Mass Media, Election Control, and the Economy

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Abstract

In this paper I embed politically motivated media in a political business cycle model where taxes and spending in the provision of two public goods must be set in order to meet a balanced-budget condition, elections are held every other period, and there is technological uncertainty in the production of the public goods. Uncertainty originates in the head of government's (the **incumbent**) competency level, which is not observed by voters. There is a superiorly informed agent (the media) able to elicit with some probability a perfectly correlated signal about this competency shock. This agent is also able to spread this information across the polity. Yet, due to political preferences that are independent of the politician's skill in power, this agent might find in her best interest to withhold information when found, in order to alter the electoral outcome at the polling station in favour of those preferences. There is a range for the parameters considered in this model for which there is manipulation of agents' beliefs about the incumbent's capacity in manoeuvring the economy, in spite of all agents being fully rational and in spite of all of them knowing how strong the informed agent's preference for or against the incumbent is. As an important aside, we are able to find a new theoretical micro-founded model for Political Business Cycles. Manipulation over both election outcomes and the economy, however, is limited by pluralism and voters' skepticism. (JEL: 131, D82, D83, D84, D72, D78, H30).

Keywords. Equilibrium Political Business Cycles, Expert Advice, Belief Manipulation, Technological Uncertainty, Media Bias, Public Information, Political Accountability, Electoral Control, Strategic Information Transmission.

1 Introduction

In this paper I propose a simple analytical framework embedding politically motivated media into a standard dynamic Fiscal Policy decision problem. In every period, an incumbent who runs for reelection sets, constrained by a balanced-budget condition, taxes and the provision of public goods. Because competence evolves and is correlated through time, and changes from

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one appointed citizen to another, elections are held with some frequency (every other period) in order to make appointed officials accountable for their performance in power. However, competence is not directly observed. Agents can either extract noisy signals correlated to the incumbent's performance upon observation of public macro figures, or learn the incumbent's competence with precision when the media had found and disclosed evidence about his ability. The politician, the media, and producers, are assumed to be fully rational and have full common knowledge of the model. As for the voters, several informational and behavioural environments, ranging from naive to rational and skeptical voting, are considered. In a fundamental way, the media, who may learn, from time to time, hard information on competence, develops a preference for or against the incumbent which is independent of his skill in manoeuvring the economy. This is the source of media bias. I show that even when agents are fully rational, this bias, may lead to media's intervention over political public affairs, affecting thereby election outcomes and the economy. As an important aside, this strategic information problem makes taxes and current public expenditures fluctuate around electoral years unlike the way they do during non-electoral ones. That is, a source for the political business cycle (PBC).

Herein, the Political Business Cycle (PBC) is originated in an attempt on manipulating voter's inference of the incumbent's competency, which although not being observed by voters, may be learnt with some probability by a better informed agent that we call the media, who is also the agent exerting the manipulation over voters' beliefs. In the provision of one of two public goods, the politician must hire or acquire in the private market economy intermediate inputs that are produced by competitive price-taking firms. The ablest he is as a politician (which here takes the form of an exogenous shock), the fewer units of this input, at a given price, he will need in order to comply with the delivery of public goods that he is expected to come up with[1]. In addition to this technological uncertainty emerging from the political arena, production of this public good is also exposed to a simultaneous and exogenous shock which is independent of the incumbent's competency, and absolutely out of the polity's control. Agents observe the equilibrium price for input z and the realization of fiscal macro policy variables, and therefore extract valuable information from these correlated signals, though this process is limited. Indeed, due to their combined effect these shocks make agents' inference of each shock considered alone imperfect. Voters in the economy are willing to have the head of state as skillful as possible, and because administrative performance is correlated over time, the election is the opportunity for getting rid of those incumbents who do not come above a certain level of expected average competency. The sources for uncertainty leading to the 'informational' or 'signal extraction' problem, can be subdued to some extent by the media, who may learn the politician's competence and share this information before trading in the market for the intermediate good is carried out, refining thereby expectations and affecting for the better decisions at the polling station. However, the media may have political preferences and may not find in its best interest to spread the news when information about competence is revealed to them.

Indeed, the media is owned by a group of negligible mass, who noticeably have preferences for the incumbent that are independent of his/her skill in manoeuvring the economy and the

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[1]In the jargon of Hirshleifer (1971) the competency level is then one source of technological uncertainty in this economy.

polity. The key implication of this environment lies in that the media will have the incentive *and* power to either 'protect' their likeminded incumbent when there are bad news on his competence, or else to cast a shadow of doubt when good news about the incumbent have come to light and the media are not in favour of him. This is true despite all voters knowing on which side the media is on and how strong their political preference is, as I assume in this model. How far will the media go in protecting a bad incumbent or in harming a good one is among the issues we try to address in this paper[2].

The way through which the media inform voters and, from time to time, manipulate their beliefs, is as follows. The media play essentially two roles: (i) they are able to elicit hard information on the incumbent's competence, with some probability, and (ii) they are able to spread information about this competence across citizens; two fairly, yet perhaps optimistic, descriptive features of any mass media system. So whatever the media knows, everyone knows as long as the media decides to spread the news. But, and most importantly, the media might not learn something about the incumbent, and independently of having learnt something or not, it cannot lie about it. The hard information assumption constrains thus the media, who would have to bring forward any evidence supporting its reporting on the politician's competence if requested (we assume this is constitutionally enforceable). However, it can strategically decide to withhold information when found, if by doing so they are able to influence voters' decision at the polling station to their advantage. Indeed, if the media's preference in favour of the incumbent is strong enough and when their signal about the politician's competence level is not high enough for reelection purposes, they might decide to 'protect' him by sending a non-informative message[3]. This will affect the economy through two channels. First, producers of the intermediate input used in the production of public goods, will have to forecast prices and demand with less information, facing two sources of uncertainty instead of one. Though being potentially important in terms of the model's economic variables' variation, this effect does not necessarily generate itself fluctuations around electoral years that differ from those obtained in non-electoral ones. Indeed, a second and more interesting channel is one bearing a 'suspicion effect' (as coined by Anderson and McLaren (2010)) in agents' expectations. Agents in the economy know on which side the media is on, and know that if good news —that is, competence being greater than the expected competence of any politician drawn from the population at large— on the incumbent's competence had come to light, the media would have scrambled to spread the news[4]. They will conjecture, rightly, that if known, the competence parameter would lie somewhere between its lowest possible value and its unconditional mean, which implies tilting the posterior competence parameter's density function downwards (upwards when the media is against the incumbent), in such a way that the economy as a whole, in equilibrium, will fluctuate during electoral years in ways that differ from 'normal' years. This suspicion

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[2]Throughout the paper I use media both in its singular and plural form, indistinctly. This distinction will be important, however, when I study in an extension of the basic model the effects that pluralism within the media system (which must not be taken for the number of active outlets in the industry) has upon manipulation of voters' beliefs.

[3]Out of the model's symmetry the argument applies the other way round: the media may decide to withold information when against an incumbent found to be highly competent.

[4]Certainly, as I show below, it is a dominant strategy to spread the news when the found competency of a favoured (not favoured) incumbent lies above (below) the unconditional expected competence value.

effect is, to be sure, the source for PBCs in this model. When inferring the media's strategic optimal message, upon observation of their pull in favour or against the incumbent, producers must consider ordinary citizens' voting behaviour, which determines the chances of reelection of the incumbent.

To wrap up, the incumbent's competence affects the economy together with, and because of, the decision he makes on the amount of taxes and public good provision. By spreading the news the media draw closer together, stochastically speaking, producers' forecasted demand with actual demand in the market economy, and holds accountable the politician at the polling station; by withholding it, instead, they change the polity's economic performance and alter the inference that voters make on the politician's competence through observed prices and other informative signals. The latter may affect in turn decisions at the polling station[5]. Due to the existence of two independent stochastic shocks inference is imperfect, and there lies the power and interest of the media in manipulating, from time to time, the economy. This is despite all voters being fully rational. As a consequence of this conflict, we are able to find a new micro-foundation for Political Business Cycles, which enriches the predictions on this political cycle by introducing a simple monitoring technology which also captures some important aspects of real world monitoring of politicians' quality through mass media reporting.

1.1   Related Literature

This paper brings together two strands of the major category of Political Economy literature which have had until now nothing in common except that their authors all belong to the same academic cadre. On one hand, it follows much of the recent literature on Media Bias when choosing the features one is willing the media to have without losing tractability, in particular the assumptions on the supervision technology —which is able to hold politicians accountable—, and its related implicit slanting technology: the withholding of information (see in Besley and Prat (2006) and Anderson and McLaren (2010) application of this supervision technology). On the other hand, it provides an alternative answer to why Political Business Cycles are created, a topic that remains to present an unresolved puzzle in the literature on the Political Business Cycle. A first contribution of this paper is, therefore, intersecting these two seemingly unrelated bulks of literature. By doing so I provide a new model for PBCs and extend or bridge gaps in each of these literatures considered alone.

Indeed, though much has been said on Mass Media Bias[6], much less has been said about its consequences upon ultimate economic outcomes. It is true that in this literature media bias *may* have consequences on some political decisions, which in turn, it is presumed, will affect the economy; but the link is thin at best, and never explicit. The present paper attempts filling in, to some modest extent, this gap, by focusing on one particular Political Economy type of

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[5]Indeed, as it will be clear below, without this possibility the media would not have incentives to manipulate the economy, and the model would have to be dismissed all together.

[6]See Besley and Prat (2006), Baron (2006), Stromberg (2004), Ellman and Germano (2009), and most remarkably, the piece by Anderson and McLaren (2010), for supply-driven bias. On demand-driven bias, see Gabszewicz et al. (2001) , Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2006). Most prominent empirical work includes Groseclose and Milyo (2005), DellaVigna and Kaplan (2007) and Gentzkow and Shapiro (2010). See Gentzkow and Shapiro (2008) for a review with discussion of most interesting results from this disperse if eclectic literature.

problem, namely the theory of PBCs.

The link with the literature on Political Business Cycles initiated by Nordhaus (1975), is of a different kind. This literature is large, and has been running now for more than 35 years (Drazen (2000b)). One of its most remarkable features is that in spite of having plenty of evidence on pre and post electoral Political Business Cycles on the empirical side, there is still no agreement on how these cycles are created. There is consensus though in that the monetary approach (such as the one stressed by several of Alesina's and other authors' contributions (see for example Alesina (1987) and Alesina and Roubini (1992)) is unsatisfactory in explaining them[7]. A more auspicious avenue of research seems to be one exploiting either models combining both monetary and fiscal policies, or models featuring only fiscal issues instead (such as Rogoff (1990) and Rogoff and Sibert (1988))[8]. In this paper I take the latter route, which though sharing much of their environment and motivation, differs in several aspects to the ones found in those related works studying the Political Budget Cycle. In particular, I provide a new micro-foundation for PBCs which does not hinge on a signaling game between the incumbents and the voters. Besides, I also enrich the description and characterization of the PBC, as compared to these and other works, providing a wider range of possible outcomes and predictions. That said, the extent to which the media can influence the business cycle in the present model is limited by pluralism and the degree to which media exhibits politically motivated behaviour.

More generally, the supervision technology and information transmission conflict in the present paper follows Milgrom and Roberts (1986), the media being the interested and informed party, and the voters and producers the uninformed agents who request information to the informed one in order to make-up a decision. The model can also be interpreted as a strategic comunicational game between an informed sender (the media) and an uninformed receiver (private agents in the economy) who takes an action that affects the welfare of both (see Crawford and Sobel (1982)). The more the sender's welfare function resembles that of the receiver, the less noise there will be in the transmission of information. In the present paper this is also true: the stronger is the pull in favour or against the incumbent (the receivers being neutral in this respect), the more scope there will be for manipulation, and the more volatile the cycle will be.

2 The model

The model consists in a political business cycle model with informational frictions[9]. There is a polity/economy consisting of citizens, producers, and the media. Citizens, any one of which

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[7]As Drazen points out: "... after twenty-five years, monetary surprises as a driving force of a PBC just do not provide a very convincing story" (see Drazen (2000b), page 95).

[8]For a discussion of all these and other related issues see Drazen (2000a) and Drazen (2000b).

[9]Following Alesina et al. (1997) the model could also be considered to be a rational-opportunistic political business cycle model with strategic information transmission, with the media being the agent exhibiting opportunistic behaviour instead of the politician. However, because throughout I consider cases in which voters are not fully rational, I prefer a more general categorization than the one proposed by the referred authors. Similarly, because the model can be easily extended to other more general contexts, its predictions are not confined to the study of equilibrium political budget cycles only, as one would be tempted to call after Rogoff (1990). Indeed, extension of the present model to environments such as the one found in Persson and Tabellini (1990) for monetary policy is direct, and our main findings would apply.

will be indistinctly referred to as **the** *representative agent*, **a** "citizen", **a** "consumer", or **a** "voter", consume and vote. A citizen appointed at the head of the polity —the *incumbent*— also administrates, on behalf of the citizenry, every period, and constrained by a balanced-budget condition, taxes and the supply of two publicly provided goods consumed by all citizens. Production of public goods may require, as may be the case, the acquisition of an intermediate input supplied in the private economy by *producers*, who do not vote. Finally, a citizen, or a small group of citizens, referred to as **the media**, owns (own) a technology able to both (i) extract informative signals about the actual competence of the incumbent, which is not observed by the citizenry, and (ii) spread this information across the polity. Because competence is correlated through time, and because elections are regularly implemented, information about competence is useful to citizens when they vote for or against the incumbent. This information is also beneficial to producers when deciding how much of the intermediate input to supply. In an important way, the media may be politically motivated, which here takes the form of preferences in favour or against the incumbent which are independent of her/his competency *when* in power.

A   The representative agent

The economy is composed of a large and constant number of *ex ante* identical agents, the mass of which is normalised to be equal to one. These agents consume and vote. The representative agent is concerned with the expected value of his utility function, $E_t(W_t)$, where E denotes the rational expectation operator and subscript t denotes time. We have

$$W_t = \sum_{s=t}^{T} \left[U(c_s, g_s) + V(G_s) \right] \delta^{s-t} \tag{2.1}$$

Where c denotes the representative agent's consumption of the private good, g the consumption of a publicly provided good, and G the consumption of a public investment good[10]. The parameter $\delta < 1$ is the representative agent's discount factor. T can go to infinity.

In order to keep tractability, but without loss of generality[11], welfare is parametrized. It is assumed that

$$U(c_s, g_s) = c^\alpha g^{1-\alpha} \tag{2.2}$$

and

$$V(G_s) = \varpi \frac{G^\phi}{\phi} \tag{2.3}$$

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[10]Being inessential to the problem, interpretation of G is ignored. This good may be either a non-rival public good or, as in the present model, a publicly provided good. In passing, note that because the size of the polity has been normalised to one, c, g, and G, also correspond to the aggregated values of these variables in the economy.

[11]The results remain essentially the same when a more general instantaneous quasi-linear utility function such as $\Gamma_t = U(c_t, g_t) + V(G_t)$ is considered. Then it would suffice to impose that $U_{cg} + U_{gg} < 0$ and $U_{cg} + U_{cc} < 0$ (c and g are non-inferior goods), that $U(.)$ and $V(.)$ are standard strictly concave and twice differentiable increasing functions with $U'(0) = V'(0) = \infty$ and $\lim_{x \to \infty} V'(x) = 0$ (the Inada conditions), and $V''(G)G + V'(G) < 0$.

Thus, the representative agent's welfare is

$$W_t = \sum_{s=t}^{T} \left[c_s^\alpha g_s^{1-\alpha} + \varpi \frac{G_s^\phi}{\phi} \right] \delta^{s-t} \tag{2.4}$$

Where ϕ $(0 < \phi < 1)$, α $(0 < \alpha < 1)$, and $\varpi > 0$ are preference parameters.

B The political problem, electoral rules, and the government

In order to produce g and G for consumption, the polity requires the organization of a state able to levy taxes, and the appointment of a government who administrates these resources on behalf of the citizenry. Because the skill of any citizen appointed as head of state is not directly observed, and varies across both *appointed* citizens and time, the polity runs elections with a certain frequency[12]. This is established in, and made enforceable by, the polity's constitution.

It is assumed that every other period an election takes place[13]. Elections serve to appoint a citizen at the head of state[14], who is essentially responsible for setting key fiscal policies on behalf of his fellow citizens. The electoral rule follows a simple majority rule.

Any citizen appointed in power through a majority election is referred to as the **incumbent**, and denoted with $\mathcal{I}$. The welfare of an incumbent is identical to welfare of her/his fellow citizens, except for fixed private benefits $\mathcal{X} > 0$, which are exclusively derived from holding office. We have

$$W_t^{\mathcal{I}} = \sum_{s=t}^{T} \left[c_s^\alpha g_s^{1-\alpha} + \varpi \frac{G_s^\phi}{\phi} + \mathcal{X} \right] \delta^{s-t} \tag{2.5}$$

For most of the discussion below $\mathcal{X}$ is assumed to be arbitrarily small[15].

Every election has an incumbent running for reelection against an opponent or challenger. An opponent is a candidate-citizen randomly drawn from the citizenry. Any citizen can eventu-

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[12]So the election institution serves as a mechanism for the public's control over its representatives (see Barro (1973) and Ferejohn (1986) for models where elections serve as accountability and discipling devices).

[13]Every mandate lasts two periods. This means, for example, that an incumbent who had been elected for the first time in history and is reelected at the end of his/her first mandate, will last in power at *least* four periods. And so on. This electoral timing serves fundamentally one purpose. It allows to assess, and then compare, fluctuations in the main macroeconomic variables of interest — taxes and current expenditures — for both electoral and non-electoral years. This electoral structure is standard in the literature on political business cycles, as discussed in Alesina et al. (1997).

[14]A government in this model, therefore, is a citizen who leads the polity. This conforms to the basic approach found in Besley and Coate (1997).

[15]One of the interesting features of the model is that it generates political business cycles without the politician's direct intervention. Because we want to shut down the signaling mechanism (see Rogoff (1990) and Rogoff and Sibert (1988)), we implicitly assume that the incumbent (i) does not have an informational advantage over voters, and (ii) cannot step down from the reelection, even if the challengers' competence is believed to be much higher than his competence when either the media or an informative signal extracted from the economy reveals it. One way of justifying (ii) is having arbitrarily small private benefits from holding office: large enough as to make the incumbent willing to go for reelection, but small enough to refrain him from manipulating fiscal policy variables to win the election.

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ally become a politician running for office[16], though the probability of any single citizen being picked as a candidate is practically zero[17].

