The Political Economy of Expert Advice and the Macroeconomy: A New Interpretation of the Political Business Cycle

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Abstract

In this work I slightly modify the informational structure in Rogoff (1985)'s macroeconomic model to allow for the existence of expert advice (that here we interpret as Media) in a world where supply shocks are uncertain and monetary policy is discretionary. The expert is able to elicit signals that are correlated with some noise to the state of the economy, which here takes the simple form of symmetric, positive or negative, supply shocks. The expert sends a public message based on its signal in the form of forecasts on the next period's state. Citizens have to choose among different platforms offered by opportunistic politicians that compete à la Downs on *one* policy dimension: The administration's level of tolerance to inflation surprises. With superior information (that of the expert), voters appoint policymakers with different degrees of tolerance to inflation depending on which is the likeliest state; by doing so they improve their expected welfare. However, if the expert (Media) is *partisan* or has preferences that are dissonant to those of the general public, it can manipulate beliefs on the state of the economy to its advantage, strategically and systematically. As an aside, and a very important one, we obtain post-electionary Political Business Cycles (PBC): When the Media announces deceitfully a "low state" ("high state"), the appointed administration will be too hard (too lenient) on inflationary matters respect to what the public would command if it were to them to decide. Importantly, the sign of inflationary surprises generates a PBC that coincides with Alesina (1987)'s prediction - in the sense that a conservative administration brings lower ouput and lower inflation just after it has assumed power. However, I show that the drivers of this outcome are quite different to the ones exposed in that work. In particular, neither the *rational-partisan* approach, nor the electoral uncertainty, are necessary.

Keywords. Political Business Cycles, Expert Advice, Discretionary Monetary Policy

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1 Introduction[1]

Under uncertainty, even when there's well spread agreement and understanding on how the economy works, the *debate* on what is the most likely state of the economy on those dimensions of the economy that are not perfectly known to agents, is able to alter the performance of the economy significantly through economic reform, however limited this reform may be. With some conflict of interest or some degree of heterogeneity between citizens' most preferred policies, the handling of information plays a significant role in shaping the decisions society makes on public affairs.

In this paper I show one example of this, by studying the effect of electoral outcomes upon the business cycle when information on unknown future states of the economy is strategically delivered by an expert (possibly with partisan preferences) with superior information.

I build from Rogoff (1985)'s macro-economy with uncertainty on supply shocks. I interpret an election as an opportunity for citizens to appoint a policymaker encharged of monetary policy, who once appointed follows discretional monetary policy. So citizens know Rogoff (1985)'s model, have *ex-ante* identical preferences à la Rogoff's social loss function, and maximize their expected welfare following Rogoff's program. Without changing the informational structure assumed in this paper the appointed policymaker will be indeed Rogoff's conservative central banker always, and it would therefore make no difference whether we appoint him in perpetuity through a legal or institutional arrangement prescribed in the Constitution, or in every election instead (in fact, in our interpretation the election would not play any role in Rogoff's plain economy). However, this ceases to be true if we change the informational structure.

I depart slightly from Rogoff (1985)'s environment to allow for expert advice on future states of the economy. This expert (who can be interpreted as the Media) is able to deliver forecasts on the supply shock taking place in the following period. I show that if the election serves as an occasion to appoint central-bankers with different levels of tolerance to inflation, they will use the expert's superior information in order to minimize expected losses accordingly. That is, depending on the expert's message, they will appoint a more or less conservative administration. If the Media is partisan, however, it will be tempted to strategically manipulate its messages in order to get closer to its bliss point, which brings down its effective perceived precision. As a consequence of this, it is able too to generate political business cycles (PBC), by generating inflationary surprises.

This paper follows therefore the literature that studies strategic aspects that model policy issues. As in this literature, I take the alternative approach to the traditional one that assumes that a social welfare function is maximized, having all agents identically and infinitely long-lived. Instead, I take into account some of the political or institutional realities that further constrain actual policy. So

[1] Based on Blanchard and Fisher (1989).

we are here in the realm of positive economics: We wish to explain existing policy, rather than to propose what are meant to be best policies in a world without political constraints. In particular, the present work wishes to contribute to the literature on PBC, by embedding an expert in a model of *exogeneous uncertainty*, as Blanchard and Fisher (1989) name this kind of problems in the study of Monetary and Fiscal Policy Issues. Alesina (1987)'s contribution on post-electionary PBC is one example of this type of models. Rogoff (1985) is another. Although I build from Rogoff's framework (I follow his modelling strategy), I wish to address Alesina's, that is, I wish to give an answer to the question: "what drives the PBC?".

First we describe the basic set-up in Section 2, which is nothing but a brief description of Rogoff (1985)'s economy and policy problem, adapted in order to embed an expert with more precise information than agents about the state of the economy in the following period. Then, in Section 3, we start building by studying the case absent the Media, that we present as an important benchmark from which we depart. In Section 4 we introduce Media and study the solution to Rogoff (1985)'s policy problem for several cases. In Section 5, the short-period game and its unique equilibrium are described. Section 6 concludes and proposes few possible extensions.

2 The model

The (macro)economy

At any point in time the economy is characterized by the following Phillips Curve[2]:

$$y_t = \overline{y} + \beta\left(\pi_t - \pi_t^* + u_t\right) \tag{1}$$

Where y_t is actual output, $\overline{y}$ is full employment output (that we assume constant), π_t is the inflation rate at time t, and π_t^* is the expected inflation rate following rational expectations ($\pi_t^* \equiv E_{t-1}\left(\pi_t|\Omega_{t-1}\right)$, where Ω_{t-1} is all available information in period $t-1$). u is a supply shock, the key parameter through which we introduce uncertainty. Departing slightly from Rogoff's macro-environment, and without loss of generality, I assume there are two possible states of nature: one in which u is positive; another in which u is negative[3]. This supply shock follows a Bernoulli distribution with equal weights

[2]A full-fledged macro-model that lands onto this reduced-form expression can be found in Rogoff (1985)'s Section II. As an aside, note that β is the inverse of the labour share (as it is clear in Rogoff's formulation). Then, $\beta > 1$.

[3]In the original model u is defined as white noise with known variance σ^2.

$$\widetilde{u_t} = \begin{cases} u_H > 0 \text{ with probability } \frac{1}{2} \\ u_L < 0 \text{ with probability } \frac{1}{2} \end{cases}$$

I assume that $Eu = \frac{u_H}{2} + \frac{u_L}{2} = 0$ (or $u_H = -u_L$).

