2
The Model

We consider a setting where there is a continuum of price setting firms of measure 1, and a Central Banker. Each firm $i \in [0,1]$ chooses price p_i to maximize profits

$$\pi_i \left(p_i, p_{-i}; \theta\right) = K - (1-r)\left(p_i - \theta\right)^2 - r\left(p_i - \overline{p}\right)^2,$$

where K is a large positive number – the maximum profit level firm i can earn,

$$\overline{p} = \int_{i \in [0,1]} p_i d_i$$

is the average price level, and θ measures the aggregate economic activity.

This utility implies that, when picking its pricing policy, the firm cares about relative prices, through the term $\left(p_i - \overline{p}\right)^2$, and the overall activity level, $\left(p_i - \theta\right)^2$. Such preferences are standard, and can be derived from a monopolistic competition model à la (4)

The Central Banker's preferences are represented by

$$U^{CB}\left(\overline{p}, \sigma_p^2; \theta\right) = -\left(\overline{p} - (\theta - c)\right)^2 - \beta\sigma_p^2,$$

where $\sigma_p^2 = E\left[p_j - \overline{p}\right]^2$ is a measure of price volatility, and $\beta \geq 0$ captures the relative weight that the banker puts on the variability of prices *vis-a-vis* their average price target, $\theta + c$. We assume that such target differs by an amount c from the real state θ. This is meant to capture the misalignment of incentives between the firms and the banker. In fact, there is a myriad of reasons – ranging from time inconsistency problems ((12)) to the possibility of the banker being subject to political pressure by interested parties ((17)) – to believe that a (benevolent) central banker has incentives to produce unexpected inflation. The assumption that the banker would like to convey a higher state than the true one is a reduced form way to model these incentives.

There are at least two reasons to justify why the Central Banker may care about price volatility. The first is straightforward: if the monetary authority cares about the firms, it would dislike volatility. This can be easily seen for the special case in which there is no misalignment of incentives between the firms and the banker, and the latter maximizes the sum of the firms' profits. The second is founded on the anecdotal evidence provided by Central Banks' statements: in most of them, there are explicit references to the authorities' pursuit of price volatility reduction.[1]

The Central Bank is better informed than the agents about θ. The agents view θ as being uniformly distributed over $[0,1]$, whereas the authority knows the exact value of θ. Before setting their prices, however, agent i learns a private signal about the state, x_i, which bounds the degree of asymmetry between the authority and the firms.

We assume the following simple technology for the signal. Letting $I_i = 1$ with probability q, and $I_i = 0$ with probability $1 - q$,

$$x_i|\theta, I_i = \begin{cases} \theta \text{ if } I_i = 1 \\ x_i \sim U[0,1], x_i \perp \theta \text{ if } I_i = 0 \end{cases}.$$

In words, the signal fully reveals the state with probability q, but is completely uninformative with complementary probability.

Before the agents receive their private signal about the state, the Central Bank can make a statement about the Economy. We make the natural assumption that the firms cannot commit to any particular pricing policy so that the communication between the Central Bank and firms takes the form of c*heap talk*.

The game unfolds as follows. In period zero, the monetary authority learns θ, and makes a statement s in a set S about the state. In period 1, each firm i observes both the Central Bank's statement and the private signal x_i. Finally firms set prices simultaneously in period 2.

[1]See *FBR Speech* on November 18th, 2005 by Vice-Chairman Ferguson on housing prices or the speech by Otmar Issing, member of the European Central Bank, on the 13th and 14th of December, 2004.