The available actions for the representative agent when voting can then be summarized as follows. Denote with v the action of casting a vote in favour of one of the available choices. The set of actions is V, with $v \in V = \{\mathcal{I}, \mathcal{O}\}$, where $v = \mathcal{I}$ means voting for the "incumbent" and $v = \mathcal{O}$ means voting for the "opponent".

C Technology

The production of public goods

Every period, and exogenously, every citizen is endowed with a constant amount y of units of a non-storable final good (the numeraire; output) which can be privately consumed. The price of this final good, p_y, is normalised to be equal to 1. To finance the provision of public goods, the government levies a lump sum tax, τ_t, on every citizen's endowment, which can be linearly used as an input in the production of public goods. Citizens' private consumption, which is carried out at the end of every period, equals thus disposable income

$$c_t = y - \tau_t \tag{2.6}$$

As discussed above, the production of public goods needs the organization of a government in charge of administrating the public resources and needs. This is institutionalized, as discussed above, by the appointment of a fellow citizen as the head of state. This citizen is able to generate income from taxes, which he can transform linearly into public goods. In addition to taxes, the incumbent can use another input, l, the level of which depends both on the incumbent's competency ε[18] and external variables out of the polity's control which are subsumed in the parameter ϑ. Competence is an intrinsic trait of the appointed citizen, which he cannot control either. The parameter ϑ can be interpreted as governance's sheer sways of good or bad "luck"[19].

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[16]In an open seat election, at the very beginning of the polity's existence, say period t_0, two candidates are randomly withdrawn from the citizenry in the same way. In any posterior period, an incumbent always runs against an opponent who is withdrawn from the citizenry at large. For most of our discussion incumbents cannot or are not willing to step down from power unless voters decide to replace them for an opponent in the respective election. This is indeclinable. We study the economy for any period such that $t > t_0$.

[17]Notice that we could artificially refer to the incumbent and the challenger as party R and party D, as Rogoff and Sibert (1988) do. This would not carry any consequence on our interpretation of the model's results as long as both parties —or members of each— are not "partisan" (their preferences on economic policies are identical)! as in Rogoff and Sibert (1988). The present model and theirs are not partisan therefore, and I have preferred to avoid the introduction of parties in order to keep notation simple. They only agent (potentially) showing some partisan behaviour in our model is the media.

[18]Note that in a more general interpretation where the government consists of a group of appointed officials (maybe representing a particular constituency or party), this parameter could be interpreted as the combined efficiency of members of that political party or coalition in power, or of those members of the party with formal responsabilities in the government.

[19]It may help thinking, for example, as ε being a reduced form of Lula's combined inherent traits as a political leader, and ϑ as a reduced form for the global "boom" of demand for commodities which had boosted the Brazilian economy during Lula's mandate, and which without doubt contributed to his highly praised government. This 'out of the polity's control' variable is standard in political business cycles models (see Alesina et al. (1997) and Persson and Tabellini (1990)).

Hence, technology in the production of public goods is such that

$$\tau_t + l_t = g_t + G_t \tag{2.7}$$

For most of our discussion below, it is assumed that the deployment of l as an input in the production of public goods, requires an intermediate input, z, that the government must hire or acquire in the market economy. In that case it is assumed that l is produced with the following technology

$$l_t = \mathcal{A}\mathcal{G}(\varepsilon_t, \vartheta_t)\frac{z_t^\eta}{\eta} \tag{2.8}$$

Where $\mathcal{G}$ (for overall "governmental efficiency") is a general function capturing the combined effect of competency and "luck" in the production of l, with $G_\varepsilon(.), G_\vartheta(.) > 0$. In order to have a downward sloped demand for the governmental use of the intermediate input, it is assumed that $\eta < 1$. Finally, parameter $\mathcal{A}$ is a scaling factor.

When z is not required in the production of l, then $l_t = \mathcal{A}\mathcal{G}(\varepsilon_t, \vartheta_t)^{20}$.

The following simplifying assumption is made

$$\mathcal{G}(\varepsilon_t, \vartheta_t) = \varepsilon_t + \vartheta_t \tag{2.9}$$

In order to keep tractability, and without loss of generality, it is assumed that the government, which is the only buyer of z in this economy, is a price taker when acquiring units of z from different sellers[21]. The price at which units of z are traded is p_z.

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[20]If this were the case and $\mathcal{G}(\varepsilon_t, \vartheta_t) = \varepsilon$ we would obtain the linear technology for public goods found in Rogoff (1990). It should be noticed that the introduction of technology with competence having multiplicative effects on either g, G, or both, would exhibit some substitution effects that would have in turn important consequences on the sign that changes to competence induce on taxes and expenditures. However, the mechanism through which this occurs is not altered by these considerations, and in order to keep our model's results as close as possible to other related works, the simple technology described above —where only income effects count— will be considered.

[21]This reductionism serves to keep the model as simple as possible. A more general formulation and consistent with the government's price-taking behaviour assumption would incorporate an aggregate demand for input z for private ends. Suppose we have $z_t = az_{pub}^\rho e^{\vartheta_t}$, where z is the aggregate demand for input z in the economy, z_{pub} the governmental demand, $a > 0$, and ϑ_t an i.i.d aggregate demand shock, normally distributed such that $\vartheta_t \sim \mathcal{N}(0, \sigma_\vartheta^2)$. Suppose the parameter $\rho > 0$ is meant to capture some correlation between the governmental demand z_{pub} and overall demand. Then the assumed equation is the reduced form of an economy with a continuum of scattered and independent competitive markets for z, all facing a common aggregate shock, an individual iid normally distributed idiosyncratic shock, and each exhibiting some fixed individual effect (which in the aggregate sum up to some parameter a). If one assumes that the idiosyncratic shocks are independent, then when aggregating across markets, and using the law of large numbers, one arrives to an expression alike the one describing aggregate demand. Note that in that case the introduction of an aggregate demand shock would be isomorphic to a shock to salable output faced by producers of input z when deploying units of z the day trade is carried out. Private demand, in that case, could come from abroad. We are not being explicit here on how input z is used for private purposes (either consumption or production of final goods), for this is inconsequential for our subject matter. What is essential in the model is to have some observable aggregate variable in the economy (the aggregate price of z in this case) containing some information (in the form of a noisy signal) about the incumbent's competence. If the reader is uneasy with this assumption, it may help considering the non-governmental demand for this input as if coming from foreign economies. Of course, there are many

In every period the government's manoeuvring of the fiscal variables is constrained by a balanced-budget condition. Then, we have

$$\tau_t + l_t = g_t + p_{zt}z_t + G_t \tag{2.10}$$

When z is not needed, this condition becomes $\tau_t + l_t = g_t + G_t$.

Producers and the market for the intermediary input

When governance requires its use, the non-storable intermediate input z is supplied, every period, by a large number of scattered price-taking producers that carry out exchange in a perfectly competitive market. For simplicity's sake, and without loss of generality, its production is assumed to take time —an interim window of time within a given period—, so that the amount of z to be supplied must be chosen at the beginning of every period, before trade is carried out. The problem of any individual producer j at the eve of period t reduces then to deciding on how much of z to produce and supply in order to maximise expected profits

$$E_t[\Pi_{tj}|\Omega_t] = E_t[p_{zt}|\Omega_t]z_{jt} - \frac{z_{jt}^2}{2} \tag{2.11}$$

Where Π lies for profits, E is the rational expectation operator, Ω_t the information set of any producer at the beginning of any period, and p_{zt} is the price for good z. Production is certain, but because it must be decided in advance, the market-clearing price is uncertain from the point of view of producers. Equation (2.11) is then a reduced form for supply of z[22].

Producers do not vote[23]. There is no loss then in normalising their mass to be equal to 1.

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other ways or mechanisms that would do. One may argue, for example, that a more natural environment for studying governmental purchases is assuming that the implemented mechanism consists of a concession or other public-private partnership arrangements. Or directly an auction mechanism. However, at a cost of making the model less tractable and more knotty, we would not gain much more insights from the problem at stake if in those mechanisms, ceteris paribus and in equilibrium, the bidders are willing on average to bid more aggresively the higher is the incumbent's competence believed to be.

[22]I follow here Grossman (1981)'s simple setting when introducing Muth (1961)'s seminal concept of rational expectations. One way of making explicit this environment for production of z is that "producers" are agents in the economy who own, or are endowed with, a fixed non depreciating capital good exhibiting decreasing returns, and which together with a commodity (say h) that is itself salable in international markets to which these producers have access but are not able to influence (the international price for h is constant), serves in the production of z. The capital good cannot be expropriated and we assume all producers holding an identical amount $\bar{L} > 0$ of this production factor (it may help thinking this factor as land or human capital, or some other production factor that is fixed in the short run).

[23]If the reader is uneasy with this assumption, one alternative interpretation with identical properties is that producers do not constitute a majority (they virtually have no political power). As a matter of fact, it would make no difference at all if production were carried out by producers abroad. The key is having ordinary consumers constituting the majority in every election. Then their preferences, and not those of producers, will be considered by the incumbent when setting taxes and public spending. This assumption does not alter our results to any extent, as long as producers do not own the media. In this latter case, they would always use information about the incumbent if found in order to maximise profits, but not necessarily share this information with other constituencies as long as there are political motives for doing so, as we assume the elite owning the media have in our model. In any case, we would not observe in that case a political business cycle, though the media would still influence the election: in our model voter's signal extraction is weaker and its consequences upon politicians' accountability more severe, if producers owned the media.

Because the media will provide information about the incumbent's competence, in a way to be described below, and because this competence will affect the governmental demand for the intermediate input, and with it its equilibrium price, producers are willing to heed the newspaper's message. The introduction of producers in our model, therefore, is not merely a modelling choice. It explicitly introduces agents in the economy (producers) who will have incentives to heed (and pay for) the media's message in order to decide upon actions that have consequences on their private material welfare (expected profits). It is indeed a key element in the model's approach, conforming to recent work on the role of the media in political affairs[24], where the paradigm is that of having readers buying newspapers out of the private benefits they get from doing so. This approach is a convenient way of not having to address the difficult task of rationalizing politically motivated behaviour among uncoordinated rational agents. In the present model we do not resort to Kantian arguments to justify why people want to buy newspapers to decide what to vote[25]: newspapers exist because producers are willing to pay for information released by the media in order to maximise expected profits.

D   Uncertainty

There is uncertainty in the administration of public goods and taxes. All uncertainty is technological, and in particular affects function $\mathcal{G}(\varepsilon_t, \vartheta_t)$. There are two sources of uncertainty: (i) the incumbent's competence ε, and (ii) the exogenous shocks out of the polity's control ϑ. Incumbents observe the combined shock upon governmnental efficiency, described by function $\mathcal{G}(\varepsilon_t, \vartheta_t)$, but are not able to disentangle one from another. For this reason there are no incentives for them to signal their type, which is unobserved. This also implies that in the basic setup incumbents are essentially benevolent. As for the rest of the ordinary citinzenry, they do not observe $\mathcal{G}(\varepsilon_t, \vartheta_t)$. More on this below.

Competency

As mentioned above, any citizen can serve as head of state. But citizens differ in terms of their ability in producing the publicly provided goods *when* in power. This competency evolves through time, and from one appointed citizen to another. Specifically, for any citizen i appointed in power, it is assumed that competency evolves according to the following serially correlated stochastic process[26]

$$\varepsilon_t^i = \begin{cases} \epsilon_t^i + \epsilon_{t-1}^i \text{ if } i \text{ is a reelected } \textbf{incumbent} \\ \epsilon_t^i + b \quad \text{if } i \text{ is a } \textbf{challenger} \text{ or any candidate in an open seat election} \end{cases}$$

With ϵ_t^i being a i.i.d stochastic process on $\mathcal{E} \equiv [0, \epsilon^*)$, having a twice-continuously differentiable distribution function $\mathcal{F}$ with $E(\epsilon_t^i) \equiv \int \epsilon_t^i d\mathcal{F}(\epsilon_t^i) = \bar{\epsilon}$. These shocks are assumed to

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[24]See in particular Stromberg (2004) and Anderson and McLaren (2010).

[25]As it is stressed in the voting literature, to have people purchasing newspapers in order to be informed on public affairs and make up a decision regarding an impending election *only*, would be hard to reconcile with the rational individual cost-benefit approach.

[26]This stochastic structure for competence follows Rogoff and Sibert (1988) and Persson and Tabellini (1990) closely.

be independently distributed across agents and through time[27]. The parameter $b > 0$ can be either larger or lower than $\bar{\epsilon}$. The first case is meant to capture situations in which the challenger has a certain advantage over an incumbent in getting along with the mandate's first period, which may occur in polities where new governments face less opposition and less public scrutiny than reelected incumbents. But the contrary might be true if the art of governing gains from experience, which no new comer has the privilege to acquire without wielding power and meddling into the public sphere. Most importantly, for most of our unfolding discussion b is assumed to be an objective exogenous parameter reflecting structural and intrinsic traits of the polity's political system, that we take as given. Information collection about the opponent is of a different kind by its very nature. Generally speaking, opponents are not able to show how skillful they are in wielding power, nor are impaired by the visibility to which incumbents are exposed when making mistakes in public affairs, unless voters keep track of past performances in a very jealous and diligent way. The media does provide information about challengers, and has the incentives to investigate their ability as politicians (this we prove formally below). We will come back to this issue in extensions, but make clear that for most of our discussion b will be treated as exogenous.

Notwithstanding, note that this stochastic structure prevents any incumbent that has proven to be highly competent in his early mandates, to remain in power more than two subsequent presidential periods with certainty. The model is exhibiting short memory, capturing realistically the fact that the ability in manoeuvring the economy and the polity may wither off across time.

Because competence is correlated through time, voters would want to keep incumbents that exhibit relatively high contemporaneous competency shocks ϵ_t^i, as compared to incumbents facing relatively low competency shocks, and in particular, voters are willing to keep incumbents that are believed to be more competent than what they expect the opponent to be next period if elected.

Luck or exogenous shocks beyond the incumbent's control

Every period, the function $\mathcal{G}(\varepsilon_t, \vartheta_t)$ is also hit by a contemporaneous exogenous shock over governmental efficiency, ϑ_t, which is independent of competency, and is assumed to be a i.i.d stochastic process on $\mathcal{L} \equiv [0, \vartheta^*)$, with unimodal, twice continuously differentiable, and symmetrically distributed density function h. The higher this shock, the more efficient would the incumbent be in delivering public goods without violating the balanced-budget constraint, everything else being equal. It is assumed that this shock is not directly observed by any agent in the economy. This parameter can be interpreted as global shocks or the polity's exposure to world events it cannot control.

Information about contemporaneous competency, in this setting, would help voters in keeping incumbents accountable, enhancing the screening power of the electoral institution. In addition, it aligns producers' expectations to the actual state of the economy. Although ordinary citizens are not able to observe competence directly, there is a superiorly informed agent

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[27]Other more general stochastic structures which do not have this property are considered in extensions to this basic setup. Notice that if ϵ_t^i could only take two possible values, we would have Rogoff (1990)'s stochastic structure for competence.

able to extract, occasionally, informative signals about competence. This agent is the media.

E   The media

There is an agent or group of agents of negligible mass (and therefore no political power[28]) owning a technology able to extract, and afterwards spread across the polity, information that is useful for agents in the economy.

   The media consume, vote and send public messages. Their consumption behaviour is identical to any representative agent. Their vote may not coincide with that of the representative citizen, though this is inconsequential for the election outcome, that will be governed by the preferences of the representative citizen (the medium voter). The key role of the media lies in its information transmission, able to affect both the economy, through producers' expectations, and the election.

The monitoring technology and messages

The way superior information is generated here is simple. The media exclusively owns a technology enabling them, at any point in time, to find out the incumbent's contemporaneous competency shock with probability π. Thus, with probability $1 - \pi$ the media learn nothing. The power of making these messages spread across the polity's constituencies is monopolised by the media. We assume further that the extracted information is hard verifiable information (in the spirit of Milgrom and Roberts (1986)'s informed but interested party information transmission problem). That is, the media can provide evidence (proofs) on the declared incumbent's competence only when it has learnt its value[29] and cannot misreport or forge this evidence[30]. However, and crucially, the media can manipulate information by withholding or concealing the evidence from the public eye when found[31]. We assume that information gathering and communication is costless. Denote with s_m the perfectly correlated signal that the media is able to extract. Then, the supervision technology is such that

$$
s_m = \begin{cases} \epsilon_t^i & \text{with probability } \pi \\ \emptyset & \text{with probability } 1 - \pi \end{cases}
$$

---

[28]In fact, one of the interesting features in this model is that the media is able to influence electoral outcomes in spite of its relatively small political power at the polling station. This is essential: the power of the media lies in its exclusive ownership and control of a technology able to elicit informative signals about government to which no one else in the polity has access to, and the output of which, by the very nature of the media system, the media is able to spread across the polity. Two realistic features of any modern media system.

[29]This supervision technology is a direct application of Anderson and McLaren (2010) to a specific economic problem, and more generally belongs to the class of *persuasion* games (see Milgrom (2008)).

[30]The information is verifiable by a product demostration or else, there are truth-in-advertising laws protecting receptors of information conveyed by the media.

[31]In Dewatripoint and Tirole (1999)'s jargon this means that the media can manipulate disclosure of evidence. According to that work this is realistic in contexts where information concealment is hard to detect and not punished severely when detected, and in cases where the investigator (the media in our case) has ownership over the information it generates or collects. All these features, fit quite naturally into an environment where information is gathered and transmitted by the media system, especially in countries where the constitution protects press freedom, as in the US.

Because this structure is common knowledge, when media's messages are not empty they are credible, and thus it is optimal for producers and voters to heed what the media say when making up a decision.

The hard information assumption limits the set of available actions for the media. Denote with m the message sent by the media to the public. If nothing is learnt about the incumbent's competency, then they can only transmit an empty message: $m = \emptyset$. If, on the contrary, the media find some evidence then the message can be either an empty message or the competency itself $m = s = \epsilon_t^i$ ($m \in \{\emptyset, \epsilon_t^i\}$). If $\mathcal{M}$ is the message space, then

$$
\mathcal{M} = \begin{cases} \{\emptyset, \epsilon_t^i\} & \text{with probability } \pi \\ \emptyset & \text{with probability } 1 - \pi \end{cases}
$$

As for the ordinary citizens, they never learn the incumbent's competence level contemporaneously unless the media make a public announcement revealing it.