2.1 Agents and preferences

There's a continuum of *ex-ante* identical agents[4] of mass 1 indexed by α, and with preferences described by the following social loss function[5]:

$$U_\alpha (\pi_t, y_t : \overline{y}, \chi) = \chi \pi_t^2 + (y_t - k\overline{y})^2 \tag{2}$$

With $\chi > 0$ and $k > 1$. χ is the weight given to inflation concerns. So the more intolerant is the representative citizen to inflation, the higher χ (say $\chi' = \chi + \varepsilon$, with $\varepsilon > 0$). In other words, the more conservative he would want the policymaker to be. The second assumption, $k > 1$, is crucial here. We allow for the presence of distortions or market imperfections that cause the natural rate of employment to be too low respect to what is in the public's interest (without it we miss the fundamental source of tension between stabilization policy and inflationary concerns[6].) Note that we could assume heterogeneity in agents' preferences and still keep the partisan electoral competition at bay, if we assumed these preferences to be single-peaked: then the policy preferred by the **median** voter will always prevail.

Citizens have to vote at the end of the period in order to appoint a policymaker encharged of executing discretional monetary policy (alternatively, one could interpret this as electing the administration so as to put more or less pressure on monetary policy). This is implemented by picking up the level of tolerance to inflation ε from $(0, +\infty)$ which is added to the agents' own tolerance to inflation χ, just as in Rogoff (1985)'s exercise. More details on the policy to be chosen are described below.

All agents are alike in terms of preferences, except for an individual agent a able to elicit superior information, that we refer to throughout as "the Media" or "the expert", indistinctively, and who possibly does not share the public's preferences. To be precise, this agent's preferences are described by the following loss function

[4] *Ex-post*, they will differ only in terms of the information the have at hand.

[5] This specification is a simplification of Rogoff (1985)'s economy. It follows Blanchard and Fisher (1989)'s exposition on the matter.

[6] See Rogoff (1985).

$$U_a\left(\pi_t, y_t : \overline{y}, \chi, \varepsilon^m\right) = \chi' \pi_t^2 + \left(y_t - k\overline{y}\right)^2 \tag{3}$$

With χ' possibly different to χ ($\chi' \neq \chi$, but $\chi' > 0$). I call this expert *partisan*, or *partisan* Media, when $\chi' \neq \chi$. We can rationalize this partisan behaviour in several ways. One may think the Media as representing preferences of the *elite*. Alternatively, one could think of the Media as reflecting the views of small interest parties that are able to *capture* the Media. Finally, the Media may be biased for commercial reasons that become relevant depending on the market's structure: one may think advertisers (probably more conservative on inflationary issues), on one side of the Media's market, having different preferences to readers (probably more concerned on stabilising output) on the other side of the market, and the Media's bias as its optimal balancing of both sides of the market's policy preferences in order to maximise profits.

The expert is able to elicit a signal that is correlated to the state of the economy. In other words, the private noisy signal informs him on the next period's supply shock's sign (positive or negative), which is known to match the realised sign of the shock with probability $p > \frac{1}{2}$. The expert sends a message to the public on the next period's state, based on this information. However, she does so strategically when she is *partisan*. She manipulates her message in other to induce the appointment of policymakers closer to his bliss point. Importantly, both the signal and χ' are private knowledge to the Media. The informational structure so far is common knowledge.

The Political context

Every period, citizens vote on their preferred policy ε, that is, the degree of tolerance to inflationary surprises (alternatively, we could interpret this as the level of tolerance to fiscal pressure, following Drazen (2000a)'s approach). This deserves some further explanation.

Implicitly, I am stating that the appointed administration is *able* to implement some rules leading in practice to the appointment of a policymaker that is harsher on inflationary surprises than what the representative agent would be himself if he had the chance of being at the head of the central bank.The crucial point is understanding that the election allows society in some way or another to appoint more conservative central bankers in order to reduce, optimally, in expected terms, losses arising from inflationary biases that are inherent to discretionary monetary policy in the presence of market imperfections.

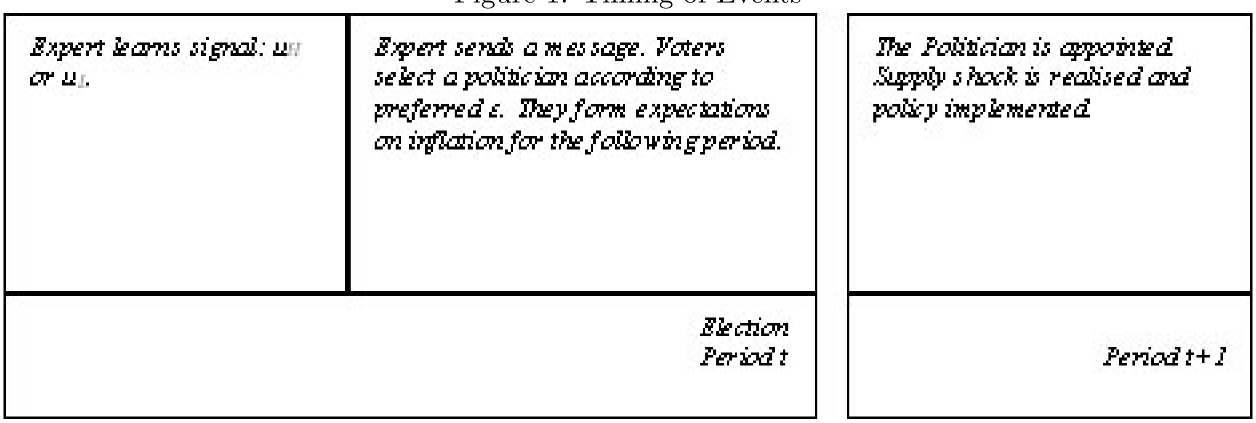
There are two parties or candidates engaged in electoral competition that we cariturize à la Downs (so parties or candidates are essentially opportunistic). They offer platforms along the ε dimension in order to win the election. Once in power they implement their promised platform. Because there are no commitment issues, the offered platforms are implemented.

The solution of this electoral game is well known: both candidates offer in equilibrium the same platform, which is the one preferred by the median voter. In our model this means that the offered and selected ε is that alligned to citizens' beliefs (or to the median voter's bliss point if we took the alternatively interpretation.)

The Timing of Events

At the beginning of the period at which the election is going to be held, the Media observes its signal. Then it announces the state of the economy that it expects for the following period in the form of a forecast. Citizens vote according to beliefs formed (shaped, manipulated) by the Media's reporting. To keep things tractable, I assume that this forecast takes the form of a message $\widetilde{m}$ elicited to the public, with $\widetilde{m} \in \{u_H, u_L\}$. At the end of the period the electoral game takes place and citizens elect ε, according again to beliefs that are influenced by the Media's reporting. The following period, when the elected administration assumes power, the supply shock is observed and the monetary policy implemented. So once elected, the politician observes u and acts accordingly, that is, fixes π in order to minimize the objective function of the representative agent α, given ε, the expected inflation rate π^* and the observed supply shock u. The game repeats itself succesively. However, voters and agents in general update their beliefs following *Bayes*'s rule on the Media's reputation along time, once the supply shock has been revealed to them after the election.

