communicating their policies. Examples include speeches given by central bankers, policy announcements, press releases, testimonies, and minutes of policy meetings. In recent years, some central banks have been increasing the amount of information available to the public and making it more transparent. As Paul Jenkins of the Bank of Canada says, "while central banks used to say little and let actions speak for themselves, today it would be accurate to say that words can, and often do, speak louder than actions" (see Jenkins, 2004).

In this regard, the examples of the Bank of Canada and the Federal Reserve in the U.S. are instructive. In the early 1990s, the Bank of Canada (1) did not disclose its decisions on its policy instrument and thus did not explain them; (2) did not change the short-term interest rate in fixed increments; (3) did not hold policy decision meetings at fixed dates; and (4) did not make sufficiently detailed commentaries on the Canadian economy and monetary policy (see Macklem, 2005). In the mid-1990s, the Bank took several important steps towards greater transparency. In 1995, it started publishing its semi-annual Monetary Policy Report that details the Bank's overview of the economy and its outlook for growth and inflation; in 1996, it started issuing a press release after each policy decision; since 2000, it has had eight fixed policy decision dates per year.

In the U.S., the past bias towards secrecy of the Federal Reserve is well documented (see Goodfriend, 1986). Over the last decade this has changed. In February 1994, the Federal Open Market Committee (FOMC) decided to issue a press release after each meeting at which a policy action was taken; prior to this date the market had to infer the federal funds rate target. Starting May 1999, a press release had been issued after each meeting at which there was a major change in views about future developments. A "policy bias", part of such press release, was widely interpreted by the market as a hint at future policy actions. Since March 2002, the roll call of the vote on the federal funds rate target has been released after each meeting; this would include the preferred policy choice of the dissenters. In December 2004, the FOMC decided to release the minutes of its meetings three weeks after each meeting instead of six weeks. Each of these events is a step forward towards greater transparency and an increasing number of occasions to talk to the public.

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* Tel.: +1 519 253 3000x2391; fax: +1 519 973 7096.
  E-mail address: nurlan@uwindsor.ca.

Sandra Pianalto, the President of the Federal Reserve Bank of Cleveland, says that the FOMC "has learned to talk" when referring to the evolution of the FOMC from being viewed as secretive to being viewed as more transparent. "Do markets understand our behavior because we are more predictable or because we communicate better? I suspect that both forces are at work. As they say, talk is cheap, and I am not suggesting that better communications are of any value without actions that back up the words" (see Pianalto, 2005). This statement underscores one of the main questions this paper addresses: Can a central bank talk informatively, Does the public listen to the central bank, and What does it take to be listened?

In this paper we consider only a special kind of communication by central banks, in which sending a message does not change the payoff structure for the parties involved.[1] This means of communication contrasts with costly signaling such as the education game in Spence (1974).

We build a model with many private agents and a central bank and show how this model can be viewed as a game of two players. We use a version of the Sender–Receiver cheap-talk game introduced by Crawford and Sobel (1982). In cheap talk games — for an overview, see Farrell and Rabin (1996) — players' payoffs are not affected by message sending. Talk is "cheap". We model the relationship between a central bank and the private economy as a repeated monetary policy game with cheap talk. There are two players, a central bank (CB) and the public (P). The CB can be of two possible types, "low-inflation" or "high-inflation". After learning its type, the CB announces it (not necessarily truthfully). Next, the P chooses its action (which results in the formation of inflation expectation), and then the CB chooses inflation. The actions of both players are observable. First, we show that when the CB is reasonably patient, there is a fully revealing equilibrium in which the CB truthfully announces its type. The intuition behind the first result is that when the CB is sufficiently patient, reputational considerations are important. Second, we demonstrate that social welfare is higher in the best fully revealing equilibrium than in the best babbling equilibrium. The reason behind this result is that when the type is truthfully announced, the P and the CB can attain the best possible outcome under rational expectations.[2] It is also found that the welfare gain of transparency increases with the slope of the Phillips curve, the natural rate of unemployment, and the degree of heterogeneity in the population.

We study several different environments. We allow the CB's type to be either permanent or change every period following an i.i.d. process. In the latter case, the CB makes announcements every period. We also consider the case when the CB does not have perfect control over inflation, and its inflation target is not observable. In these new environments, as before, the best fully revealing equilibrium is superior to the best uninformative equilibrium.

The paper is organized as follows. Section 2 describes the environment. Section 3 contains the main results. Section 4 presents two extensions of the basic model. Section 5 reviews the related literature and concludes.

2. Model

2.1. Economic environment with many private agents

As in Athey, Atkeson, and Kehoe (2005) and Stokey (2003), the economy is populated by a central bank (CB) and a continuum of private agents. Agents' preferences are over unemployment and inflation (see chapter 6 in Woodford, 2003, for a discussion of how such preferences could be obtained from a full-fledged general equilibrium model through a second-order approximation). The population of private agents is heterogeneous and consists of two types. The first type prefers a lower rate of inflation than the second type. The proportion of the high-inflation type agents (and thus, the proportion of agents of the other type) changes over time. The aggregate statistic on the proportions of agents of the two types is not known to private agents; however, they know the process governing the change of the proportions. The changing preferences over inflation at the individual level can be motivated by changing circumstances of individuals — say, their borrowing or lending position. The change in the proportions of types can be viewed as an aggregate shock.

The CB, unlike private agents, observes the aggregate of the private information and knows perfectly the composition of types in every period. (Modern central banks gather a vast amount of information across their nations, and are likely to know more than private agents about an aggregate shock.) The CB is assumed to maximize social welfare: it maximizes a weighted average of the agents' utilities by giving equal weight to every agent. Thus, the weight given to, say, the low-inflation type equals the proportion of this type agents in the population, and this weight changes over time. (Sleet, 2004, builds a model with similar shock structure where preference shocks are over the provision of public goods.) To simplify the analysis, we follow the literature and assume that the monetary policy instrument of the CB is inflation.

Each period, the CB observes the proportions of agents of the two types. Next, it announces its target inflation rate. Private agents learn about their own preferences over inflation and choose the growth rate of their individual wages. They do this before learning the actual rate of inflation. Next, the CB chooses the inflation rate. This timing is important, and this assumption follows the literature based on Barro and Gordon (1983). It intends to capture the fact that monetary policy decisions can react to economic disturbances faster than private agents can adjust their nominal wage contracts.

Let us describe the model in more detail. A private agent maximizes the lifetime utility function $\sum_{t=0}^{\infty} \delta^t u(t)$, where $u(t)$ is period t utility. Each period she chooses her individual wage. The form of the one-period utility function u is

$$-(w-\pi)^2 - z^2 - (\pi-\theta)^2, \tag{1}$$

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[1] We study so-called "cheap talk" games.
[2] We call this the Ramsey outcome.