The media are political

The media are political. The media have the same preferences as the representative agent, in particular regarding the purely economical component of welfare, except for a purely political taste shock β for or against the incumbent, which enters linearly into the welfare function of the media, and which is independent of the skill of the incumbent. We have

$$
W_t^m = \sum_{s=t}^{T} \left[c_s^\alpha g_s^{1-\alpha} + \varpi \frac{G_s^\phi}{\eta\phi} + \beta_t^{\mathcal{I}} \right] \delta^{s-t} \tag{2.12}
$$

Where supperscript m denotes the media. The higher is β_t the stronger is the media's preference for the incumbent[32]. This political shock on the media's preferences is stochastic and is assumed to be serially correlated and independent of both past and contemporaneous competency and luck shocks. We have

$$
\beta_t^{\mathcal{I}} = \kappa_t^{\mathcal{I}} + \kappa_{t-1}^{\mathcal{I}} \tag{2.13}
$$

where $\{\beta_t^{\mathcal{I}}\}$ is an i.i.d stochastic process on $[-\kappa^*, \kappa^*]$[33], and κ^* may be infinite. κ is distributed with distribution function $\mathcal{K}(\kappa)$, with density $k(\kappa) > 0$, and $E[\kappa] \equiv \int \kappa dK(\kappa) = 0$. This preference shock is the source of media **bias** in this model. If the political motive is strong enough, then the media will have incentives to manipulate its messages accordingly, in order to protect a likeminded relatively incompetent incumbent, or conversely to cast a shadow of doubt upon unfavoured competent ones. In a fundamental way, this pull (bias) in favour or against the incumbent is publicly observed by all members of the polity. Specifically, it is assumed that

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[32]Note that this preference shock follows the probabilistic voting model approach, first proposed by Lindbeck and Weibull (1987). It also fulfils a analogous function to that of the 'good looks' shocks in Rogoff (1990). This is standard in the literature.

[33]It is assumed that this support is sufficiently wide with respect to the values that competence itself can take. If, for instance, the upper limit κ^* meant few scope for media manipulation, it would rend the whole problem uninteresting.

both shocks affecting the bias in any period t ($\kappa_t^{\mathcal{I}}$ and $\kappa_{t-1}^{\mathcal{I}}$) are known to everyone. In fact, a nice feature of this configuration is that the media may be contemporaneously against the incumbent ($\beta_t^{\mathcal{I}} < 0$) and still decide to protect her by concealing bad news on his competence if the most recent shock is positive $\kappa_t^{\mathcal{I}} > 0$. How far will the media go in protecting a bad incumbent or in harming a good one is among the issues we address in the present model.

I make the following simplifying assumption[34] .

Assumption 1 (*The media does not develop a preference for the challenger*). $E_t[\beta_{t+1}|\mathcal{O}] = 0$.

So whatever the media knows, everyone knows as long as the media decide to spread the news. But, and most importantly, the media might not learn something about the incumbent, and independently of having learnt something or not, they cannot lie about it. The hard information assumption constrains thus the media, who would have to bring forward any evidence supporting its reporting on the politician's competence if requested (we assume this is constitutionally enforceable). However, it can strategically decide to withhold information when found, if by doing so they are able to influence voters' decision at the polling station to their advantage. Indeed, if the media's preference in favour of the incumbent is strong enough and when their signal about the politician's competence level is not high enough for reelection purposes, they might decide to 'protect' him by sending a non-informative message (no disclosure)[35]. This will affect the economy through two channels. First, producers of the intermediate input used in the production of public goods, will have to forecast prices and demand with less information, facing two sources of uncertainty instead of one. Though being potentially important in terms of the model's economic variables' variation, this effect does not necessarily generate itself fluctuations around electoral years that differ from those obtained in non-electoral ones. Indeed, a second and more interesting channel is one bearing a 'suspicion effect' (as coined by Anderson and McLaren (2010)) in agents' expectations. Agents in the economy know on which side the media is on, and know that if good news —that is, competence being greater than the expected competence of any politician drawn from the population at large— on the incumbent's competence had come to light, the media would have scrambled to spread the news[36]. They will conjecture, rightly, that if known, the competence parameter would lie somewhere between its lowest possible value and its unconditional mean, which implies tilting the posterior competence parameter's density function downwards, in such a way that the economy as a whole, in equilibrium, will fluctuate during electoral years in ways that differ from 'normal' years. This suspicion effect is, to be sure, the source for PBCs in this model.

The media may be either non-pluralistic or pluralistic

For most of our discussion below the media industry, independently of the number of newspapers or means of communication belonging to it, is considered to be either in favour or against the incumbent as a whole, exhibiting all of its constituents the same political preference β, at any

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[34]The role of information about the challenger is considered in extensions to the this basic setup.

[35]Out of symmetry the argument applies the other way round: the media may decide to withold information when against an incumbent found to be highly competent.

[36]Certainly, as I show below, it is a dominant strategy to spread the news when the found competency of a favoured (non favoured) incumbent lies above (below) the unconditional expected competence value.

given point in time. The justification for this is the observed extreme concentration of the media industry in most countries[37].

Yet, however concentrated the media industry is in most economies, we cannot dismiss the possibility of having some degree of political discrepancy, or pluralism, within and across media systems, in spite of concentration and commercialization. This may reflect political heterogeneity across the population, or supply forces, such as state intervention, or lobbying; it does not matter here. In our context, however little this divergence of interests is within the media, which in the present model can be of minor expression (κ is continuous), it will have significant consequences upon the election and the economy. Pluralism therefore must be addressed.

Whenever we consider pluralism the following assumptions will be made. Without loss of generality, when stuyding pluralism we will assume the media industry consists of two independent news producers, A and B, exhibiting each different political motives. That is, each newspaper "j" observes a preference shock κ^j independently drawn from the same distribution function $K(\kappa)$ (with $j = A, B$), with $\kappa^A \neq \kappa^B$. As for all the remaining features of the media discussed above, I will assume they are identical: they have the same supervision technology (no single publisher has an advantage over the other when investigating about the incumbent's competence), and the same trasmission power (messages sent by both publishers reach every corner of the polity). We also assume that if any evidence is found, it is not manipulable within the media system: if either newspaper learns the competency parameter, this is immediately known by the competitor ipso facto. Note that because of the stochastic nature of the political motive, pluralism, if any, is essentially stochastic across time, exhibiting different degrees of pluralism from one period to another.

I distinguish two different possible situations with pluralistic media. In one case, the publishers' political motives exhibit the same signs, but differ in their intensities (say $\kappa_A > \kappa_B > 0$ or $-\kappa_A < -\kappa_B < 0$). Whenever we observe this situation we shall refer to the media system as exhibiting *moderate* or *mild pluralism*. Another possibility is having the political motives with different signs (that is $sign(\kappa_A) \neq sign(\kappa_B)$) . We shall refer to this situation as exhibiting *complete pluralism.* Before moving onto the information structure and timing of events, an important remark is in order.

Remark.— So far I have made no mention to the role of newspapers' prices. It has been implicitly assumed that prices are arbitrarily close to zero and insignificant. This is not to say that they are not important, but there are several reasons supporting this decision when considering the type of issues studied in this paper, apart from simplifying the analysis to a large extent. In our model the media is assumed to be supported by the polity's welfare, which is a reduced form of media having been supported by either advertisers or any agent whose willingness to pay is correlated to the economy's activity. Prices (and profits thereby) will be explicitly introduced in an extension to the model, through producers' ex ante willingness to pay for information contained in the media. Another reason for not delving deeper into the pricing strategies of publishers is that most of the insights one is able to draw from such an

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[37]I refer to Anderson and McLaren (2010) for several concrete and telling examples where concentration plus political agenda-setting does have consequences on disclosure, which influences the beliefs that citizens form about certain variables that have both public and private consequences.

exercise, are already described in Anderson and McLaren (2010)'s thorough study of politically motivated media and its impact on prices and the media's organisation. Here, the aim is to focus more on the politico-economic consequences of politically motivated media, especially over policy decision-making and policy outcomes.

F   Information and timing of events

The aim is to investigate the consequences of strategic political information transmission in the context of a standard political business model. We consider therefore a wide range of possible informational and behavioural structures.

Throughout, it is assumed that producers are rational and form expectations rationally following Bayes updating rule. Producers have common knowledge of the model and the distribution of all random variables. In particular, they are aware of the political motive of the media. However, because production must be realised before trade, producers cannot use information borne in the main macroeconomic variables (g, τ or welfare itself) when deciding how much of z to supply.

As mentioned above, the incumbent is assumed to observe the combined shock to its administrative efficacy $\mathcal{G}(\varepsilon_t, \vartheta_t)$ only. The incumbent does not have an information advantage, and therefore does not attempt deceiving voters following some opportunistic behaviour, nor would its manipulation of the policy variables be considered as informative signals.

As for the voters, several cases are considered. At one extreme, voters are assumed to be uninformed or simply "naive". In that case voting behaviour is assumed to follow a simply retrospective rule such as "if this period's welfare is above a certain threshold vote for the incumbent; if not, vote otherwise". Naive voters are not aware of the underlying political motive of the media, and do not infer anything when empty messages are conveyed. One intermediate case is having voters using knowledge of the model and extracting informative but noisy signals about competence upon observation of the economy's aggregates. In any of these cases, however, when the media discloses evidence about competence to the public, it is assumed that everyone learns this information and votes accordingly following a simply voting rule such as "if the reported competence is above a certain threshold vote incumbent; otherwise vote for opponent". At the other extreme, where voters are assumed to be rational and sophisticated, information is processed using Bayes rule, the model is common knowledge to them and they understand incentives of the media to withhold information. They also use information conveyed in observable macro variables. I have represented the alternative informational and behavioural possible situations in the following figure. The boxes marked with "×" denotes situations that are studied in this paper.

FIGURE I
Possible Voting Behavioural and Informational Situations

In all cases, it will be assumed that the comtemporaneous shock is learnt by all parties but with a lag. This is to simplify the exposition and implies that during an electoral period all agents are aware of the most recent past competence shock ϵ_{t-1}^i (this is significant of course only when the media had not timely revealed this information).

The essential information structure and timing of events is described in the next figure (figure II), where we have considered the case with production and sophisticated voters. Most of its structure remains the same for non-electoral years, though a key difference is that only during electoral periods will the media have the incentive to withhold information when found. So consider the beginning of the second period of any mandate, at the end of which an election is to be held. At the very beginning the competency shock ϵ_t and the contemporaneous political shock on the media's preferences for or against the incumbent, κ_t, are withdrawn. All agents in the economy observe past competency shock ϵ_{t-1}, κ_{t-1} and κ_t. The actual shock on competency ϵ_t is not observed by any party.
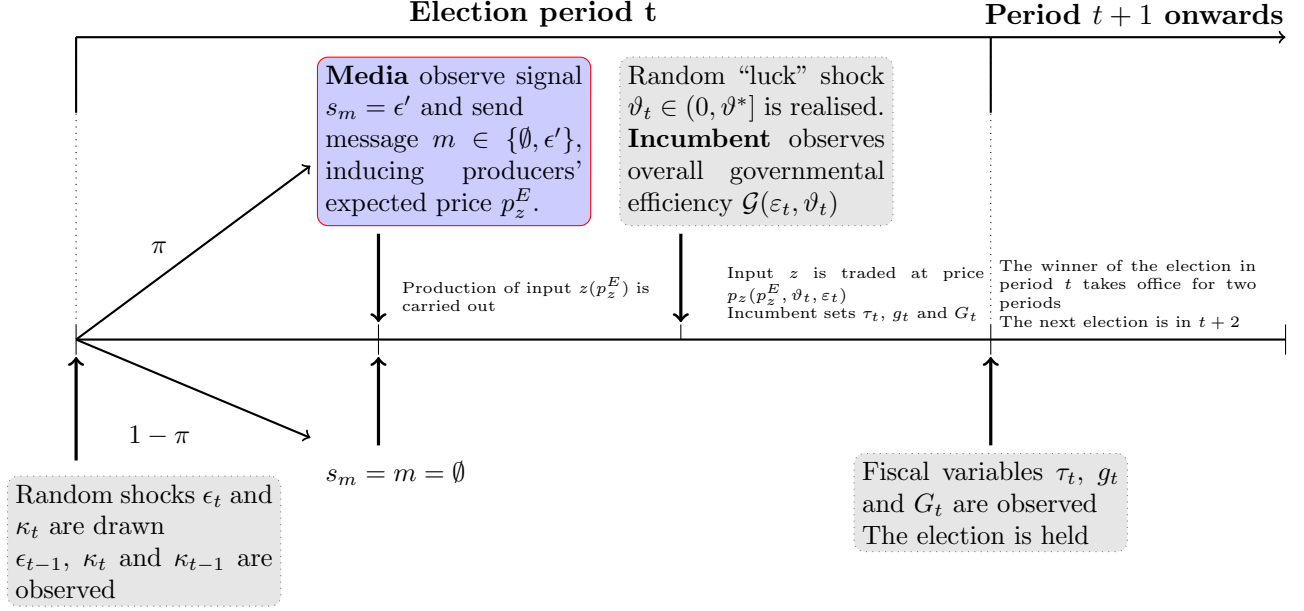
Election period t   **Period $t+1$ onwards**

Media observe signal $s_m = \epsilon'$ and send message $m \in \{\emptyset, \epsilon'\}$, inducing producers' expected price p_z^E.

Random "luck" shock $\vartheta_t \in (0, \vartheta^*]$ is realised. **Incumbent** observes overall governmental efficiency $\mathcal{G}(\varepsilon_t, \vartheta_t)$

π

Production of input $z(p_z^E)$ is carried out

Input z is traded at price $p_z(p_z^E, \vartheta_t, \varepsilon_t)$
Incumbent sets τ_t, g_t and G_t

The winner of the election in period t takes office for two periods
The next election is in $t+2$

$1 - \pi$

$s_m = m = \emptyset$

Fiscal variables τ_t, g_t and G_t are observed
The election is held

Random shocks ϵ_t and κ_t are drawn
ϵ_{t-1}, κ_t and κ_{t-1} are observed

FIGURE II
Timing and Information

With probability π the media find evidence about competence. In that case the have two alternatives: either they disclose the information, or they withhold it by sending an empty message (this is the dark shaded box in the figure). With probability $1 - \pi$ the media finds no hard information on competence and have no choice but report an empty message.

More generally, in any situation, the media send a message m which is received by producers of the intermediate input z, who form expectations on the equilibrium price of z based on the media's message. At the time trade is carried out, production is predetermined. That is, the amount of z is fixed, and what is to be determined is its equilibrium price.

At the time trade of z is to be carried out the incumbent observes the combined contemporaneous shock on his/her overall governmental efficiency, captured generally by function $\mathcal{G}(\varepsilon_t, \vartheta_t)$. Taking this overall shock and the price as given, he decides how many units of z to acquire from producers, and sets accordingly, constrained by the balanced-budget condition, all fiscal policy variables: τ_t, g_t, G_t. At the time this occurs, the market for z clears, and the equilibrium price is determined. The price will depend on the actual competence, the strike of luck ϑ and producers' anticipation of these shocks through expectations based on reports by the media.

At the end of the period all agents observe τ_t, g_t, G_t (voters in particular, depending on the case, will also learn in some instances the market clearing price and producers' expectations). Using information about competence conveyed by the media and/or the economic aggregates, voters vote either for the incumbent or the challenger.

Without production we will assume the media send a message after having observed the fiscal policy variables' realisation. We start studying this case next, as a useful benchmark. Most of the main insights as to how agents solve their problems will be described in the next section, and will be referred to when studying the case with production. However, it is worth insisting that by its very nature the case without private production of an intermediate input

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will not affect the economy contemporaneously, though it can potentially harm the screening power of the election institution (from an ex-ante point of view, post-election performance will be on average lower with politically motivated media, than without it, for poorly endowed incumbents will have higher chances of continuing in power, while relatively highly skilled incumbent will be spared from power more often).

3 Election manipulation without a PBC: a benchmark

In this section we consider a situation where the intermediate input z is not used in governmental production. We show that the media may have power influencing the election, though this power vanishes when pluralism is complete. Two distinctive features captured by the model are highlighted in this section. First, politically motivated media will act opportunistically after having observed the macro figures: a media against the incumbent may decide to cast a shadow of doubt upon his competency if governance is swayed by bad luck; when the media is in favour, they may withhold information to "cosset" their likeminded incumbent if he had been favoured by chance. And the media may be opportunistically non-partisan. At the other extreme, when voters can only rely on information conveyed by the media, or when signals about competence take intermediate values, I show a tendency towards extremist suspicion of voters against the media's political interest. This effect stems from the structure of the persuasion game with skeptical buyers (voters), first applied to the study of the media industry and its influence on politics in Anderson and McLaren (2010).

Without production we have a modified version of equation (2.8)

$$l_t = \mathcal{A}(\varepsilon_t + \vartheta_t) \tag{3.1}$$

First we solve for the incumbent's problem, which will remain fundamentally the same throughout. Then we consider different information structures and voting rules for voters. For each of them we study the media's decision on what message to make public when information about competence is found. We also assess the consequences of this manipulation upon post-electoral performance from an ex-ante point of view, given that the media is politically motivated and that they withhold information.

A The incumbent's problem

In every period the incumbent observes $\mathcal{G}(\varepsilon_t, \vartheta_t)$, which he takes as given when maximising welfare. The problem is to maximise (2.4) subject to (2.6) and (2.10) (omitting in the latter the need of acquistion of units of z), given $\mathcal{G}(\varepsilon_t, \vartheta_t)$. Notice that because the incumbent is not concerned with reelection ($\mathcal{X}$ is omitted), the unconstrained program (assuming an interior solution), for given $\bar{l} = l_t = \mathcal{AG}(\varepsilon_t, \vartheta_t)$, becomes

$$\max_{\tau_t, G_t} (y - \tau_t)^\alpha (\tau_t + \bar{l} - G_t)^{1-\alpha} + \varpi \frac{G_t^\phi}{\phi} \tag{3.2}$$

The first order conditions for an interior solution to (3.2) imply

$$\frac{y - \tau_t}{\tau_t + \bar{l} - G_t} = \frac{\alpha}{1 - \alpha} \tag{3.3}$$

and

$$G_t = \left(\frac{\varpi}{1-\alpha}\right)^{\frac{1}{1-\phi}} \left(\frac{\tau_t + \bar{l} - G_t}{y - \tau_t}\right)^{\frac{\alpha}{1-\phi}} \tag{3.4}$$

One can readily confirm that there is a unique $[\tau^*, G^*]$ satisfying (3.3) and (3.4), and that this point is a global maximum for (3.2). Using (3.3) in (3.4) implies

$$G_t = \left(\frac{\varpi}{(1-\alpha)^{1-\alpha}\alpha^\alpha}\right)^{\frac{1}{1-\phi}} \equiv \bar{G} = G^* \tag{3.5}$$

This implies that the investment public good is constant, independent of the shock affecting governmental overall efficiency. This result will simplify notation significantly, but is without loss of generality. It plays an analogous role to the fixed and observable level of government services assumed in Rogoff and Sibert (1988)'s seminal work on elections and the macroeconomy, and to Rogoff (1990)'s public investment good[38].