Figure 1: Timing of Events



The interpretation is that the electoral process gives voters the opportunity to choose **who** they want to appoint as a policymaker. So I assume, as in Rogoff's exercise: "... *that in period $t-1$ society selects an agent to head the central bank in period t.*"

Before continuing, an important remark. As pointed out in Drazen (2000b), one of the drawbacks of the monetary approach in explaining the PBC (advocated in Alesina and coauthors' several contributions) is that it assumes, as we do here, that it is the political process that "picks" the central banker. Drazen dislikes this assumption and he critizes this approach on the grounds that it is not "*institutionally realistic*". However, in his own formulation of the PBC's driving mechanism (combining both fiscal and monetary policies), he often uses the notion of "*pressure*" from the executive (who is appointed in a partisan fashion), which forces the monetary authority to follow a different rule to the one he is supposed to be endorsed to. I cannot see the practical difference between the so-called *pressure* on one hand, and the political process electing the policymaker on the other. For modelling purposes they are a nuance, as we are not able to identify them when explaining real policy-making outcomes.

Nevertheless, whatever the interpretation we wish to side, still there are some features in the present model that are valuable in comparison to those found in the literature. First, we do not have to assume two-dimensional heterogeneity as in Drazen or in Alesina. Indeed, when it comes to preferences, our agents are identical. There's a minor level of *ex-post* disparity which has to do with the level of information at hand for different agents in the economy, but this is an assumption that is weaker than that in Drazen or Alesina. Secondly, and as a consequence of this, we do not need the partisan competition approach. So, even though I share Drazen's view that Political Economy problems is essentially about dealing with heterogeneous agents, I claim that we do not need such level or kind of heterogeneity to explain post-electoral PBC. In addition, we dismiss electoral uncertainty and impose weaker assumptions on labour contracts, which are key factors in Alesina's account on what drives the PBC.

Next, we begin by studying this economy absent the media.

3 The Benchmark: no Media

I first consider an economy without media. We call this Rogoff (1985)'s bare-boned economy. To find and describe the solution to our problem, we proceed by backward induction. Once the election has been held, and the policymaker appointed, we enter the next period, where the shock is observed by the policy maker. His problem therefore is to set inflation, given π^*, u and ε so as to minimize his loss function (a modified version of equation (2), which has been augmented by ε.) The constraint he faces is of course the structure of the economy, which is described by the Phillips curve. By plugging (1) in (2) we can write the unconstrained problem as the minimization of (I omit time subscripts hereafter)

$$U = (\chi + \varepsilon)\,\pi^2 + \left[(1-k)\,\overline{y} + \beta\,(\pi - \pi^* + u)\right]^2$$

The solution to which is[7]

$$\pi = \left(\chi + \varepsilon + \beta^2\right)^{-1} \beta \left[(k-1)\,\overline{y} + (\pi^* - u)\,\beta \right] \tag{4}$$

Taking expectations, we can obtain $\pi^* \equiv E\pi$:

$$\pi^* = \left(\chi + \varepsilon + \beta^2\right)^{-1} \beta \left[(k-1)\,\overline{y} + \beta\pi^* \right]$$

Where I have used the fact that $Eu = 0$. Finally:

$$\pi^* = \frac{\beta}{\chi + \varepsilon}\,(k-1)\,\overline{y}$$

Plugging this back into (4) we get the realised inflation rate

$$\pi = \frac{\beta}{\chi + \varepsilon}\,(k-1)\,\overline{y} - u\left(\frac{\beta^2}{\chi + \varepsilon + \beta^2}\right)$$

The inflationary surprise $\pi - \pi^*$ is thus

$$\pi - \pi^* = -u\left(\frac{\beta^2}{\chi + \varepsilon + \beta^2}\right) \tag{5}$$

That is, with a negative (adverse) supply shock, inflation is higher, and output is low. To see the latter one, pick (1) after noting that $\pi - \pi^* = -u\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)$. Then

$$y = \overline{y} + \beta u\left(1 - \frac{\beta^2}{\chi + \varepsilon + \beta^2}\right)$$

As $\frac{\beta^2}{\omega+\beta^2} < 1$, $\left(1 - \frac{\beta^2}{\omega+\beta^2}\right) > 0$, which in turn implies $\overline{y} > y$ (recall that $u < 0$). So there's high inflation surprise and low output.

[7] Note that the problem is well defined (U is strictly concave in π).

Now, what matters here is $E(U_\alpha)$, computed in period $t-1$, knowing the policymaker's reaction function derived above. Note that the minimization of $E(U)$ should not be based on the policymaker's loss function, but rather on that of the representative consumer or citizen. This is the object we finally care about. Using our previous result, lets obtain an expression for this object. We have

$$E(U_\alpha) = \Pi + \Gamma$$

Where

$$\Pi = \left(\chi\left(\frac{\beta}{\chi+\varepsilon}\right)^2 + 1\right)(k-1)^2\,\overline{y}^2$$

$$\Gamma = \left(\frac{\chi\beta^2 + (\chi+\varepsilon)^2}{(\chi+\varepsilon+\beta^2)^2}\right)\beta^2 V_u$$

Where I have used $Eu=0$ in the crossed terms. Also $V_u \equiv Eu^2 = \frac{u_H^2+u_L^2}{2} = u_H^2$. Finally, if $\zeta \equiv \chi\left(\frac{\beta}{\chi+\varepsilon}\right)^2$ we have[8]

$$E(U_\alpha) = (1+\zeta)(k-1)^2\,\overline{y}^2 + \left(\frac{1}{1+\zeta}\right)\beta^2 V_u \tag{6}$$

Now, given $E(U_\alpha)$, and given our assumption on the election as an opportunity to appoint a more conservative central banker, what would be the chosen ε? Or, in other words, what would be the equilibrium platform ε offered by the competing candidates in order to win the election? The answer is direct, thanks to Rogoff (1985)'s contribution. By minimizing $E(U_\alpha)$ through ε we appoint Rogoff's central banker, whose level of excess of inflationary intolerance I shall denote ε^R in honour to Rogoff. Formally, the problem is to minimize $E(U_\alpha)$ with respect to ε, subject to $\chi+\varepsilon>0$. To solve we differentiate respect to ε

$$\frac{\partial E(U_\alpha)}{\partial\varepsilon} = \chi\left(\frac{\partial\Pi}{\partial\varepsilon}\right) + \left(\frac{\partial\Gamma}{\partial\varepsilon}\right) \tag{7}$$

[8] This is alike to the expression obtained in Blanchard and Fisher (1989).

$$\frac{\partial \Pi}{\partial \varepsilon} = -\frac{2\left[(k-1)\,\overline{y}\beta\right]^2}{(\chi+\varepsilon)^3} \tag{8}$$

$$\frac{\partial \Gamma}{\partial \varepsilon} = 2\beta^2 V_u \left[\left(\varepsilon\beta^2\right) / \left(\chi+\varepsilon+\beta^2\right)^3\right] \tag{9}$$

We know more. We can apply the Theorem appeared in Rogoff (1985): With market imperfections, that is $k > 1$, then $0 < \varepsilon^R < \infty$ [9]. So, as in Rogoff (1985), in the face of uncertainty, voters improve their expected welfare by appointing more conservative central bankers. But what if we slightly deviate from Rogoff's environment, and we allow for more precise information, by way of expert advice? This we explore next.