Using (3.5) back in (3.3) we obtain the optimal level of taxes τ^* which can be replaced in (2.10) to obtain g^* and in (2.6) to obtain c^*. We have

$$\tau^* = (1-\alpha)y + \alpha\bar{G} - \alpha\bar{l} \tag{3.6}$$

$$g^* = (1-\alpha)(y + \bar{l} - \bar{G}) \tag{3.7}$$

and

$$c^* = \alpha(y + \bar{l} - \bar{G}) \tag{3.8}$$

In order to ensure an interior solution, it is assumed that $y > \bar{G}$ all through, that is, income is higher than the total amount devoted to public investment needs. For simplicity, it is also assumed that taxes can only take positive values, though this is inconsequential. Hence, $\bar{G} > 2\epsilon^* + \vartheta^*$ ($\bar{G}$ is larger than the higher value that $\bar{l}$ can possibly take. So taxes (current expenditures) are decreasing (increasing) in the incumbent's competence ε. Finally, using (3.6), (3.7), and (3.8) back in (2.4), we obtain actual welfare. Hereafter we denote with $\Upsilon(\varepsilon_t, \vartheta_t)$ the contemporaneous optimized level of welfare for given level of governmental efficiency l_t. We have

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[38]One of the interesting properties of public investment in that work is that it provides an endogeneous lagged learning of past competence ϵ_{t-1}. In that model it is assumed that the realization of G is only observed and "consumed" with a lag, reflecting thereby the realization of long-term reforms and projects that only come to light with time (therefore the label "investment" public good). So even when g_t can be transformed into G_{t+1} at a constant unity rate, their timing of production differs. Past competence is automatically observed once the project associated to the public investment is accomplished. We could add this feature to the present model, by making either the production technology or the welfare derived from the public investment good G depend proportionally on competence, and assume that its realisation takes time —as in Rogoff (1990)— and is not affected by the "luck shock" ϑ. Then G will reveal directly the incumbent's competence, with a lag. However, this would come at the cost of heavier notation, without much gain as to the qualitative results the model is able to show.

$$\Upsilon_t(\varepsilon_t, \vartheta_t) = \mathcal{B}(y + l_t - \bar{G}) + \xi \qquad (3.9)$$

where $\mathcal{B} \equiv \alpha^\alpha (1-\alpha)^{1-\alpha}$ and $\xi \equiv \varpi \frac{\bar{G}^\phi}{\phi}$. Welfare is increasing in competence ε and luck ϑ. Because welfare is increasing in competence, voters are willing to keep incumbents which are competent enough, and to oust them from power otherwise. To determine the level for competence needed to have chances for reelection, we must look at the voter's choice problem.

B   The voting decision

As discussed above, one of the main objectives of this paper is to provide insights to the consequences that politically motivated media may have upon election decisions and economic outcomes for several alternative informational and behavioural structures describing voters decision at the polling station. In this section we will describe the general rational prospective voting rule, though we will consider other less sophisticated voting rules too.

The voting rule is quite simple and will be preserved in most subsequent cases. The representative agent is willing to vote for the incumbent ($v = \mathcal{I}$) if and only if his/her expected welfare after keeping the incumbent in power is larger than the expected welfare when the challenger is voted instead ($v = \mathcal{O}$). That is, the representative agent votes incumbent if

$$E_t[W^*|\mathcal{I}] \geq E_t[W^*|\mathcal{O}] \qquad (3.10)$$

Where W^* denotes optimal welfare according to (3.10). However, because ε follows a first-moving average process, voters' expected utility is the same under either candidate for period $t+2$ onwards. Therefore, only welfare derived from period $t+1$ would count. The voting rule in (3.10) reduces thus to

$$E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] \geq E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}] \qquad (3.11)$$

Using (3.9) and making use of the stochastic structure of ε and ϑ, this condition reduces to

$$E_t(\epsilon_t|\Omega_t^v) \geq b \qquad (3.12)$$

The incumbent is voted for if his competence is believed (according to the information set Ω_t^v voters have at time "t") to exceed a certain threshold b, which can be interpreted as the challenger's natural advantage or disadvantange when arriving to power, or simply and more generally, the belief on the challenger's initial competence. In either case we take b as given and exogeneous.

Generally speaking, information on competence can be obtained by (i) observation of any of the macroeconomic variables, τ, g and realised welfare itself, all of which serve as equally informative signals of the contemporaneous competence shock ϵ_t; (ii) from messages transmitted by the media; (iii) or both.

In the first situation inattention to the media makes the media essentially spurious. Unless citizens benefited from entertainment services delivered by the media, which are not modelled here, there would be no reason to have media in the first place. The second case might reflect either sheer naiveté of voters, when they do not understand the model and are unable thus to

use information in the economy, or simply situations in which these important macroeconomic figures are not released before the election is held. Both situations appear abnormal however. On one hand, if voters were as naive as in the first situation, then one wouldn't expect them to understand the strategic behaviour of politically motivated media either, which would rend the whole exercise less appealing. On the other, polities that install elections to put control over incumbency are not expected to abide by an arbitrarily silly electoral institution forcing them to vote before useful information is released. However, because it highlights in a very stark way the extreme suspicion effect upon the electoral outcome we consider this case and interpret it as situations where the public release of macroeconomic figures is ill-timed, of poor quality, or simply difficult to process by the public.

As for the third situation, I anaylse different situations. At one extreme one has voters using information conveyed in macroeconomic figures appropiately (as noisy signals of competence) but acting naively with respect to the incentives of the media to withhold information, when the media send empty messages, and at the same time using information of the media rationally when the media's messages are informative about competence. A closely related voting behaviour, but having extremely naive voters, is a situation where voters follow a simple rule such as "if the media say nothing vote incumbent if the economic performance is above a certain level; else vote opponent; vote incumbent if the media's report shows that competency is above b". A third case is having voters using all relevant information, knowing the structure of the model, and in particular being aware of incentives of the media to withhold information. I consider all three.

It is important to note that a key feature of the model when no production of z is involved, is that messages of the media will not have consequences on economic activity contemporaneously, which is not true when producers make decisions based on messages sent by the media. As a consequence of this, as we show next, the media's strategic decision problem remains the same in all voting behavioural situations, and independently of how pluralistic or non-pluralistic the media might be.

C   The media's decision

As it has been stressed, if no information about competence had been learnt by the media, there would be no decision to be made, which follows from the hard information assumption. In that case the media will send an empty message $m = \emptyset$ (and it cannot do otherwise). This message may affect election outcomes of course, but there is nothing interesting about the media's decision. Indeed, the problem is relevant only when the media have extracted an informative signal. Then, and only then, the media may exhibit bias, which will occur when it is optimal for them to withhold information. Voters and producers are not able to distinguish one situation from the other, and therefore the consequences of information concealment will be the same whenever an empty message is observed. Because the problem is symmetric, we consider next the case when $\kappa_t > 0$, that is, the media is *contemporaneously* in favour of the incumbent. Throughout, it is assumed that when indifferent between disclosure and withholding of information the media prefer to disclose any evidence.

For any informative signal $s = \epsilon'$ the media has then two possible actions: either they withhold information about the incumbent, by sending an empty message $m = \emptyset$, or they

disclose information by sending an informative message $m = \epsilon'$. Their optimal decision will rely on the comparison of the welfare they expect to get under each of these actions. In order to assess the expected welfare, the media must consider the decision made by voters after observing the message and information conveyed in the economy. In general, because informative messages are truthful, the second source of information —that is, information contained in the observable macro variables— is spared of if $m = \epsilon'$ (the media's message is a sufficient statistic). When $m = \emptyset$ the incumbent is not reelected with certainty, either because the signal extracted from the economy is too low, because voters are suspicious of the media's message, or both. In any case the media assess the probability of the incumbent's reelection, that we denote $P(\mathcal{I}, \tilde{m}) \equiv Pr(v = \mathcal{I}|s = \epsilon', m = \tilde{m})$. The media's expected welfare for given contemporaneous preference shock in favour of the incumbent κ_t[39], and given action m' is then obtained

$$E_t[W_t^m(m')] = E_t[\Upsilon_t(\varepsilon_t, \vartheta_t)|\mathcal{I}] + \beta_t + \delta P(\mathcal{I}, m')\left[E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] + \kappa_t\right]$$
$$+ [1 - P(\mathcal{I}, m')]E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}] + \bar{w}$$

(3.13)

Where $\bar{w}$ denotes a constant term that equals the sum of expected welfare from period $t + 2$ onwards, and $E_t[\beta_{t+1}|\mathcal{O}] = 0$ has been used (recall the assumption on preferences of the media for the challenger). From assumptions made on voting behaviour when the media spreads informative messages (non-empty messages) we know that if the media decides to publish the signal then $P(\mathcal{I}, \epsilon') = 1$ if $\epsilon' \geq b$ and $P(\mathcal{I}, \epsilon') = 0$ otherwise. Denote with $\triangle \equiv E_t[W_t^m(\emptyset)] - E_t[W_t^m(\epsilon')]$ the expected gain of withholding information with respect to disclosing it to the general public. It is direct from (3.13) that $\triangle = \delta[1 - P(\mathcal{I}, \emptyset)](E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}] - E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] - \kappa_t) < 0$. It is a dominant strategy therefore to send the informative message when $s = \epsilon_t \geq b$. If $\epsilon' < b$ it is direct to show that the media will decide to make the signal public if and only if

$$\epsilon_t \geq b - \frac{\kappa_t}{\mathcal{BA}} \equiv \epsilon_L$$

(3.14)

Of course, if the pull in favour of the incumbent is too strong ($\kappa_t > b$) the media would always prefer to withhold information. Similar steps lead to an upward threshold, $\epsilon_H \equiv b + \frac{\kappa_t}{\mathcal{BA}}$, above which the media, when against the incumbent ($\kappa_t < 0$) will always prefer to send the informative message.

We gather all these results in the following lemma.

Lemma 1 (**Media's political motive and bias**). *Suppose provision of public goods does not require inputs produced in the private economy, and that $y > \bar{G} > 2\epsilon^* + \vartheta^*$. Then, at the end of the second period of any mandate (the election period), for given and known contemporaneous shock to the political preference of the media $\kappa_t > 0$ ($-\kappa_t < 0$), when the contemporaneous*

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[39]Note that the stochastic process assumed for the political preference shock in (2.13) is a convenient formulation in that some bias in the media may be taking place even when $\beta < 0$, that is when the media is currently against the incumbent. What really matters thus for bias is the sign of the contemporaneous shock κ_t.

competency shock ϵ'_t is observed by the media ($s = \epsilon'_t$), and $\epsilon'_t \geq b$ ($\epsilon'_t \leq b$), it is a dominant strategy to disclose information: the media send the message $m = \epsilon'_t$. On the contrary, if $\epsilon'_t < b$ ($\epsilon'_t > b$) there exists a threshold $\epsilon_L < b$ ($\epsilon_H > b$), below (above) which it is strategically optimal for the media to send an informative message $m = \epsilon$, and above (below) which it is optimal to send a non informative message $m = \emptyset$.

In the following figure we represent the media's strategic manipulation of information decision for different levels of political motivation. Because the thresholds are linear functions of κ, I have represented the bias as the tolerance (intolerance) of the media to lower (higher) levels of competence with respect to the objective level of competence expected for the opponent, b. If the media's pull in favour of the incumbent is strong (κ being high), then the threshold will approach zero, and one would expect the media to withhold information whenever $\epsilon < b$. If the media were against the incumbent, then higher levels of $|\kappa|$ would lead them to withhold information even when the incumbent is close to its best possible level ϵ^*.

against $(\kappa > 0)$
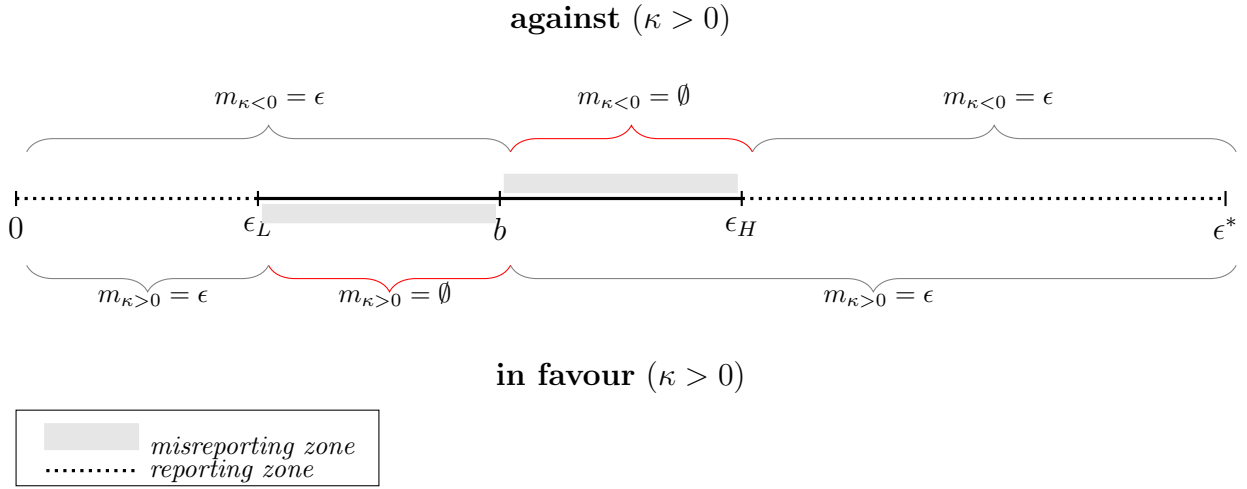

in favour $(\kappa > 0)$

FIGURE III
Media's political motive and bias

An important result implied by lemma 1, and pervading most of our discussion throughout, concerns pluralism.

Corollary 1 (Complete pluralism). *If the media is completely pluralistic there is no scope for information (and therefore election) manipulation.*

D   Voters inference problem and the election outcome

Naive retrospective voting and opportunistic concealment of information

We start our study of the consequences of politically motivated media on election outcomes with the simplest of the possible voting behavioural situations discussed above. Suppose that voters do not fully understand the model. In particular, suppose they do not understand incentives of

the media to withhold information[40], but use information contained in observable aggregates, such as welfare, when the media's message is empty. This approach conforms to seminal work on political business cycles (see Nordhaus (1975)), where voters are assumed to not understand the opportunistic behaviour of incumbents exploiting a Phillips curve trade-off between inflation and unemployment. To keep the model as simple as possible I assume that if some evidence about competence is publicized by the media, voters pay attention to this information and decide who to vote depending on the relative competency of each contender[41] ; that is, they compare the reported competence with b. But if the media send an empty message, I assume that voters do not pay attention to the possible motives behind this lack of information. In that case voters follow a naive voting rule of the type "if contemporaneous welfare is above a certain threshold Υ^* I vote for the incumbent; else, I vote challenger". Formally, the voting rule is

$$
v = \begin{cases} \mathcal{I} & \text{if } m = \emptyset \text{ and } \Upsilon_t \geq \Upsilon^*, \text{ or if } m = \epsilon' \text{ and } \epsilon' \geq b \\ \mathcal{O} & \text{otherwise} \end{cases}
$$

The main insights drawn from study of this case will not change qualitatively, and the exposition of them will be much neater, if we assume for the time being that the media decides what message to send after realisation and observation of Υ_t[42].

First consider the case without pluralism within the media system. The media can be in favour or against the incumbent. If in favour, it is a dominant strategy to report good news ($\epsilon_t \geq b$) about the incumbent when found, independently of the realisation of Υ_t. But if the media had found bad news about the incumbent, then they may decide to withhold the information. If the pull in favour of the incumbent is not too strong, they may decide to disclose their evidence anyway if competence is below ϵ_L (recall lemma 1). But if the media had found information and competence laid somewhere between ϵ_L and b, the media will wait till observation of Υ_t to decide whether to disclose or withhold information. If the incumbent faces a strike of good luck (high ϑ) then the media will be *opportunistic* and decide to withhold information, *cosseting* thereby the incumbent. Analogously, when the media is against a highly competent incumbent and Υ_t is low, the media may opportunistically *pull-the-rug-on* the incumbent by casting a shadow of doubt upon his competence. Therefore the title. If, on the contrary, information found in the economy is against the media's interest (Υ_t being low when the media is in favour of the incumbent, and high when against him), the media has no power in altering the electoral decision and because it is costless for them, may decide to

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[40]Presumably, this behaviour may naturally arise in contexts where the gathering and processing of information are too costly, leading agents to rationally not pay attention to messages by the media, especially when they do not convey information. The rational inattention approach is left as a possible interesting extension.

[41]Think of voters buying newspapers for news on latest football highlights. If communication of evidence about the incumbent is sufficiently clear, it would suffice to put its content next to the football news to which the voter devotes so much of his attention.

[42]One of the main constraints upon the media's decision when private production of an intermediate input is involved in the production of public goods, is that the media cannot wait till information borne in the aggregate variables is realised: their silence will affect production decisions affecting the value that these variables take. This lies at the heart of our present work, and will be addressed further below.

disclose information when electoral manipulation lies beyond the media's reach. Furthermore, if reputation of the media were at stake, the media will have incentives to disclose information in those particular cases. They would be opportunistically *non-partisan*.

It is convenient to introduce here the informative, unbiased, but noisy signal about competence upon observation of welfare. We define

$$s_w \equiv \Upsilon_t - B(y - \bar{G}) - \xi - \epsilon_{t-1} = \epsilon_t + \vartheta_t \qquad (3.15)$$

It is direct to show that the condition on welfare $\Upsilon_t \geq \Upsilon^*$ can be expressed as a condition on this signal such that the probability of the incumbent winning the election when the media had withheld information is equal to $Prob(s_w \geq s^*)$, with $s^* \equiv \Upsilon^* - B(y - \bar{G}) - \xi - \epsilon_{t-1}$. Now consider the *ex-ante* probability that the incumbent is reelected, given the fact that the media is politically motivated. We can write (using the last definition and lemma 1)

$$Prob(v = \mathcal{I}|\kappa > 0) = (1 - \pi)Prob(s_w \geq s^*)$$
$$+ \pi \left[1 - \mathcal{F}(b) + [\mathcal{F}(b) - \mathcal{F}(\epsilon_L)] \, Prob(s_w \geq s^*|\epsilon \in [\epsilon_L, b)) \right]$$

From this last expression it is direct to show that the probability that the incumbent is reelected is increasing in s^*. More interestingly, the probability of reelection is increasing in the media's political pull in favour of the incumbent κ.

Proposition 1 (**Naive retrospective voting and opportunistic withholding of information**). *If voters follow naive retrospective voting rules and $\kappa > 0$ ($\kappa < 0$) the following results hold.*

1. *The probability of reelection is increasing in income y, the critical level of welfare Υ^*, past competence ϵ_{t-1}, and the lower the size of public investment $\bar{G}$. For given observed $\epsilon \in [\epsilon_L, b)$ ($\epsilon \in [b, \epsilon_H)$) the media is more likely to opportunistically "cosset" ("pull-the-rug-on") the incumbent, the higher (lower) is income y, the critical level of welfare Υ^*, past competence and ϵ_{t-1}, and the lower (higher) the size of public investment $\bar{G}$.*

2. *The ex-ante probability that the incumbent is reelected is increasing in the media's bias: the higher (lower) is κ the higher (lower) are the chances the incumbent is reelected, ceteris paribus.*

The scope for election manipulation can be checked in great measure if pluralism is *mild*, and utterly eliminated if pluralism is *complete*. In the first case the impact will depend of course on the situation to which the emergence of a new publisher exhibiting a different political stance than the *establishment* is compared to. The impact will be larger the greater is the dispersion between the publishers' political motives within the media. Suppose for example that initially the media as a whole is in favour of the incumbent, which is captured by the political motive parameter $\kappa_A > 0$. Now suppose one of the publishers belonging to the media system exhibits a stronger pull in favour of the incumbent $\kappa_B > \kappa_A > 0$. With respect to the initial situation note

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that the emergence of some pluralism is inconsequential upon the probability of reelection. The converse is not true. The materialization of mild pluralism with the added publishers having a weaker pull in favour or against the incumbent will tend to diminish the scope for information manipulation. This is due to the assumptions made on the media's learning of competence when pluralistic. Indeed, whenever the observed competence lies between the publishers' thresholds (say $\epsilon_{L_A} < \epsilon < \epsilon_{L_B}$), publisher B would want to spread the news. More generally, the impact of *moderate* pluralism will depend on the strength of the political motive of the publisher relatively less influenced by political concerns.

$$Prob(v = \mathcal{I}|sign(\kappa_A) = sign(\kappa_B); \kappa_A \neq \kappa_B) = (1-\pi)^2 Prob(s_w \geq s^*)$$
$$+2\pi(1-\pi)\left[1 - \mathcal{F}(b) + \left[\mathcal{F}(b) - \mathcal{F}\left(\min\left(\epsilon_L^A, \epsilon_L^B\right)\right)\right]\right] Prob(s_w \geq s^*|\epsilon \in [\epsilon_L, b))$$

Matters are much starker when pluralism is *complete*. Whenever any one of the publishers finds out the truth, the other learns ipso facto this evidence. And if the signs of their preferences for the incumbent differ, no matter how big their absolute difference is, there will be at least one of them willing to disclose the evidence. This is a dominant strategy from lemma 1. So while in the case with *mild* pluralism the absolute distance can have either a large effect upon information manipulation or no effect at all, when pluralism is *complete* the effect is drastic: there will be no scope for manipulation. Indeed, now the ex-ante probability that the incumbent is reelected is

$$Prob(v = \mathcal{I}|sign(\kappa_A) \neq sign(\kappa_B)) = (1-\pi)^2 Prob(s_w \geq s^*) + 2\pi(1-\pi)(1 - \mathcal{F}(b))$$

Which does not depend on any of the publishers' biases. The probability of reelection is still increasing in key parameters of the economy through s^*, though the exposure to this risk is less severe than in the case without pluralism. Summing up, we have the following result for pluralistic media.

Proposition 2 (Naive retrospective voting and opportunistic withholding of information when media is pluralistic). *If voters follow naive retrospective voting rules and the media is mildly pluralistic then their is less scope for information manipulation than in the case with non-pluralistic media. The amount by which the scope for information concealment is limited depends on the amount by which the political motives differ across the media system. Results from proposition 1 still apply but the range of values of observed competence for which the media is potentially opportunistic is reduced to those values for which the less politically motivated publisher belonging to the media is willing to withhold information. If the media exhibits complete pluralism, then there is no room for information manipulation when evidence is found.*

When voters correctly extract signals and update beliefs using Bayes rule, but are non-skeptical about the media

Now consider voters who use the signal wisely, but are non-skeptical of the media's political motives. Understanding of the basic structure of the model, in particular regarding the incumbent's problem, would lead voters to discount from their beliefs on competence the observed realisation of variables such as income, past competence, etc... Here we consider a rational use of information conveyed in macro variables. Voters use directly signal s_w (equation (3.15) to update their beliefs on competence.

Following the general voting rule in (3.12), voters will vote for the incumbent when no hard information about competence had been published, if and only if $E(\epsilon_t|s_w = s'_w) \geq b$. But $E(\epsilon_t|s_w = s'_w) = s'_w - \bar{\vartheta}$. Hence, voters will vote incumbent if and only if

$$s_w \geq b + \bar{\vartheta} \equiv \hat{s}$$

Following similar steps as the ones applied for the situation exhibiting naive voting behaviour, we can write the ex-ante probability that the incumbent is reelected, given that the media is in favour of the incumbent (κ), as follows

$$Prob(v = \mathcal{I}|\kappa > 0) = (1 - \pi)Prob(s_w \geq \hat{s})$$
$$+\pi\left[1 - \mathcal{F}(b) + [\mathcal{F}(b) - \mathcal{F}(\epsilon_L)]\, Prob(s_w \geq \hat{s}|\epsilon \in [\epsilon_L, b))\right]$$

As expected, now reelection will not be affected by key structural parameters describing the economy, but rather on key moments of the distribution of the stochastic variables of the model. Now the opponent's advantage affects the probability of reelection in an important way. Also voters condition on the average value that "luck" can take. Thus, Bayesian updating alone puts some limits to opportunistic behaviour. The degree to which opportunistic withholding is hampered depens crucially on parameter b, and the second moment of the distribution of ϑ. Another important theme is the structural asymmetry between the scope that media in favour of the incumbent has for manipulating information, as compared to media against the incumbent, if b is different than $\bar{\epsilon}$. For example, if $b < \bar{\epsilon}$ a media in favour of the incumbent will have, ceteris paribus, more chances of "getting away with it", than media against the incumbent, for equal absolute intensities in their political motives.

Proposition 3 (Bayesian updating and non-skeptical voters). *If voters update beliefs about competence using information about competence borne in observable macroeconomic figures, but are not skeptical about the political motive when empty messages are conveyed by the media, then the probability that the incumbent is reelected is increasing in the media's bias, and decreasing in the opponent's objective advantage b. In this case, the probability of reelection and opportunistic misreporting will not be affected by structural variables and parameters describing the economy as in the case with naive voting behaviour. The basic insights from Proposition 2 hold. In particular, there is no room for election manipulation if pluralism is complete.*

When voters cannot use the informative signal s_w but are skeptical

Suppose for a moment that voters are rational and in particular are suspicious about the media's misreporting, but are not able to use information about competence that is borne in the economic aggregate variables at the time the election is held (or, alternatively, that fiscal policy is implemented after the election and before the beginning of the new mandate). In that case voters would only have information conveyed by the media. Of course, this would not entail any decision error at the polling station when the media find and disclose evidence about the incumbent's competence: the media's perfectly correlated signal about competence, which is hard information by assumption, will dissipate any doubts regarding the incumbent's skill in power. Things are more interesting if messages do not convey information about competence. In those cases a strong bias against the media's observed political bias might have important consequences upon the electoral choice. For rational voters will suspect the media to be withholding information from them if the political motive is too strong. And the consequences would be the same either if the media were indeed concealing information from voters, or had not found any evidence at all. The election outcome may suffer then from an extreme *suspicion effect* —as coined by Anderson and McLaren (2010)— against the publisher's political bias, which, depending on the belief on the opponent's competence b may be starker than the one found in that paper. This is due to the very nature of our politico-economic problem, which constrains preferences of voters and the media, which are endogenous. In their paper, Anderson and McLaren (2010) take preferences for a given policy variable as given, and study the effect of concealment of information over the posterior that rational voters form on that policy variable. In the present model voters' rational preferences are determined with respect to parameter b, and only vary, ceteris paribus, when this parameter does. For given belief b, the media's preferences (recall lemma 1) are defined as a distance with respect to this critical value, and can take any possible value in the support of ϵ, whereas in Anderson and McLaren (2010) the media's political position is assumed to take one of the fixed extremes of the ideological spectrum (either $\epsilon_H = \epsilon^*$ or $\epsilon_L = 0$ in our case). In spite of these differences, our main results on suspicion effects upon information manipulation evoke essentially the same findings brought about in that paper.

Proposition 4 (*When informative signals about the economy are not timely released and voters are rational*). *If voters cannot use the informative signal about competence s_w at the time the election is held, then (a) if $b = \bar{\epsilon}$ there is an extreme suspicion effect over the electoral outcome against the media's political preference, independent of the media's political bias and independent of the intensity that these political motives may take; (b) If $b < \bar{\epsilon}$ there is an extreme suspicion effect in **favour** of the incumbent: there is a uniquely determined political bias $\hat{\kappa}_L > 0$ above (below) which the incumbent is never (always) reelected; and (c) if $b > \bar{\epsilon}$ there is an extreme suspicion effect **against** the incumbent: there is a uniquely determined political bias $\hat{\kappa}_H < 0$ above (below) which the incumbent is never (always) reelected.*

Proof. See appendix. □

I now anticipate some intuition to the basic mechanism through which the suspicion effect affects the opportunistic withholding of information. We will a have a closer look to it in the

following case with rational voters and informative signal extraction, and have it pervading most of our upcoming discussion. But here I provide the basic insights. Suppose $b = \bar{\epsilon}$ and that the media is against the incumbent, $\kappa < 0$. If voters observe empty messages they know that the media may have decided to withhold information. They know from lemma 1 that if the actual competence of the incumbent laid somewhere between b and ϵ_H the probability of observing an empty message is 1, for if the media had not found evidence about competence (with probability π) they would be obliged to send an empty message, and if on the contrary they had found evidence they would strategically decide to keep the information to themselves and send an empty message all the same (lemma 1). For all other cases ($\epsilon \in (0, b)$ or $\epsilon \in [\epsilon_H, \epsilon^*)$) the probability of observing an empty message for given ϵ is the probability of not having found evidence about competence, $1 - \pi$. The probability of observing an empty message ($v(m = \emptyset, \kappa < 0)$), is then obtained as $\nu(m = \emptyset, \kappa < 0) = 1 - \pi + \pi \left[\mathcal{F}(\epsilon_H) - \mathcal{F}(b) \right]$. The Bayesian posterior for ϵ, conditional on no news having been reported is

$$\tilde{\epsilon}(\kappa, \pi, \emptyset) = \frac{1}{\nu(\kappa; \pi, b)} \left((1 - \pi) \int_0^b \epsilon f(\epsilon) d\epsilon + \int_b^{\epsilon_H} \epsilon f(\epsilon) d\epsilon + (1 - \pi) \int_{\epsilon_H}^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right)$$

Which can be written as

$$\tilde{\epsilon}(\kappa, \pi, \emptyset) = \frac{(E[\epsilon | \bar{\epsilon} \leq \epsilon < \epsilon_H] + (1 - \pi) \left[E[\epsilon | \epsilon \leq \bar{\epsilon}] + E[\epsilon | \epsilon \geq \epsilon_H] \right])}{\nu(\kappa; \pi, b)}$$

This posterior is, irrespective of the size of the political drive κ, strictly larger than $\bar{\epsilon}$ (the denominator is $\nu < 1$). This means that media against the incumbent will never get away with it if $b = \bar{\epsilon}$. And the same is true if the media were in favour of the incumbent. This is clear in Figure IV.a, where on the horizontal axis we have the thresholds obtained from lemma 1 (ϵ_L and ϵ_H) as functions of the political motive κ, and on the vertical axis we have the posterior. The shaded region marks situations in which empty messages imply the posterior being above the critical parameter b, which means reappointing the incumbent. As is also neat in this figure, the incumbent is never reelected if voters observe some bias in favour of him.
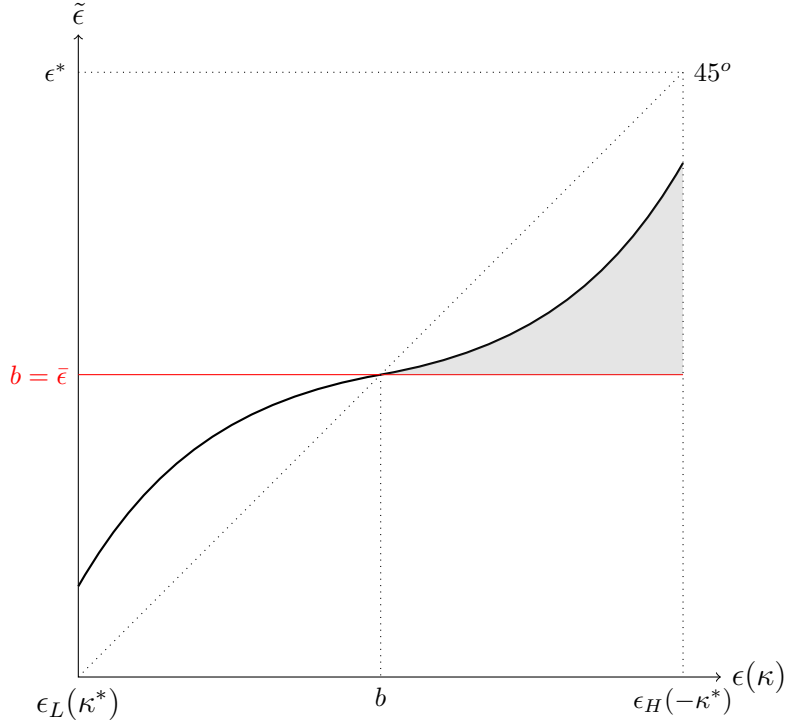
FIGURE IV.a
Extreme suspicion effect $(b = \bar{\epsilon})$

If the opponent is believed to have a certain structural advantage over the incumbent $(b > \bar{\epsilon})$, then an interesting effect takes place favouring the media against the incumbent: the larger is their political motive, the more likely is the incumbent to be reelected. Indeed, if voters observed a low level of compromise against the incumbent the would be almost certain (this certainty depends to a large extent on the supervision technology) that if some evidence had been concealed its disclosure would have revealed competency fairly close to $\bar{\epsilon}$. Only when the compromise against the incumbent is strong enough would the voters conjecture that withholding of information will also be taking place for values of competence way above b. In Figure IV.b we depict this situation. Only to the right of $\epsilon_H(\hat{\kappa}_H)$ (the shaded area) would the publisher influence the election outcome.
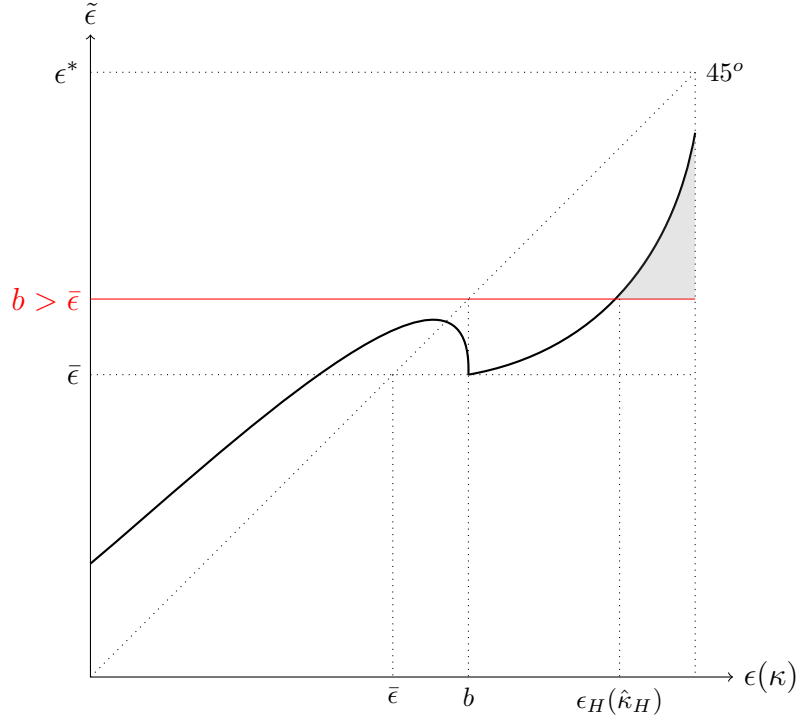
32

FIGURE IV.b
Extreme suspicion effect against incumbent $(b > \bar{\epsilon})$

The converse turns things round: if the challenger is thought to have a structural disadvantage when compared to the incumbent $(b < \bar{\epsilon})$, only the media in favour of the incumbent will have some power over the election, and will have more to gain from it the weaker their pull in favour of the incumbent is, as shown in Figure IV.c.
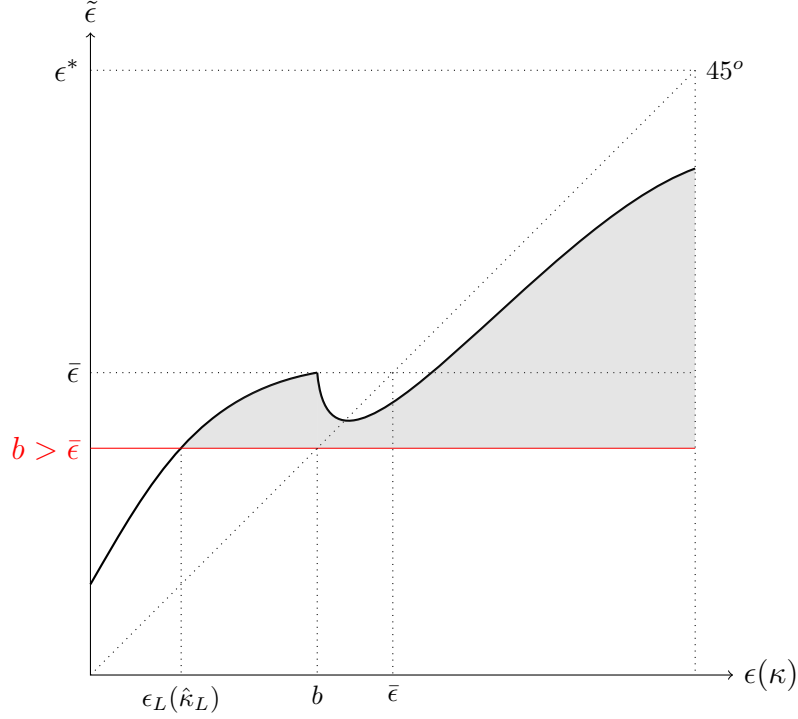
FIGURE IV.c
Extreme suspicion effect in favour of incumbent ($b < \bar{\epsilon}$)

As should be expected, the introduction of pluralism within the media system may improve matters dramatically, though this is true only when pluralism is complete: that is, when signs of the publishers' political motives differ. In that case only a slight difference is able to eliminate the extreme suspicion effect upon the electoral outcome. For voters would be sure that no evidence had been withheld when no message is conveyed by different publishers. In the case where two publishers exhibit political motives of the same sign, but different intensities (say $\kappa_A > \kappa_B > 0$ or $-\kappa_A < -\kappa_B < 0$), then there would be an improvement only if mild pluralism comes in the form of less politically attached publishers.