4 The case for media intervention

Lets assume there is Media, and that it has enough reputation so as to be followed either in political terms (people form beliefs on what is the best ε based on the media's reports) or in financial terms (they form expectations on inflation based on the very same reports). To keep things simple, lets assume that the media reports on next period's state of the world in a way resembling that of Bénabou and Laroque (1992)'s expert. One can interpret this as the media giving forecasts on next period's state (next period's output growth, as so many entities do, especially during an electoral year.) So the media receives a noisy private signal that is correlated with the true state (this information structure is common knowledge.) That is

$$\Pr\left[\widetilde{u} = u | \widetilde{s} = u\right] = p > \frac{1}{2}$$

Where $\widetilde{u}$ is the state as described above. So u belongs to $\{u_L, u_H\}$. I assume, as Bénabou and Laroque (1992) do, that the sender (the Media) reports his signal truthfully ($\widetilde{m} = \widetilde{u}$) or untruthfully ($\widetilde{m} = -\widetilde{u}$) (recall that $\frac{u_H}{2} + \frac{u_L}{2} = 0$), using a *symmetric* mixed strategy:

$$q = prob\left[\widetilde{m} = s | \widetilde{s} = s\right] \forall s \in \{-u_H, u_H\}$$

Note that in our model untruthfulness is not a by-product of financial speculation as in Bénabou and Laroque (1992), but of strategic *partisan* manipulation of information.

[9] See proof in Rogoff (1985), page 1178.

The message space is therefore $\{-u_H, u_H\}$ itself. The public is uncertain about the Media's honesty, and it attaches a probability that it is. This prior I call ρ. So ρ is the subjective probability that the Media is not partisan. Rational agents use Bayes's rule to infer the credibility θ of the media's report (that is, the probability that what he predicted **will** be alligned to the observed shock). $\theta \in [1-p, p]$ and is defined as

$$\theta = \rho p + (1-\rho)\left[pq + (1-p)(1-q)\right]$$

Note that without Media, the public believes that $\widetilde{u} = u_H$ with probability $\frac{1}{2}$. After the media's announcement, rational citizens update their belief to a common posterior belief $b = \theta$ if the media has announced u_H and $b = 1-\theta$ if it has announced $-u_H$. Formally,

$$b = prob\left[\widetilde{u} = u_H | \widetilde{m} = u\right] = \frac{1}{2} + sign\left(u\right)\left(\theta - \frac{1}{2}\right)$$

Before proceeding, we analyse two possible benchmarks: One in which the Media has perfect foresight and is not *partisan*; another in which the signal is noisy but there's no *partisan* behaviour.

Benchmark one: when the media is precise (no noisy signals) and truthful

Here we analyse the case for truthful and precise media (which is nothing but the perfect foresight equilibrium case), which lies at one extreme of the possible informational structures. In this case, naturally, $\pi^* = \pi_{\widetilde{m}}$[10], where m denotes the media's message. If the announcement is **high state**, then the appointed discretional policymaker will set inflation at

$$\pi = \left(\chi + \varepsilon + \beta^2\right)^{-1}\beta\left[(k-1)\,\overline{y} + (\pi_H - u)\,\beta\right]$$

By taking expectations on both sides of this expression, noting that $E\pi = \pi_H$, we get

$$\pi_H = \frac{\beta}{\chi + \varepsilon}\,(k-1)\,\overline{y} - \zeta u_H$$

And when evaluating the expected social loss function, we find

[10]There are no inflationary surprises here.

$$E(U_\alpha|H) = \left(\chi\left(\frac{\beta}{\chi+\varepsilon}\right)^2 + 1\right)\left[(k-1)\overline{y} - \beta u_H\right]^2 \tag{10}$$

By simple inspection of (10) the optimal solution is to set ε as high as possible, with $\varepsilon \longrightarrow \infty$ [11].

This makes sense, for as with perfect information there are no inflationary surprises, and therefore no ways of altering output. Thus, it is only inflation that matters. As Rogoff (1985) puts it: "*... In the absence of productivity disturbances, inflation-rate targeting works extremely well, since there is then no tradeoff with employment stabilization. Indeed, it would then make sense to make ε as large as possible*".

By symmetry, we get the same result under the **low state** announcement.

Benchmark two: expert reporting absent partisan manipulation

Now let us revise what happens to our problem above when the media is influencing the public's beliefs, but it is neither fully precise nor always truthful. I'll proceed in several steps. First I show how inflationary expectations are affected. Then we show that depending on the annoucement, we find different optimal policies, as opposed to our bare-boned economy. Furthermore, as an essential property of our economy with expert advice, I show that both policies are above the level of conservativeness obtained in Rogoff (1985)'s model. Given these important results, we then show the short-run equilibrium when the Media is partisan.

Let's begin by using backward induction, taking as given beliefs $b > \frac{1}{2}$ (withoug loss of generality). Lets assume that the election has been held, and a central banker, with a given ε has been appointed. Also, for the time being, let's assume that the Media's credibility is high enough so as to be followed in its announcements. Formally, $\theta > \frac{1}{2}$.

Before proceeding, note that when the media announces the high state and b is the belief that the supply shock is going to be positive, then:

$$E_{u|H} = bu_H + (1-b)\,u_L = bu_H - (1-b)\,u_H = u_H\,(2b-1)$$

And when he announces the low state, we have

[11] The second derivative is $\frac{\partial^2 M_H}{\partial \varepsilon^2} = 6\chi\beta^2\left(\frac{[(k-1)\overline{y}-\beta u_H]}{(\chi+\varepsilon)^2}\right)^2 > 0$.

$$E_{u|L} = (1-b)\,u_H + bu_L = bu_H - (1-b)\,u_H = -u_H\,(2b-1)$$

We have, therefore

$$E_{u|H} = u_H\,(2b-1)$$

$$E_{u|L} = -u_H\,(2b-1)$$

$$V_{um} = V_{u|H} = V_{u|L} = 4u_H^2 b\,(1-b)$$

Note that $V_{um} \geq V_u$ iff $b\,(1-b) \geq 1/4$ (where the subscript m denotes media.) One of the main findings of the present paper is that the sign of the announcement matters, which is among the results we show next. Hence, we study each at a time: the **high state** announcement first, and the **low state** announcement thereafter.

The solution when the media announces the high state

The appointed central banker will set inflation once he has observed the shock. For a given ε, inflation will therefore be

$$\pi_H = \left(\chi + \varepsilon + \beta^2\right)^{-1} \beta\,[(k-1)\,\overline{y} + (\pi^* - u_H)\,\beta] \tag{11}$$

if the shock is high (where we subscript H for "*high state*" announcement) , and

$$\pi_L = \left(\chi + \varepsilon + \beta^2\right)^{-1} \beta\,[(k-1)\,\overline{y} + (\pi^* + u_H)\,\beta] \tag{12}$$

if the shock is low (where L denotes *low* announcement). Note that these reaction functions do not depend on the announcement directly, but only via expected inflation π^*). Expected inflation in the private sector is based on the media's superior information. If the media had announced u_H, then $\pi_H^* = b\pi_H + (1-b)\,\pi_L$. We can develop this expression a bit

$$\pi_H^* = \frac{\beta}{\chi+\varepsilon}(k-1)\,\overline{y} - \frac{\beta^2}{\chi+\varepsilon}E_{u|H}$$

So expected inflation is lower than without media, as expected with our assumption on the Media's superior information. This implies that actual inflation (where $H|H$ denotes the inflation rate when the high shock occurs and it was announced H) will be

$$\pi_{H|H} = \left(\frac{\beta}{\chi+\varepsilon}\right)(k-1)\,\overline{y} - \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H - \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\frac{\beta^2\,(2b-1)}{\chi+\varepsilon}u_H$$

With this expression we can obtain inflationary surprises, $\pi_{H|H} - \pi_{H|H}^*$

$$\pi_{H|H} - \pi_H^* = -2\,(1-b)\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H < 0 \tag{13}$$

So inflationary surprises are negative in this case, but lower than (in absolute terms) inflationary surprises in the no-media case (compare (13) to (5)).

Now, by similar reasoning, if the realized shock is low, then

$$\pi_{L|H} = \left(\frac{\beta}{\chi+\varepsilon}\right)(k-1)\,\overline{y} + \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H - \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\frac{\beta^2\,(2b-1)}{\chi+\varepsilon}u_H$$

which in turns delivers

$$\pi_{L|H} - \pi_H^* = 2b\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H > 0$$

All this allows us to compute the expected loss function when the announcement has been 'high', which we denote $E\,(U_\alpha|H) = bU_{\alpha,H|H} + (1-b)\,U_{\alpha,L|H}$. By using the definition of the loss function in (2) we have

$$U_{\alpha,H|H} = \chi\pi_{H|H}^2 + (y - k\overline{y})^2$$

or

$$U_{\alpha,H|H} = \left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left[(k-1)\,\overline{y}-\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\left(\chi+\varepsilon+\beta^2\,(2b-1)\right)u_H\right]^2$$

Similarly

$$U_{\alpha,L|H} = \chi\pi_{L|H}^2 + (y-k\overline{y})^2$$

or

$$U_{\alpha,L|H} = \left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left[(k-1)\,\overline{y}+\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\left(\chi+\varepsilon-\beta^2\,(2b-1)\right)u_H\right]^2$$

Finally, after some algebra it can be proven that

$$\begin{aligned} E\left(U_\alpha|H\right) &= E\left(U_\alpha\right) - 2\,(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)(2b-1)\,u_H \\ &+ \beta^2\left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)^2\left(2\,(\chi+\varepsilon)+\beta^2\right)(2b-1)^2\,V_u \end{aligned} \tag{14}$$

Where $E\left(U_\alpha\right) = (1+\zeta)\,(k-1)^2\,\overline{y}^2 + \left(\frac{1}{1+\zeta}\right)\beta^2 V_u$, as obtained in (6) (note that $E\left(U_\alpha\right)$ is Rogoff's expected social loss function). To find the solution, we must obtain the first derivatives of the last two terms in (14). Lets define

$$\Theta \equiv -2\,(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)(2b-1)\,u_H \tag{15}$$

$$\Sigma \equiv \beta^2\left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)^2\left(2\,(\chi+\varepsilon)+\beta^2\right)(2b-1)^2\,V_u \tag{16}$$

So in addition to (7), (8), and (9), we have

$$\frac{\partial E\left(U_{\alpha}|H\right)}{\partial\varepsilon}=\frac{\partial E\left(U_{\alpha}\right)}{\partial\varepsilon}+\left(\frac{\partial\Theta}{\partial\varepsilon}\right)+\left(\frac{\partial\Sigma}{\partial\varepsilon}\right) \tag{17}$$

$$\frac{\partial\Theta}{\partial\varepsilon}=\frac{4\left(k-1\right)\overline{y}\beta^{2}\left(2b-1\right)u_{H}}{\left(\chi+\varepsilon\right)^{3}} \tag{18}$$

$$\frac{\partial\Sigma}{\partial\varepsilon}=-2\left[\begin{array}{c}\frac{\chi\beta^{2}}{\left(\chi+\varepsilon\right)^{3}}\left(\frac{2\left(\chi+\varepsilon\right)+\beta^{2}}{\left(\chi+\varepsilon+\beta^{2}\right)^{2}}\right)+\\ \left(\frac{\chi\beta^{2}}{\left(\chi+\varepsilon\right)^{2}}+1\right)\left[\frac{2\left(\chi+\varepsilon\right)+\beta^{2}-1}{\left(\chi+\varepsilon+\beta^{2}\right)^{3}}\right]\end{array}\right]\beta^{6}\left(2b-1\right)^{2}V_{u} \tag{19}$$

Lets define, *par* analogy, ε^{m_h} as the value of ε that minimizes $E\left(U_{\alpha}|H\right)$. Then we have the following first part of an extension to Rogoff (1985)'s theorem.