Rational voting behaviour

Fully rational voters understand the model and therefore use information about competence borne in economic variables, but also take into account the media's messages, even when they do not convey information about competence. They understand the media's strategic political behaviour and update beliefs accordingly.

According to the rational voting rule in (3.12), the key variable is the posterior belief on the contemporaneous shock on the incumbent's competence. We define $\tilde{\epsilon}(\kappa_t, \pi, m) \equiv E(\epsilon_t | \Omega_t^v)$. The aim is to study how this posterior belief is affected by the media's messages and the signals extracted from economic outcomes. As discussed, any of the key macro variables serve equally as an informative signal about the incumbent's competence. We consider welfare, and consider the signal s_w defined in equation (3.15).

Now Υ_t is observed before the election is held. Then s_w is a noisy but unbiased signal for competence and $\Omega_t^v = \{s_w, m\}$. If $m = \epsilon'$, clearly $\tilde{\epsilon}(\kappa_t, \pi, m) = \epsilon'$. The more interesting case is when $m = \emptyset$.

Let $\psi(\epsilon; s'_w, m = \emptyset, \pi, \kappa_t)$ denote the Bayesian posterior density for ϵ conditional on the signal s'_w having been observed and on the media having sent an empty message, and let $\Psi(\epsilon; s'_w, m = \emptyset, \pi, \kappa_t)$ be the associated cumulative distribution. The public knows and understands the model and therefore is able to solve the media's problem, though it cannot observe the actual realisation of ϵ. Let us assume that $\kappa_t > 0$. Then the public knows the publisher's bias ϵ_L (from lemma 1). The probability that no message is conveyed is $v(\kappa_t; \pi, b) \equiv 1 - \pi + \pi[\mathcal{F}(b) - \mathcal{F}(\epsilon_L)]$, which is independent of s_w. Let $\phi(s_w | \epsilon')$ denote the posterior density for s_w conditional on ϵ' and assume that $f_{s_w}(\epsilon' | s_w)$, that is the posterior density for ϵ after having observed s_w, exists and is well defined.

Then, the Bayesian posterior density for ϵ, conditional on no news having been reported and on observation of s_w, is

$$\psi(\epsilon; s'_w, m = \emptyset, \pi, \kappa_t) = \begin{cases} \frac{(1-\pi)f_{s_w}(\epsilon'|s_w)}{v(\kappa_t;\pi,b)} & \text{if } \epsilon' < \epsilon_L \\[2mm] \frac{f_{s_w}(\epsilon'|s_w)}{v(\kappa_t;\pi,b)} & \text{if } \epsilon_L \leq \epsilon' < b \\[2mm] \frac{(1-\pi)f_{s_w}(\epsilon'|s_w)}{v(\kappa_t;\pi,b)} & \text{if } \epsilon' \geq b \end{cases} \tag{3.16}$$

For a value $\epsilon' \leq \epsilon_L$ the probability that $\epsilon < \epsilon'$, conditional on $m = \emptyset$ and $\tilde{s}_w = s_w$, is

$$\Psi(\epsilon'; s'_w, m = \emptyset, \pi, \kappa_t) = \frac{(1-\pi)\mathcal{F}_{s_w}(\epsilon'|s_w)}{v(\kappa_t; \pi, b)}$$

Similarly, if $\epsilon_L \leq \epsilon' \leq b$ the corresponding probability that $\epsilon_L \leq \epsilon < b$ is

$$\Psi(\epsilon'; s'_w, m = \emptyset, \pi, \kappa_t) = \frac{\mathcal{F}_{s_w}(\epsilon'|s_w) - \mathcal{F}_{s_w}(\epsilon_L|s_w)}{v(\kappa_t; \pi, b)}$$

and for any $\epsilon' \geq b$ is

$$\Psi(\epsilon'; s'_w, m = \emptyset, \pi, \kappa_t) = \frac{(1-\pi)[\mathcal{F}_{s_w}(\epsilon'|s_w) - \mathcal{F}_{s_w}(b|s_w)]}{v(\kappa_t; \pi, b)}$$

Because $\frac{1-\pi}{v} < 1$ and $\frac{1}{v} < 1$, it is direct that $\Psi(\epsilon'; s'_w, m = \emptyset, \pi, \kappa_t) > F_{s_w}(\epsilon|s_w)\forall\epsilon \in (0, \epsilon^*)$. This is the *suspicion effect* taking place over voters' beliefs. However, in this specific public choice problem there is also an *opportunistic effect* taking place, that may either reinforce the suspicion effect by dragging the belief on the incumbent's actual competency shock further downwards when the realisation of ϑ is low, or, on the contrary, undo to some extent the suspicion effect when the ϑ is high. If the pull in favour of the incumbent is not too high ($\kappa_t \to 0$), and therefore preferences of the media are close to preferences of the representative agent, then a high shock on luck may abate the suspicion that the media is withholding information. Conversely, if the pull in favour of the incumbent is too high ($\kappa_t \to \kappa^*$) not even a large shock on luck will be able to overcome the suspicion effect on the incumbent's competence.

Indeed, consider the signal for competence s_w. If $s_w < b$ then $\tilde{\epsilon}(\kappa_t, \pi, m) < b$ and the representative agent never votes for the incumbent (the voter is sure competency cannot exceed b). If $s_w < \epsilon_L$, the voter is sure the media was not withholding information, but this would not influence his election decision, for $\epsilon_L < b$ by definition. At the other extreme, if $s_w > b + \vartheta^*$ voters are also sure the media were not withholding information from them, but this knowledge is inconsequential to the election. A more interesting case is when $s_w \in (b, b + \vartheta^*)$. Yet, it is hard to make definite predictions on the election outcome without imposing further restrictions on the shocks' probability and density functions, and the support from which they are drawn.

4   The media and the political business cycle

When the production of public goods involves production in the market economy, matters are more complicated. Although, and in an important way, the economy will not always exhibit a political business cycle, I will refer here onwards loosely to it as the case with a PBC. There are several distinctive features of this case that deserve being remarked. Firstly and crucially, the media now must account for the effect that empty messages have on the market economy when deciding whether to disclose information or to conceal it from the public. Because the media care for the economic performance (as much as the representative agent if their political drive is low) there is a potential cost of information manipulation if producers do not get it right when deciding how much to produce. Secondly, from our assumption on the time it takes to produce the intermediate input used in the provision of public goods, the media is obliged to decide whether to disclose information when found before observation of the informative signal s_w. Producers cannot wait, and this does away with any opportunistic *cosseting*, or *pulling-the-rug* on the incumbent. The media may still try to appear independent or non-partisan upon observation of s_w, but this will not have consequences upon the economy, nor the election. The election will be a foregone result, and the effects upon the economy a sunk cost. This also implies that producers cannot use the signal either, and can only be suspicious about the media's political motive when no informative message is conveyed. However, they will take into account and anticipate the use that voters give to the signal upon its observation. Thirdly, the media's bias will depend on the probability of reelection of the incumbent, which was irrelevant in the previous case. Absent the opportunistic behaviour we identified above, the key drivers of the PBC are the voting patterns, which affect the probability of reelection, the media's observed bias, and most importantly, the producers' suspicion of the media's political motive.

Besides these distintive features arising from production, we must also allow for other voting and information processing behaviour. Indeed, voters may be bayesian when updating beliefs upon observation of informative signals extracted from the economy, but the may use the wrong signals. If, for instance, voters do not account for the role of production of z on overall welfare, and do not use information conveyed in the price of z, their signal will be biased. Furthermore, this may lead to manipulation of production through withholding of information that improves the reelection chances of the incumbent. Similarly, skeptical voters who cannot use any signal, may be not have common knowledge on the role of production, and would not take into account the interplay between the media's strategic withholding of information and decisions from the productive sector.

We start with the incumbent's problem, which due to the incumbent's benevolent nature,

remains essentially the same. Then we solve for the producers' problem, assuming a given expected equilibrium price of z. Then we revise the general problem faced by the media, when taking the equilibrium in the market for z, voters behaviour, and producers' expectations, as given. Then we solve the model for different assumptions on the voting behaviour.

The incumbent's problem revisited

The problem is to maximise (2.4) subject to (2.6) and the following two conditions (from (2.10) and (2.8))

$$\tau_t + l_t = g_t + p_{zt}z_t + G_t$$

and

$$l_t = \mathcal{AG}(\varepsilon_t, \vartheta_t)\frac{z_t^{\eta}}{\eta}$$

Where l is now determined by the choice on units of z. The unconstrained program (assuming an interior solution), for given observed overall shock on governmental efficiency $\mathcal{AG}(\varepsilon_t, \vartheta_t)$, and given observed price for z, p_z (recall that the incumbent is a price taker), becomes then

$$\max_{\tau_t, G_t, z_t} (y - \tau_t)^{\alpha}\left(\tau_t + \mathcal{AG}(\varepsilon_t, \vartheta_t)\frac{z_t^{\eta}}{\eta} - G_t - p_z z_t\right)^{1-\alpha} + \varpi\frac{G_t^{\phi}}{\phi} \tag{4.1}$$

The program is well defined and has a unique solution, which is a global maximum. To the first order conditions (3.4) and (3.3), we must add now the first order condition on the demand for z. We have

$$(1-\alpha)(y-\tau)^{\alpha}\left(\tau_t + \mathcal{AG}(\varepsilon_t, \vartheta_t)\frac{z_t^{\eta}}{\eta} - G_t - p_z z_t\right)^{-\alpha}\left[\mathcal{AG}(\varepsilon_t, \vartheta_t)z^{\eta-1} - p_z\right] = 0 \tag{4.2}$$

Which, assuming an interior solution, implies

$$z^* = \left[\frac{\mathcal{AG}(\varepsilon_t, \vartheta_t)}{p_z}\right]^{\frac{1}{1-\eta}} \tag{4.3}$$

So demand is increasing in $\mathcal{AG}(\varepsilon_t, \vartheta_t)$ for given price, and decreasing in the price of z, for given overall shock $\mathcal{AG}(\varepsilon_t, \vartheta_t)$. Using (4.3) back in (4) we find the optimal level of l

$$l^* = (1/\eta)[\mathcal{AG}(\varepsilon_t, \vartheta_t)]^{\frac{1}{1-\eta}}p_z^{\frac{\eta}{\eta-1}} \tag{4.4}$$

Using first order conditions for G and τ, we find the optimal values for all variables as in the case without production of z, using l^* in (4.4) instead of $\bar{l}$. In order to study the effect of higher competence and prices upon taxes and expenditures, we must consider now determination of supply of z. We solve next for supply of z.

A   Producers' decision and the supply of z

Producers maximise profits. We take their information set as given. The first order condition when maximising (2.11) implies that total supply of z is

$$z = E_t[p_z|\Omega_t] \tag{4.5}$$

Recall that by the time trade in the market for z is carried out, supply is predetermined; there's no way back. When the good is traded, governmental demand must meet supply. The price adjusts to clear the market. The market clearing condition implies (equalising (4.3) and (4.5))

$$E_t[p_z|\Omega_t] = \left[\frac{\mathcal{AG}(\varepsilon_t, \vartheta_t)}{p_z}\right]^{\frac{1}{1-\eta}} \tag{4.6}$$

This implies that, for given expectations on the final price, the market clearing price p_z^* is

$$p_z^* = \frac{\mathcal{AG}(\varepsilon_t, \vartheta_t)}{(E_t[p_z|\Omega_t])^{1-\eta}} \tag{4.7}$$

From taking expectations on both sides of (4.7) we obtain the rational expected equilibrium price

$$E_t[p_z^*|\Omega_t] = E_t[\mathcal{AG}(\varepsilon_t, \vartheta_t)|\Omega_t]^{\frac{1}{2-\eta}} \tag{4.8}$$

Finally, replacing (4.8) in (4.7) we get the final equilibrium price

$$p_z^* = \frac{\mathcal{A}_1\mathcal{G}(\varepsilon_t, \vartheta_t)}{E_t[\mathcal{G}(\varepsilon_t, \vartheta_t)|\Omega_t]^{\gamma}} \tag{4.9}$$

Where $\mathcal{A}_1 \equiv \mathcal{A}^{\frac{1}{2-\eta}}$ and $\gamma \equiv \frac{1-\eta}{2-\eta} < 1$. Supply, which equals demand is obtained as follows (substituing (4.9) in (4.5))

$$z^* = E_t[\mathcal{AG}(\varepsilon_t, \vartheta_t)|\Omega_t]^{2-\eta} \tag{4.10}$$

An important variable that we would look at carefully further below is the efficiency units for governmental ability, net of the investment the government has to make to create these units $(p_z z)$. We define this variable as $\iota_t \equiv l_t - p_z z$. Using (4.4) and (4.3) we have that

$$\iota^* = \left(\frac{1-\eta}{\eta}\right)[\mathcal{AG}(\varepsilon_t, \vartheta_t)]^{\frac{1}{1-\eta}} p_z^{\frac{\eta}{\eta-1}} \tag{4.11}$$

Which is decreasing in the price and increasing in competence and luck. Using the equilibrium price in (4.9) we can also express this variable as a function of producers' expectations

$$\iota^* = \left(\frac{1-\eta}{\eta}\right)\frac{\mathcal{AG}(\varepsilon_t, \vartheta_t)}{E_t[\mathcal{AG}(\varepsilon_t, \vartheta_t)|\Omega_t]^{\zeta}} \tag{4.12}$$

Where $0 < \zeta \equiv \frac{\eta}{2-\eta} < 1$. Thus, the basic functioning of the economy, in particular as to how fiscal variables are determined, remains as in the former case without the involvement of

private production. Consider taxes, for instance. Following similar steps as in the previous setup without a PBC, it is direct to show that in equilibrium the optimal level of taxes is such that

$$\tau^* = (1 - \alpha)y + \alpha\bar{G} - \alpha\iota^* \tag{4.13}$$

Which is decreasing in ι^*, just as taxes where decreasing on $\bar{l}$ before. Now, of course, taxes also change when producers' expectations do. But for given equilibrium expectation on the price of z expected to prevail, taxes will fall the higher is the level of competence, as before. This is represented in figure IV. A change in competence (or luck, as the impact of both variables on the economy is identical) also involves a change in the slope of governmental demand for the intermediate input, which becomes flatter (this is direct from equation 4.3).
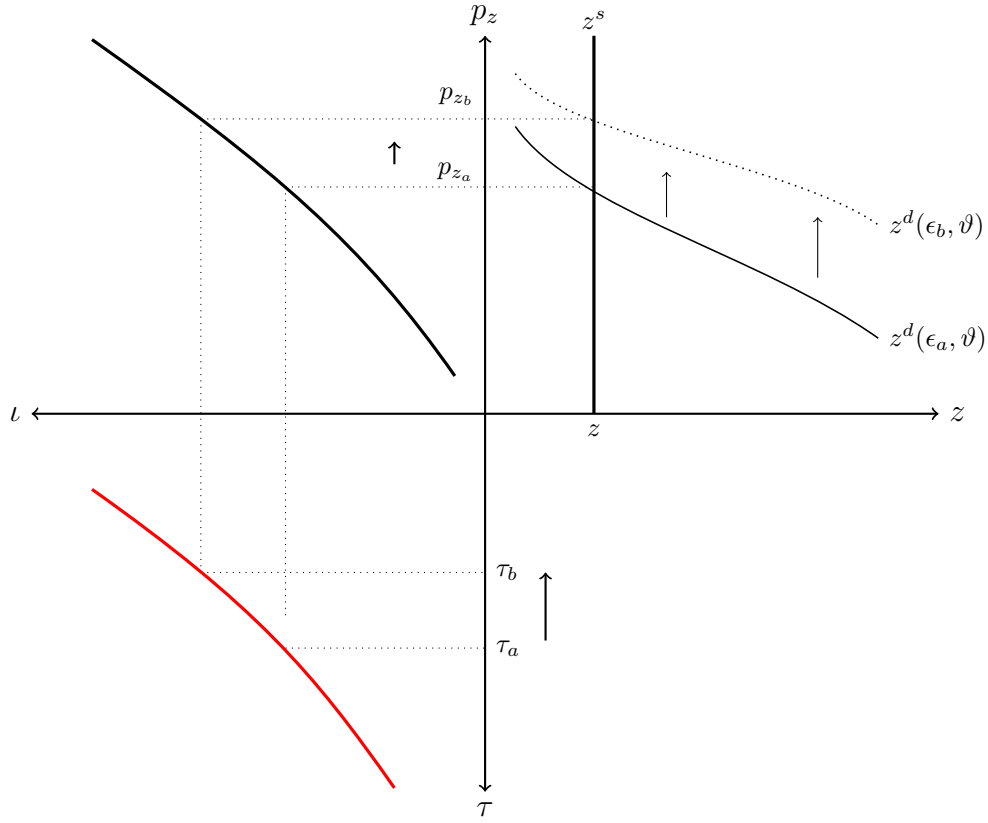

FIGURE V
Effect of competence (or luck) on equilibrium taxes

Now consider the effect of producers' expectations for given governmental demand for good z, assuming an equilibrium exists, and assuming the media is known to be in favour of the incumbent. Suppose we were at the beginning of any mandate, and no message were conveyed by the media. Because producers do not expect the media to be withholding information during a non-electoral year, they expect competence to be the unconditional mean for competence, $\bar{\epsilon}$.