Proposition 1. ***(extension of Rogoff (1985)'s Theorem to the presence of expert advice, part a)***. *When $k>1$, $\theta>\frac{1}{2}$, and $u_H\leq\frac{(k-1)\overline{y}}{2(2b-1)}$, and the Media announces the "**high state**", then $0<\varepsilon^{m_h}<\infty$.*

Proof. Note that $\varepsilon>-\chi$ by assumption. That means that $\frac{\partial\Pi}{\partial\varepsilon}$ is strictly negative. For the same reason, $\frac{\partial\Theta}{\partial\varepsilon}$ is strictly positive. $\frac{\partial\Gamma}{\partial\varepsilon}$ is strictly negative for $\varepsilon<-\chi<0$; zero when $\varepsilon=0$, and positive for $\varepsilon>0$ (therefore $\frac{\partial\Gamma}{\partial\varepsilon}$ is strictly negative for $\varepsilon\leq0$; so far, everything is as in Rogoff's). Note also that the third term is strictly negative (as $\beta>1$, then $2\left(\chi+\varepsilon\right)+\beta^2>1$.) A sufficient condition to make all terms negative is the shock not to be too high. Indeed, we impose $u_H\leq\frac{(k-1)\overline{y}}{2(2b-1)}$. If this is true, then $\frac{\partial E(U_\alpha|H)}{\partial\varepsilon}$ will at some point switch from negative to positive for a sufficiently large ε. Indeed, as $\varepsilon\longrightarrow\infty$, $\frac{\partial E(U_\alpha|H)}{\partial\varepsilon}$ approaches zero, but the rates of convergence differ among the elements composing $\frac{\partial E(U_\alpha|H)}{\partial\varepsilon}$. The term that dominates is $\frac{\partial\Gamma}{\partial\varepsilon}$, as in Rogoff (1985), with rate of convergence ε^{-2}; while both $\frac{\partial\Theta}{\partial\varepsilon}$ and $\frac{\partial\Pi}{\partial\varepsilon}$ have rate of convergence equal to ε^{-3}; similarly, all terms in $\frac{\partial\Sigma}{\partial\varepsilon}$ are converging at rate ε^{-3} and above. □

In fact, we know more. This we state in the following collorary.

Corollary 2. *When $k>1$ and $\theta>\frac{1}{2}$, and the Media announces the "**high state**", then $\varepsilon^R<\varepsilon^{m_h}<\infty$.*

The solution when the media announces the low state

Similar reasoning applies when the Media announces the low state. Recall that the reaction functions (11) and (12) remain the same for a given ε. What changes is the expected inflation rate, which we now denote π_L^*.

If the media has announced u_L, then $\pi_L^* = (1-b)\,\pi_H + b\pi_L$, and therefore

$$\pi_L^* = \frac{\beta}{\chi+\varepsilon}\,(k-1)\,\overline{y} - \frac{\beta^2}{\chi+\varepsilon}E_{u|L}$$

Recall that $E_{u|L} = -u_H\,(2b-1)$, so, as expected, $\pi_L^* > \pi_H^*$. Likewise, expected inflation is higher with media than without it when it has been announced a low state. Now we can compute $\pi_{H|L}$ and $\pi_{L|L}$. Actual inflation when the high shock occurs and the **low state** was announced is

$$\pi_{H|L} = \left(\frac{\beta}{\chi+\varepsilon}\right)(k-1)\,\overline{y} - \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H + \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\frac{\beta^2\,(2b-1)}{\chi+\varepsilon}u_H$$

and therefore

$$\pi_{H|L} - \pi_L^* = -2b\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H < 0$$

So inflationary surprises are smaller with more precise information (just as before). At the same time

$$\pi_{L|L} = \left(\frac{\beta}{\chi+\varepsilon}\right)(k-1)\,\overline{y} + \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H + \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\frac{\beta^2\,(2b-1)}{\chi+\varepsilon}u_H$$

and

$$\pi_{L|L} - \pi_L^* = 2\,(1-b)\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)u_H > 0$$

As before, we can now compute the expected loss function when the announcement has been ‘low’, which we denote $E\,(U_\alpha|L) = (1-b)\,U_{\alpha,H|L} + bU_{\alpha,L|L}$. By using again the definition of the loss function in (2) we have

$$U_{\alpha,H|L} = \left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left[(k-1)\,\overline{y} - \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\left(\chi+\varepsilon-\beta^2\,(2b-1)\right)u_H\right]^2$$

and

$$U_{\alpha,L|L} = \left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)\left[(k-1)\,\overline{y} + \left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)\left(\chi+\varepsilon+\beta^2\,(2b-1)\right)u_H\right]^2$$

after some algebra it can be proven that

$$E\,(U_\alpha|L) = E\,(U_\alpha|H) + 4\,(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{(\chi+\varepsilon)^2}+1\right)(2b-1)\,u_H \tag{20}$$

From these computations we get a second important result. First denote ε^{m_l} as the value of ε that minimizes $E\,(U_\alpha|L)$. Then I can state the following additional extension to Rogoff's theorem.

Proposition 3. ***(extension of Rogoff (1985) Theorem to the presence of expert advice, part b).*** *When $k > 1$ and $\theta > \frac{1}{2}$, and the Media announces the "**low state**", then $0 < \varepsilon^{m_l} < \infty$.*

Proof. By revisiting the former Theorem, by simple inspection it is clear that $\frac{\partial E(U_\alpha|L)}{\partial\varepsilon} \leq \frac{\partial E(U_\alpha|H)}{\partial\varepsilon}$, so $\frac{\partial E(U_\alpha|L)}{\partial\varepsilon}$ reaches zero *after* $\frac{\partial E(U_\alpha|H)}{\partial\varepsilon}$ does, as ε goes to infinity. $\square$

Note that we didn't have to restrict the size of the shock this time, indicating the asymmetric nature of our problem. As before, we can relate the obtained policy to other benchmarks, which we do in the following collorary.

Corollary 4. *When $k > 1$ and $\theta > \frac{1}{2}$, and the Media announces the "**low state**", then and $\varepsilon^R < \varepsilon^{m_h} < \varepsilon^{m_l}$.*

So far, we learn that under good prospects for the economy, voters would prefer a more lenient administration in terms of inflation, whereas **low** state forecasts lead them to pick more conservative policymakers from the financial/political *milieu.* Another very important result is that in economies that engage in this type of "game", that is, developed economies that produce and consume huge amounts of information per day (think of the thickness of any edition of The Financial Times or

The Economist), appointed officials would tend to be more conservative, where *more* here means above Rogoff (1985)'s level of conservativeness towards inflation.

We have then **two** possible optimal levels of tolerance to inflation, that we name hereafter ε^H and ε^L to ease notation.

Note that because of the electoral outcome's lack of uncertainty once the message has been delivered to the public, citizens adapt their expectations accordingly. Then, we have

$$\pi_i = \left(\chi + \varepsilon^i + \beta^2\right)^{-1} \beta \left[(k-1)\,\overline{y} + (\pi^* - u_i)\,\beta\right]$$

With $i = L, H$ (note that ε now depends on the announcement). Together with the expected inflationary surprises, these objects will be key in understanding the speculative partisan manipulation of information.

5 The Single-Period Game

We now take beliefs b as given, and study the Media's optimal messages when it has *partisan* preferences. We start with the case for right-wing Media.

Note that there are two channels through which the expected loss function and its implied preferred policies might differ between the Media and the public. On one hand, we have assumed different tolerance towards inflation, captured by χ ; on the other, because of the Media's assumed superior information and credibility issues, the Media will use this information, whereby it will weight the possible states using p instead of b. To show how messages are optimally chosen, we isolate both channels. First we consider no credibility issues and see how differences arise, if any. Then we add the effect of more precise information on the Media's side.

Suppose that the Media had the same information as the public: $b = p$ (which happens when the Media is fully credible, $\rho = 1$), and had slightly higher intolerance to inflation than the representative agent in the economy, that is $\chi' > \chi$, where χ' denotes the Media's weight for inflation. In other words, we study the Media's most preferred policy ε when its preference for inflation is slightly higher than χ, that is $\chi' = \chi + \Delta\chi$, with $\Delta\chi \longrightarrow 0$ and $\Delta\chi > 0$. With this assumption, we can study the citizens' expected loss function's behaviour when evaluated at ε^i and χ'. We do so by taking the limit as $\Delta\chi \longrightarrow 0$, of a first order Taylor approximation of the expected loss function's first derivative respect to ε. Indeed, if the *high* state announcement had been reported, then we get (by using (17))

$$\frac{\partial E\left(U_\alpha|H:\varepsilon^H,\chi'\right)}{\partial\varepsilon} = \frac{\partial E\left(U_\alpha|H:\varepsilon^H,\chi\right)}{\partial\varepsilon} + \left(\frac{\partial\Pi}{\partial\varepsilon} + \left[\chi\left(\frac{\partial\Pi}{\partial\varepsilon}\right) + \left(\frac{\partial\Gamma}{\partial\varepsilon}\right) + \left(\frac{\partial\Theta}{\partial\varepsilon}\right) + \left(\frac{\partial\Sigma}{\partial\varepsilon}\right)\right]\frac{\partial}{\partial\chi}\right)_{\varepsilon=\varepsilon^H}\Delta\chi$$

Where $\frac{\partial E\left(U_\alpha|H:\varepsilon^H,\chi\right)}{\partial\varepsilon} = 0$ and $\chi\left(\frac{\partial\Pi}{\partial\varepsilon}\right) + \left(\frac{\partial\Gamma}{\partial\varepsilon}\right) + \left(\frac{\partial\Theta}{\partial\varepsilon}\right) + \left(\frac{\partial\Sigma}{\partial\varepsilon}\right)|_{\varepsilon=\varepsilon^H} = 0$, leaving us with

$$\frac{\partial E\left(U_\alpha|H:\varepsilon^H,\chi'\right)}{\partial\varepsilon} = \left(\frac{\partial\Pi}{\partial\varepsilon}\right)_{\varepsilon=\varepsilon^H}\Delta\chi$$

Plus the residual. Because $\frac{\partial\Pi}{\partial\varepsilon} < 0$, then $\frac{\partial^2 E(U_\alpha|H)}{\partial\varepsilon\partial\chi}|_{\varepsilon=\varepsilon^H} < 0$.

If the announcement had been "*low*" instead, then the relatively more conservative Media would have the same bliss point as that of citizens (this follows similar procedure as above: pick (20) and obtain a first order Taylor approximation of this function when it is evaluated at ε^L and around χ). Formally, it is easy to show that

$$\frac{\partial E\left(U_\alpha|L:\varepsilon^L,\chi'\right)}{\partial\varepsilon} = 0$$

If we write ε_m^i as the Media's most preferred policy when the state is i, with $i = L, H$, then we can state the following property

Lemma 5. *If the Media had preferences slanted slightly to the right, with* $\chi' = \chi + \Delta\chi$ *and* $\Delta\chi \longrightarrow 0$*, then* $\varepsilon_m^H < \varepsilon^H$ *and* $\varepsilon_m^L = \varepsilon^L$.

Similarly, it can also be proved that being biased to the left will imply $\varepsilon^H < \varepsilon_m^H$ and $\varepsilon_m^L = \varepsilon^L$. This implies that when the observed state by the Media is *low*, it will have incentives to send a truthful message, whatever its partisan preferences are. Furthermore, if the Media is more leftist, this is even true when the observed state is the *high* one. However, if the Media has preferences slightly slanted to the right, then it is not clear whether it will report truthfully or not when it has observed the *high*-state. Indeed, the right-wing Media will never have an incentive to report the high-state when this state has been observed. For given $b = p$, if the Media had observed the *high* state, he would compare the following two options: announce the *high* state and get expected loss $E_H\left(\chi', \varepsilon_m^H, p = b\right)$, or announce the *low* state and get $E_H\left(\chi', \varepsilon^{m_l}, p = b\right)$, with (we use (20))

$$E_H\left(\chi', \varepsilon^{m_h}, p=b\right) = E_L\left(\chi', \varepsilon^{m_h}, p=b\right) - 4(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon^{m_h}\right)^2}+1\right)(2p-1)\,u_H$$

and

$$E_H\left(\chi', \varepsilon^{m_l}, p=b\right) = E_L\left(\chi', \varepsilon^{m_l}, p=b\right) - 4(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon^{m_l}\right)^2}+1\right)(2p-1)\,u_H$$

We can use both expressions to get

$$\begin{aligned} E_H\left(\chi', \varepsilon^{m_l}, p=b\right) - E_H\left(\chi', \varepsilon^{m_h}, p=b\right) = & \, E_L\left(\chi', \varepsilon^{m_l}, p=b\right) - E_L\left(\chi', \varepsilon^{m_h}, p=b\right) \\ & -4(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon^{m_l}\right)^2}+1\right)(2p-1)\,u_H \\ & +4(k-1)\,\overline{y}\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon^{m_h}\right)^2}+1\right)(2p-1)\,u_H \end{aligned}$$

As we just saw, $E_L\left(\chi', \varepsilon^{m_l}, p=b\right) > E_L\left(\chi', \varepsilon^{m_h}, p=b\right)$. In addition, because $\varepsilon^L > \varepsilon^H$ (as shown in Lemma 5), the sum of the last two terms is strictly positive. Therefore, $E_H\left(\chi', \varepsilon^L, p=b\right) > E_H\left(\chi', \varepsilon^H, p=b\right)$, and the right-wing Media always prefers to announce the *high*-state.

Hence, for moderately biased and fully credible Media, a left-wing Media will always report truthfully, whereas a right-wing Media will always tend to announce the *low*-state. This makes the Media not fully credible, and $\rho = 1$ shall not hold anymore. Indeed, these results allow us to refer to the right-wing Media as the opportunistic one and interpret ρ as the probability that the Media is either non-partisan or left-wing (it does not make any difference here). We cannot assume $p = b$ any longer as an important by-product. However, we can show that our main findings above remain essentially untouched if we extend our analysis to cases in which $p > b$. A way of grasping the main drivers of our next results is by studying the effect of b on the Media's most preferred policies.