Denote with Ω_a the producers' information set consistent with this posterior on competence. Now consider the same situation but during an election year, and denote with Ω_b, the information set consistent with a posterior on competence that takes into account the media's incentive to withhold information. From knowledge of previous results, producers will suspect the incumbent to be less competent than otherwise, and supply will consistently shrink in response to this suspicion. For a given demand, this will increase the equilibrium price in the market for z from p_{z_a} to p_{z_b}, making production of units of governmental efficiency more costly, all else being equal. This shortage of supply will draw taxes downwards, as shown in figure VI. This is the political business cycle effect on taxes and expenditures. Note that if voters do not take into account this effect, lower taxes may be taken as good signals for competency. And then, not only the media's political motive would be influencing private decisions affecting the economy, but also would further boost the incumbent's chances of getting reelected, even when the media has evidence of his relatively low skill in power.
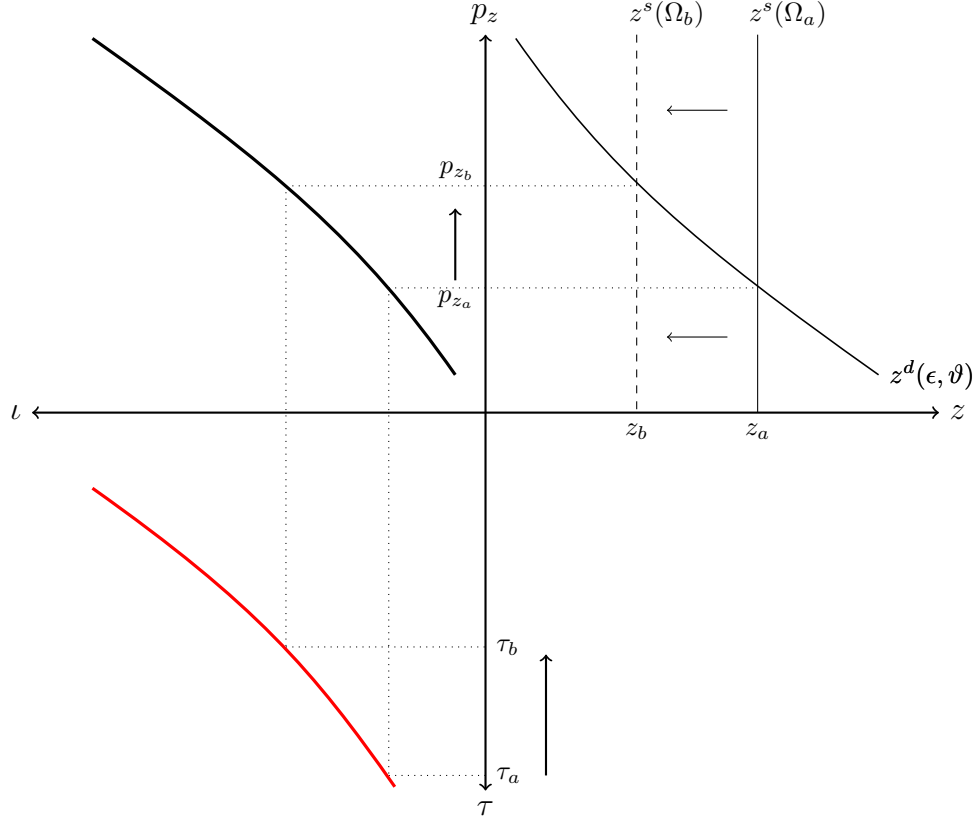

FIGURE VI
Producers beliefs about competence and taxes

B   The political business cycle effect: a simple benchmark

In order to provide some intuition as to how the mechanism through which the media's political motive generates a political business cycle, in equilibrium, let us consider a rather simplistic

benchmark. Suppose for a moment that the media's profits do not depend on the representative agent's welfare, as we have assumed so far, but on output y, which may follow a stochastic process independent of the governmental efficiency stochastic process described by function $\mathcal{G}(\varepsilon_t, \vartheta_t)$. The media would not face then a contemporaneous trade-off between disclosure and concealment, for in spite of the consequences that its decision will have upon the economy through misalignment of producers' expectations which the media has the power to correct to same extent, they would surely not have any effect on the media's profits, which are governed by the independently drawn level of output. It is easy to show that the media, if in favour (against) of the incumbent ($\kappa > 0$ ($\kappa < 0$)), will prefer to withhold information when found if and only if $\Gamma_y \geq 0$ where

$$\Gamma_y = [P(\mathcal{I}, \emptyset) - P(\mathcal{I}, \epsilon)]\, \kappa \tag{4.14}$$

If $\epsilon \geq b$ and the media happens to know it, then when disclosing information $P(\mathcal{I}, \epsilon) = 1$. This implies that if the media is in favour (against) of the incumbent, no matter how strong its pull in favour (against) of the incumbent is, it is a dominant strategy to disclose (withhold) information, for $\Gamma_y < 0$. If, on the contrary, and again, independent of the intensity of the political drive, $\epsilon < b$, then $\Gamma_y > 0$, and the media will never (always) disclose information. The effect upon production of z is evident enough. Producers will be certain that when the media is in favour of the incumbent and had found evidence against him, they would never release this information, and that when the media is against the incumbent, for the same reason, will never release evidence in favour of his reelection. Then the probability that no message is sent, for given political bias κ, is $\nu = 1 - \pi + \pi\mathcal{F}(b)$ if $\kappa > 0$ and is $\nu = 1 - \pi + \pi[1 - \mathcal{F}(b)]$ if $\kappa < 0$. Then we can write the producers' posterior, generally, as follows

$$\tilde{\epsilon}_p(\kappa, \pi, \emptyset) = \frac{1}{\nu(\kappa; \pi, b)} \left(\int_0^b \epsilon f(\epsilon) d\epsilon + (1 - \pi) \int_b^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right) \tag{4.15}$$

Now consider the case where the media is in favour of the incumbent. It is direct to show that $\tilde{\epsilon}_p$ is never greater than $\bar{\epsilon}$. This is the *suspicion effect* taking place over production decisions. Indeed, if the media did not exhibit any political motive, or the economy happened to be at the first part of any mandate, producers would expect competence to be $\bar{\epsilon}$. As shown in figure VII, supply of z would shrink with respect to a situation without media bias. This generates a political business cycle. With respect to the non-electoral period, and all else being equal, taxes will be higher, and expenditures lower, when producers suspect of media's withholding of information. The amount by which suspicion influences production is independent of the size of κ, and constant for a given b. Yet, as shown in figure VII.a, this effect varies for different levels of b. In this figure $\tilde{\epsilon}_p$ denotes the producers' posterior for competence, given the observable bias $\kappa > 0$, as a function of b.
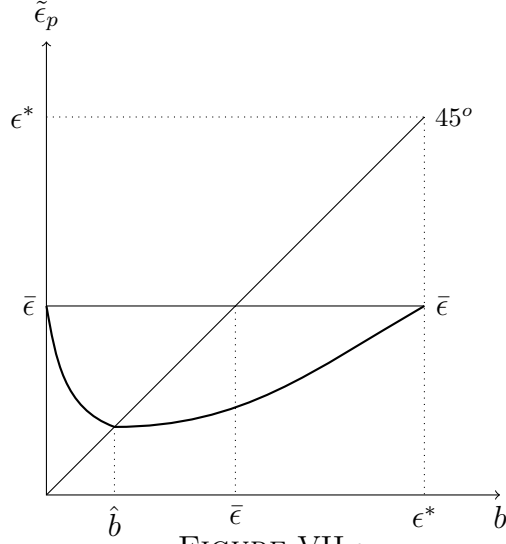
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FIGURE VII.a
Producers' suspicion and the political business cycle

In figure VII.b the effect of political motives against the incumbent over producers' posterior on competence is represented. When the media lean against the incumbent the opposite effect takes place: supply of z is enlarged, due to the suspicion against the media's interest, and in favour of the incumbent, who is believed on average to be more competent than what producers would believe if the media were not there or exhibited no bias.
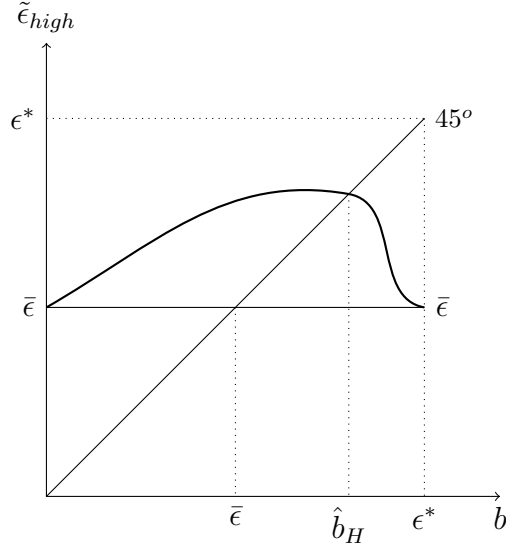

FIGURE VII.b
Producers' suspicion and the political business cycle

Proposition 5 (The PBC when profits of the media are independent of voters' final welfare). *If the media are political and non-pluralistic or mildly pluralistic, but their welfare is independent of the representative's final welfare, there will be a PBC affecting production whenever an empty*

messages $m = \emptyset$ is observed. In particular, if $\kappa < 0$, supply of z will fall with respect to a non-election period. If $\kappa > 0$, supply of z increases with respect to a non-election period. The amount by which supply varies when empty messages are observed in an election-period, is independent of the size of the media's political motive κ. If pluralism is complete, however, there is no PBC.

C   The media's and the PBC: the general case

We come back to our basic environment, with media minding the representative agent's welfare. Now the media must consider the implications that their messages would have on the economy during the election period. In doing so, they must consider the producers' behaviour, and specially their anticipation of the media's strategic withholding of information. Of course, as before, if nothing had been found regarding the incumbent's competence, the media cannot do nothing but send an empty message. The interesting case, potentially bearing some bias, is when the media had found evidence for the incumbent's competence.Not only that. The media must also assess the probability that the incumbent is reelected if an empty message is conveyed, which requires analysis of the voter's problem. We explore this next for the case with production, but for a given general voting behaviour.

Let us take the producers expectations as given and denote with $\tilde{\epsilon}_p$ the producers' posterior belief for the actual competency shock when the media misreports. Of course, if the media publishes the truth the belief is the reported level of competence. For given expectations the media is willing to withhold information when found if and only if $\Delta \geq 0$, with

$$\Delta = \Gamma + \delta \Pi \tag{4.16}$$

With

$$\Gamma = E_t[\Upsilon_t(\varepsilon_t, \vartheta_t)|\mathcal{I}, m = \emptyset] - E_t[\Upsilon_t(\varepsilon_t, \vartheta_t)|\mathcal{I}, m = \epsilon] \tag{4.17}$$

and

$$\Pi = [P(\mathcal{I}, \emptyset) - P(\mathcal{I}, \epsilon)]\left[E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] - E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}] + \kappa_t\right] \tag{4.18}$$

Where we have use the fact that $\Upsilon_t(\varepsilon_t, \vartheta_t)$ is now defined as

$$\Upsilon_t(\varepsilon_t, \vartheta_t) = \mathcal{B}(y + \iota_t - \bar{G}) + \xi$$

We have

$$\Gamma = \mathcal{B}\left(\frac{1-\eta}{\eta}\right)(\epsilon_t + \epsilon_{t-1} + \bar{\vartheta})\left[(\tilde{\epsilon}_p + \epsilon_{t-1} + \bar{\vartheta})^{-\zeta} - (\epsilon_t + \epsilon_{t-1} + \bar{\vartheta})^{-\zeta}\right] \tag{4.19}$$

and

$$\Pi = [P(\mathcal{I}, \emptyset) - P(\mathcal{I}, \epsilon)]\mathcal{B}\left(\frac{1-\eta}{\eta}\right)\left[(\epsilon_t + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} - (b + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} + \kappa_t\right] \tag{4.20}$$

D   Voters' inference and equilibrium

We consider three different voting and informational situations. First we consider the case where voters use correctly the signal extracted from the economy, but are not suspicious about the media[43]. Then we consider the case with rational voters who are skeptical about the media's political motive when no message is conveyed, but are not able to use information borne in the macro aggregates. Finally, we consider the case with rational voters who use the signal and fully understand the model, in particular incentives of the media to withhold information. Throughout, as it must and will be stressed, producers are assumed to be rational and fully understand the model. As in the case without a PBC, we compare cases with and without pluralism.

D.1   Bayesian but non-skeptical voters

In this an all subsequent cases we proceed by backward induction. As before, if there is disclosure of information about competency, then producers correctly anticipate the component of demand's fluctuation that corresponds to the government's competence, though demand will still be uncertain through the "luck" shock. As for the election, voters will face no uncertainty and will not have to extract information from the economy. If no evidence is found the media cannot do anything but send an empty message, as assumed. The only interesting case is when the media had found evidence and has the opportunity to manipulate the election.

So consider the voters' behaviour when no information is released by the media (either because they withheld information or they did not find evidence). If the representative agent is not suspicious, he will only use information conveyed in the informative signal extracted from observation of macro-aggregates. We assume that voters observe all variables in the economy, and understand the way the economy works, though do not suspect information manipulation. Now they use observation of the price p_z (as shown above, knowledge of the price suffices to obtain an informative signal; in particular, voters do not have to know or observe producers' expectations). As in the previous discussion, voters observe the realisation of economic variables. These figures are all equally informative. We use instantaneous welfare $\Upsilon_t(\varepsilon_t, \vartheta_t) = \mathcal{B}(y + \iota_t - \bar{G}) + \xi$. Now the signal, which we denote $s_{w_{pbc}}$, is defined as follows

$$s_{pbc} \equiv \left[\left(\frac{\eta}{1-\eta} \right) \left(\Upsilon_t - \mathcal{B}(y - \bar{G}) - \xi \right) \right]^{1-\eta} \frac{p_z^{\eta}}{\mathcal{A}} - \epsilon_{t-1} = \epsilon_t + \vartheta_t \qquad (4.21)$$

Upon observation of the signal, the voter votes incumbent if and only if their posterior about competence is higher than b. Denote with $\tilde{\epsilon}^s$ the posterior. We have $\tilde{\epsilon}^s = E[\epsilon_t | s_{pbc}]$. Clearly, $\tilde{\epsilon}^s = s_{pbc} - \bar{\vartheta}$. Thus, the incumbent is voted if and only if $s_{pbc} \geq b + s_{pbc} \equiv \hat{s}$.

Now consider the media and suppose there is an equilibrium. That is, the media knows the equilibrium posterior of producers given its own strategy and the behaviour of voters. This implies that the media, upon observation of ϵ, expect the incumbent to be reelected with probability $P(\mathcal{I}, \emptyset) = Prob(s_{pbc} \geq \hat{s} | \epsilon)$. Using information about the distribution of shock ϑ, this probability writes $P(\mathcal{I}, \emptyset) = 1 - \mathcal{H}(\hat{s} - \epsilon)$. Where $\hat{s}$ is known both to the media and the

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[43]We know from above that the only difference between naive voting and the present situation is that in the former also important parameters of the economy will affect the probability of reelection. For this reason we omit it here.

producers. This probability is increasing in competence, as expected.

Let us consider non-pluralistic media in favour of the incumbent ($\kappa > 0$). Suppose for a moment that $\epsilon > b$. If the media disclosed information then the incumbent would be reelected with probability 1. That is, $P(\mathcal{I}, \epsilon) = 1$, which implies in turn that $\Pi < 0$, independently of the political motive.

A   Appendix

B   Proof Lemma 1

The problem is symmetric. Consider the case where the media is contemporaneously in favour of the incumbent ($k_t > 0$). If the media observes $s_m = \epsilon_t > b$ and decides not to send a message next period's expected welfare (recall that only $t+1$'s welfare is meaningful when deciding to either misreport or report truthfully) would be $P(\mathcal{I}, \emptyset)E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] + (1 - P(\mathcal{I}, \emptyset))E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}]$. If, on the contrary, the media decides to send an informative message $m = \epsilon_t > b$, then expected welfare is $E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}]$ because the incumbent is reelected for certain ($P(\mathcal{I}, m = \epsilon_t) = 1$). Then, the media would prefer to withhold found information if and only if

$$(1 - P(\mathcal{I}, \emptyset))\left(E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{O}] - E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}]\right) > 0$$

Using (3.9) and (3.1) this condition writes[44]

$$(1 - P(\mathcal{I}, \emptyset))\mathcal{B}\mathcal{A}\left(b - \epsilon_t\right) > 0$$

Where we have used $E_t[\vartheta_{t+1}|\mathcal{O}] = E_t[\vartheta_{t+1}|\mathcal{I}] = E_t[\vartheta] = \bar{\vartheta}$ and $E_t[\varepsilon|\mathcal{O}] = \bar{\epsilon} + b$. Clearly, this condition is never satisfied when $\epsilon > b$. As for the limits ϵ_L and ϵ_H, they were discussed in the main text. This ends proof of Lemma 1.

C   Proof of Proposition 1

Suppose the media is in favour of the incumbent ($\kappa > 0$). Consider a situation where the media can choose to withhold information. Then, from lemma 1 we know that this would happen if and only if the observed level of competence is within the $[\epsilon_L, b)$ range. The media will leave the incumbent to the mercy of chance only if welfare is above the critical value Υ^*. From the voting rule we have that voters will vote incumbent if and only $\Upsilon_t \geq \Upsilon^*$. Take a particular observed realisation of competence $\epsilon_t \in [\epsilon_L, b)$ as given. Using (3.9) we can write this condition as a condition on the "luck" shock ϑ as follows

$$v = \mathcal{I} \Leftrightarrow \vartheta_t \geq \hat{\vartheta}$$

Where $\hat{\vartheta} \equiv \frac{\Upsilon^* - \xi - \mathcal{B}(y - \bar{G})}{\mathcal{B}\mathcal{A}} - \epsilon_t - \epsilon_{t-1}$. The probability of this event given ϵ can be obtained as follows

$$Prob(v = \mathcal{I}|m = \emptyset, \epsilon_t, \Upsilon^*) = H(\vartheta_t \geq \hat{\vartheta})$$

---

[44]It is assumed throughout that when indifferent the incumbent discloses information.