First note that we can write (20) as

$$E\left(U_\alpha|L\right) = E\left(U_\alpha\right) + 2\left(k-1\right)\overline{y}\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon\right)^2}+1\right)\left(2b-1\right)u_H$$
$$+\beta^2\left(\frac{\chi\beta^2}{\left(\chi+\varepsilon\right)^2}+1\right)\left(\frac{\beta^2}{\chi+\varepsilon+\beta^2}\right)^2\left(2\left(\chi+\varepsilon\right)+\beta^2\right)\left(2b-1\right)^2 V_u$$

If we differentiate this expression in order to find the optimal policy, we get

$$\frac{\partial E\left(U_\alpha|L\right)}{\partial\varepsilon} = \frac{\partial E\left(U_\alpha\right)}{\partial\varepsilon} - \left(\frac{\partial\Theta}{\partial\varepsilon}\right) + \left(\frac{\partial\Sigma}{\partial\varepsilon}\right)$$

Where $\frac{\partial^2 E(U_\alpha)}{\partial\varepsilon\partial b} = 0$. Simple inspection of $-\left(\frac{\partial\Theta}{\partial\varepsilon}\right) + \left(\frac{\partial\Sigma}{\partial\varepsilon}\right)$ shows that $-\left(\frac{\partial^2\Theta}{\partial\varepsilon\partial b}\right) + \left(\frac{\partial^2\Sigma}{\partial\varepsilon\partial b}\right) < 0$. That is, for beliefs b such that $\frac{1}{2} < b < p$, the preferred policy of the representative agent will be $\varepsilon^L\left(b\right) < \varepsilon^L\left(b'\right)$, with $b' > b$. This means that the Media's preferred policy for the *low* state will not coincide with that of the public (or the median voter) anymore, and the more right-wing Media will be biased to the right. But we know more. We can use (20) again to show that the distance between $\frac{\partial E(U_\alpha|L)}{\partial\varepsilon}$and $\frac{\partial E(U_\alpha|L)}{\partial\varepsilon}$ is increasing in b. Indeed, from

$$\frac{\partial E\left(U_\alpha|L\right)}{\partial\varepsilon} - \frac{\partial E\left(U_\alpha|H\right)}{\partial\varepsilon} = -2\left(\frac{\partial\Theta}{\partial\varepsilon}\right)$$

Using the fact that $\frac{\partial^2\Theta}{\partial\varepsilon\partial b} > 0$, we know that the preferred policies will differ less across states. Formally,

$$\frac{\partial^2 E\left(U_\alpha|L\right)}{\partial\varepsilon\partial b} - \frac{\partial^2 E\left(U_\alpha|H\right)}{\partial\varepsilon\partial b} = -2\left(\frac{\partial^2\Theta}{\partial\varepsilon\partial b}\right) < 0$$

Intuitively, there's less from which to gain from more precise information.

We have the following two results:

Proposition 6. *The single-period game has a unique equilibrium. If the probability ρ that the Media is not partisan or left-wing is no greater than $\frac{1}{2}$, his messages are not credible, and there is no transmission of information, that is $\theta = \frac{1}{2}$, and the appointed policymaker is Rogoff (1985)'s one: $\varepsilon = \varepsilon^R$. If $\rho > \frac{1}{2}$, the Media's messages are believed to convey information, even though* *the opportunistic right-wing partisan Media always lies:* $\theta = \rho p + (1-\rho)(1-p)$*. In that case a conservative administration will be appointed to face an expected* low *supply shock, with* $\varepsilon = \varepsilon^L$ *.*

Corollary 7. *With a right-wing Media the PBC predicted by Alesina (1987) is more likely to happen, independently of the electoral uncertainty.*

Proof. The proof of the first of these two results follows proof **Proposition 1** in Bénabou and Laroque (1992). If the public had credibility in the Media's announcements, that is $\theta > \frac{1}{2}$, then the public will elect and therefore appoint the policymakers that are closer to the Media's most preferred ones. If the Media was opportunistic (right-wing) then it will exploit this by lying systematically, that is, by setting $q = 0$. Because citizens are rational they anticipate this; thus, the only way by which the Media could be credible is the public to believe him to be honest or left-wing. Indeed, when $q = 0$, $\theta = \rho p + (1-\rho)(1-p) = \frac{1}{2} + (2p-1)\left(\rho - \frac{1}{2}\right)$, which is greater than $\frac{1}{2}$ only if $\rho > \frac{1}{2}$. As for $\theta < \frac{1}{2}$, it is impossible. If this were true, then the public would do good in undoing the Media's messages by electing the opposite policymaker to the one implied by the Media's announced state. But then the Media would rather prefer to systematically tell the truth in pursuing its objectives, by setting $q = 1$. Then messages should be very credible, with $\theta > \frac{1}{2}$, which is a contradiction.

The proof of the Corollary is direct. With high enough p, whenever the Media observes a *high*-state, it will be tempted to announce a *low* one, whereby the electoral process will appoint a more conservative policymaker. At the same time, through inflationary expectations, it is likely that there will be an inflationary surprise once the policymaker takes power. More conservative administrations will therefore bring lower output and lower inflation more often. □

6 Conclusions and Extensions

We have shown in this present work that by slightly changing the informational structure of a standard monetary policy problem in order to study the effect of expert advice on electoral outcomes and policy issues, we find interesting and meaningful results that have not been considered so far. First, choices on possible policies will depend, significantly, on the information held by more informed parties and on the strategic decision-making of these more informed agents. In particular, in Rogoff (1985)'s problem, agents will use the more informed party's information in order to minimize expected losses. Depending on the expected sign of supply shocks, they will appoint policymakers with varied levels of tolerance towards inflation. When the Media is right-wing, however, it can manipulate information strategically in order to appoint policymakers that are closer to its most preferred ones when the observed state is *high*, as in Bénabou and Laroque (1992)'s privileged sender.

Several extensions come to mind. One is to study possible equilibria when the Media is allowed to report succesively on future supply shocks. Several of Bénabou and Laroque (1992)'s long-run equilibrium's characteristics could easily apply in our framework. Within this extension, and by extending work in Bénabou and Laroque (1992), one possibility is to allow for more than one Media, ideally with varied partisan preferences. Finally, more on the application of this model to the study of empirical evidence on PBC, several of the model's assumptions could be tested in order to compare it to Alesina (1987)'s predictions. One could use data appeared in Alesina and Roubini (1992) , and carry out the identification of most likely states of the economy using Hamilton (1989)'s strategy.

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