This probability is clearly increasing in both past and contemporaneous competence, the critical level of welfare Υ^*, and other important parameters describing the economy. That is, ceteris paribus, the media is more likely to have "protected" their likeminded incumbent the higher his past competency is, the higher is the actual level of competence, the higher is income y and the lower is Υ^*. That is, the media manipulation of information would be more likely the higher these parameters are.

Now consider equation (3.16). Only the second element in brackets, on the RHS, will change when the threshold ϵ_L is increased (that is when κ decreases. The observed signal s_w is convolution, that is, a random variable which is the sum of two independently drawn random variables, in our case ϵ and ϑ. The pdf of s_w, that we denote as $\varphi(s_w)$, is by definition of a convolution

$$\varphi(s_w) = \int_{-\infty}^{\infty} h(s_w - \epsilon)f(\epsilon)d\epsilon \text{ for } -\infty < s_w < \infty \tag{C.1}$$

This implies that

$$Prob(s_w \geq s^*|\epsilon \in [\epsilon_L, b)) = \int_{s_w \geq s^*} \left[\int_{\epsilon_L}^{b} h(s_w - \epsilon)f(\epsilon)d\epsilon \right] ds_w$$

This implies in turn that

$$\frac{\partial Prob(v = \mathcal{I}|\kappa > 0)}{\partial \epsilon_L} = -\pi \left[\mathcal{F}(b) - \mathcal{F}(\epsilon_L) \right] \int_{s_w \geq s^*} h(s_w - \epsilon_L)f(\epsilon_L)ds_w$$
$$-\pi f(\epsilon_L)Prob(s_w \geq s^*|\epsilon \in [\epsilon_L, b)) < 0$$

So the larger the political motive the more likely is the incumbent to be reelected.

D   Proof of Proposition 2

It is direct from proof of proposition 1. Now we have

$$\frac{\partial Prob(v = \mathcal{I}|\kappa > 0)}{\partial \epsilon_L} = -\pi \left[\mathcal{F}(b) - \mathcal{F}(\epsilon_L) \right] \int_{s_w \geq \hat{s}} h(s_w - \epsilon_L)f(\epsilon_L)ds_w$$
$$-\pi f(\epsilon_L)Prob(s_w \geq \hat{s}|\epsilon \in [\epsilon_L, b)) < 0$$

Where we have changed s^* for $\hat{s}$.

E   Proof of Proposition 3

A   The case $\kappa > 0$

Take the case where the media is in favour of the incumbent, that is $\kappa > 0$. By lemma 1 voters know there is a threshold $\epsilon_L < b$. Because voters cannot use the signal s_w, the posterior about competence when the media sends an empty message is obtained as follows

$$\tilde{\epsilon}(\kappa, \pi, \emptyset) = \frac{1}{v(\kappa; \pi, b)} \left((1 - \pi) \int_0^{\epsilon_L} \epsilon f(\epsilon) d\epsilon + \int_{\epsilon_L}^b \epsilon f(\epsilon) d\epsilon + (1 - \pi) \int_b^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right) \quad \text{(E.1)}$$

with $v(\kappa; \pi, b) \equiv 1 - \pi + \pi[\mathcal{F}(b) - \mathcal{F}(\epsilon_L)]$, the probability that no message is conveyed. It is direct to show that
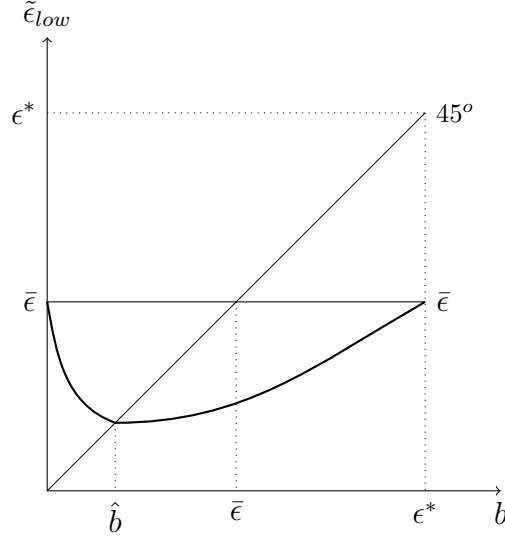
$$\frac{\partial \tilde{\epsilon}(\kappa, \pi, \emptyset)}{\partial \epsilon_L} = \frac{\pi f(\epsilon_L)}{v(\kappa; \pi, b)} [\tilde{\epsilon}(\kappa, \pi, \emptyset) - \epsilon_L]$$

The posterior grows as long as it is above the media's threshold ϵ_L, and falls otherwise. If the political motive is extremely weak, $\kappa \to 0$, then $\epsilon_L \longrightarrow b^-$ and $\tilde{\epsilon}(0, \pi, \emptyset) = \bar{\epsilon}$. If, on the contrary, the political motive is too strong, $\kappa \to \infty$, then $\epsilon_L \longrightarrow 0$, implying that $\tilde{\epsilon}(\kappa^*, \pi, \emptyset) \to \frac{1}{v} \left[\bar{\epsilon} - \pi \int_b^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right]$, with $v = 1 - \pi + \pi \mathcal{F}(b)$. For notational convenience, we define as $\tilde{\epsilon}_{low} \equiv \tilde{\epsilon}(\kappa^*, \pi, \emptyset)$, that is, the posterior when the political motive is strong. We study next how this lower bound behaves when b changes.

If the opponent was believed to be extremely disadvantaged ($b \to 0$) then the lower posterior (and the posterior as function of ϵ_L) will be constant and equal to $\bar{\epsilon}$, because the newspaper would be expected to send informative messages always if evidence were to be found. If, on the contrary, the opponent is believed to be in an extremely favorable position ($b \to \epsilon^*$), the newspaper is always expected to withhold information, and therefore the posterior is constant and equal to $\bar{\epsilon}$ for any value of κ. This implies that $\tilde{\epsilon}_{low}$ is never larger than $\bar{\epsilon}$. For intermediate values of b the limiting posterior $\tilde{\epsilon}_{low}$ evolves as described in the following equation

$$\frac{\tilde{\epsilon}(\kappa^*, \pi, \emptyset)}{\partial b} = \frac{\pi f(b)}{v(\kappa; \pi, b)} [b - \tilde{\epsilon}(\kappa^*, \pi, \emptyset)]$$

Thus, as b increases, $\tilde{\epsilon}_{low}$ falls, till it equalises b (crosses the indentity line), and then increases up to $\bar{\epsilon}$. There is a unique value of b, that we denote $\hat{b}$ which crosses the identity line. Below this cutoff the lower bound for the posterior, $\tilde{\epsilon}_{low}$, is always above b. This means that for $b < \hat{b}$ the incumbent will always be voted. For any b such that $b \in (\hat{b}, \bar{\epsilon}]$ the lower bound for the posterior is always below b, which means that the there is a unique value of κ, that we denote $\hat{\kappa}$, above which the incumbent is never voted for and below which the incumbent will be voted. If $b > \bar{\epsilon}$ the posterior would never be above the critical level b, for any κ, and the incumbent will never be voted for.

B The case $\kappa < 0$ (media against the incumbent)

When the media is against the incumbent $(\kappa < 0)$, by lemma 1 voters know there is a threshold $\epsilon_H > b$. Because voters cannot use the signal s_w, the posterior about competence when the media sends an empty message is obtained as follows

$$\tilde{\epsilon}(\kappa, \pi, \emptyset) = \frac{1}{v(\kappa; \pi, b)} \left((1 - \pi) \int_0^b \epsilon f(\epsilon) d\epsilon + \int_b^{\epsilon_H} \epsilon f(\epsilon) d\epsilon + (1 - \pi) \int_{\epsilon_H}^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right) \qquad \text{(E.2)}$$

with $v(\kappa < 0; \pi, b) \equiv 1 - \pi + \pi[\mathcal{F}(\epsilon_H) - \mathcal{F}(b)]$, the probability that no message is conveyed. It is direct to show that

$$\frac{\partial \tilde{\epsilon}(\kappa, \pi, \emptyset)}{\partial \epsilon_H} = \frac{\pi f(\epsilon_H)}{v(\kappa; \pi, b)} [\epsilon_H - \tilde{\epsilon}(\kappa, \pi, \emptyset)]$$
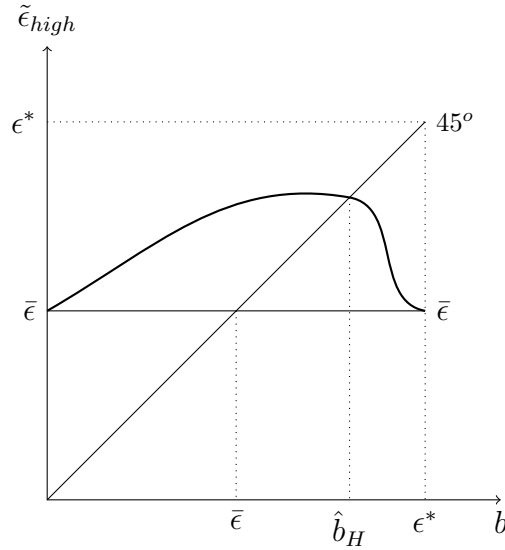
The posterior grows as long as it is above the media's threshold ϵ_H is above the posterior, and falls otherwise. If $\kappa \to 0$, then $\epsilon_H \longrightarrow b^+$ and $\tilde{\epsilon}(0, \pi, \emptyset) = \bar{\epsilon}$. If $\kappa \to -\infty$ then $\epsilon_H \longrightarrow \epsilon^*$, implying that $\tilde{\epsilon}(-\kappa^*, \pi, \emptyset) \to \frac{1}{v} \left[\bar{\epsilon} - \pi \int_0^b \epsilon f(\epsilon) d\epsilon \right]$, with $v = 1 - \pi + \pi[1 - \mathcal{F}(b)]$. For notational convenience, we define $\tilde{\epsilon}_{high} \equiv \tilde{\epsilon}(-\kappa^*, \pi, \emptyset)$, that is, the posterior when the political motive is extremely strong against the incumbent. We study next how this upper bound behaves when b changes.

If the opponent was believed to be extremely disadvantaged $(b \to 0)$ then the lower bound on the posterior (and the posterior as function of ϵ_H) will be constant and equal to $\bar{\epsilon}$, because the newspaper would be expected to send informative messages always if evidence were to be found. If, on the contrary, the opponent is believed to be in an extremely favorable position $(b \to \epsilon^*)$, the newspaper is always expected to withhold information, and therefore the posterior is constant and equal to $\bar{\epsilon}$ for any value of κ. This implies that $\tilde{\epsilon}_{high}$ is never larger than $\bar{\epsilon}$. For intermediate values of b the limiting posterior $\tilde{\epsilon}_{high}$ evolves as described in the following equation

$$\frac{\tilde{\epsilon}(-\kappa^*, \pi, \emptyset)}{\partial b} = \frac{\pi f(b)}{v(\kappa; \pi, b)} [\tilde{\epsilon}(-\kappa^*, \pi, \emptyset) - b]$$

Thus, as b increases, $\tilde{\epsilon}_{high}$ also does, till it equalises b (crosses the indentity line), at which point it begins to decrease back up to $\bar{\epsilon}$. There is a unique value of b, that we denote $\hat{b} < \bar{\epsilon}$ which crosses the identity line. Below this cutoff the lower bound for the posterior, $\tilde{\epsilon}_{low}$, is always above b. This means that for $b < \hat{b}$ the incumbent will always be voted. For any b such that $b \in (\hat{b}, \bar{\epsilon}]$ the lower bound for the posterior is always below b, which means that the there is a unique value of κ, that we denote $\hat{\kappa}$, above which the incumbent is never voted for and below which the incumbent will be voted. If $b > \bar{\epsilon}$ the posterior would never be above the critical level b, for any κ, and the incumbent will never be voted for.

F   Proof of Propositions with production

First result. Define $\Delta(\tilde{\epsilon}_p, \epsilon, \kappa, \Theta)$. Suppose that $\epsilon < b$. Then $P(\mathcal{I}, \epsilon) = 0$ and

$$\Pi = [P(\mathcal{I}, \emptyset)] \, \mathcal{B}\left(\frac{1 - \eta}{\eta}\right) \left[(\epsilon_t + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} - (b + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} + \kappa_t\right] \qquad (\text{F.1})$$

Which is increasing in κ. Also note that Γ is decreasing in $\tilde{\epsilon}_p$ for a given ϵ. This means that Γ achieves its lowest negative value when $\tilde{\epsilon}_p = \epsilon^*$. Suppose that κ^* such that $\Delta(\epsilon^*, 0, \kappa^*, \Theta) = 0$. Then whenever $\kappa > \kappa^*$ the media never discloses information. Also note that if $\kappa \geq \kappa^*$ and $\epsilon > b$ then $P(\mathcal{I}, \epsilon) = 1$ and

$$\Pi = -[P(\mathcal{I}, \emptyset)] \, \mathcal{B}\left(\frac{1 - \eta}{\eta}\right) \left[(\epsilon_t + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} - (b + \bar{\epsilon} + \bar{\vartheta})^{1-\zeta} + \kappa\right] \qquad (\text{F.2})$$

Because by definition $\Delta(\epsilon^*, 0, \kappa^*, \Theta) = 0$, this implies that the media never wants to withhold information when $\epsilon > b$. If the media is strongly attached to the incumbent then there is an equilibrium where the media nevers discloses information against the incumbent, and always

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discloses it if that information is favorable to the incumbent. The producers posterior will be in that case

$$\tilde{\epsilon}_p(\kappa > \kappa^*) = \frac{1}{v} \left(\int_0^b \epsilon f(\epsilon) d\epsilon + (1 - \pi) \int_b^{\epsilon^*} \epsilon f(\epsilon) d\epsilon \right)$$

with $\nu = (1 - \pi) + \pi \mathcal{F}(b)$.

Now assume that $\kappa = 0$. And suppose that $\tilde{\epsilon}_p(\kappa = 0) = b$. Then, whenever $\epsilon < b$ Δ will be negative. And whenever $\epsilon > b$

G   Results from extension on fighting back

A   Private transfers

A.1   One publisher

Suppose an incumbent with $\epsilon < \epsilon_L$, who observes that the media has found evidence about his competence. We consider under which conditions he would decide to try to silence the media. We start with a simple case where the probability of reelection given that the media send an empty message, that we denote as $p^{\mathcal{I}} = \mathcal{P}(\mathcal{I}, \emptyset)$, is exogenous and constant. We consider a simple two-period case.

First we consider incentive compatibility constraints on the media's decision to withhold information. First consider the case of media in favour of the incumbent $\kappa > 0$ (one type of publisher). Consider the owner j of one or more newspapers. Because the amount to be transferred must make owners of the outlets indifferent between disclosure and withholding of information, this amount shall depend on the number of owners having different outlets in the market, all assumed to have the same political motive. We define $N_j = N_{\{j\}_{\kappa_j = \kappa > 0}}$ as the number of such owners, which must not be confused with the number of outlets, which is greater of equal than the number of owners. The incumbent considers the individual transfer that he must offer to any single owner to have him indifferent between disclosure and concealment. The incentive compatible condition is obtained as follows.

Denote with c_{ap} the transfer offered to any single owner. Also denote with $\hat{\Upsilon}^{\mathcal{O}}$ the discounted (at the beginning of period $t+1$) expected welfare that any single owner expects to obtain during the polity's last mandate if he disclosed information and the challenger were appointed (recall $\mathcal{P}(\mathcal{I}, \epsilon < b) = 1$. We have

$$\hat{\Upsilon}^{\mathcal{O}} \equiv E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1}) | \mathcal{O}] + \delta E_t[\Upsilon_{t+2}(\varepsilon_{t+2}, \vartheta_{t+2}) | \mathcal{O}]$$

If the owner decides to disclose information they expect to get overall payoff equal to

$$E_t[\Upsilon_t(\varepsilon_t, \vartheta_t) | \mathcal{I}] + \beta_t^{\mathcal{I}} + \delta \hat{\Upsilon}^{\mathcal{O}}$$

If the owner decides to accept the offer and withhold information, then he expects to get

$$E_t[\Upsilon_t(\varepsilon_t, \vartheta_t) | \mathcal{I}] + c_{ap} + \beta_t^{\mathcal{I}} + \delta p^{\mathcal{I}} \left(E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1}) | \mathcal{I}] + \kappa_t + \delta E_t[\Upsilon_{t+2}(\varepsilon_{t+2}, \vartheta_{t+2}) | \mathcal{I}] \right) + \delta(1 - p^{\mathcal{I}}) \hat{\Upsilon}^{\mathcal{O}}$$

Note that $E_t[\Upsilon_{t+2}(\varepsilon_{t+2}, \vartheta_{t+2})|\mathcal{I}] = E_t[\Upsilon_{t+2}(\varepsilon_{t+2}, \vartheta_{t+2})|\mathcal{O}]$, given our assumptions on the stochastic process for competence.

The owner is indifferent between withholding and disclosing the evidence if and only if the difference in the expected welfare derived from both actions is equal. Define Δ_f as such difference. Then the media will be indifferent if $\Delta_f = 0$, where

$$\Delta_f = c_{ap} + \delta p^{\mathcal{I}}\left(\kappa_t + \mathcal{B}\mathcal{A}(\epsilon - b)\right)$$

But note the following

$$
\begin{aligned}
c_{ap} + \delta p^{\mathcal{I}}\left(\kappa_t + \mathcal{B}\mathcal{A}(\epsilon - b)\right) &= c_{ap} + \delta p^{\mathcal{I}}\left(\kappa_t + \mathcal{B}\mathcal{A}(\epsilon_L - (\epsilon_L + \epsilon) - b)\right) \\
&= c_{ap} + \delta p^{\mathcal{I}}\left(\kappa_t + \mathcal{B}\mathcal{A}(\epsilon_L - b) + \mathcal{B}\mathcal{A}(\epsilon - \epsilon_L))\right)
\end{aligned}
$$

But $\kappa_t + \mathcal{B}\mathcal{A}(\epsilon_L - b) = 0$ by definition. Then we have

$$c_{ap} = \delta p^{\mathcal{I}}\mathcal{B}\mathcal{A}(\epsilon_L - \epsilon) > 0$$

This individual incentive scheme is increasing in δ, the scaling parameters of the economy $\mathcal{B}$ and $\mathcal{A}$ and the distance between the threshold ϵ_L and the observed level of competence ϵ. Now, from our assumptions on supervision, the media must bribe all owners. And on top of that, the media knows that for any single unit of welfare to be passed on to any single, he must make use of $\frac{1}{\lambda}$ units from his private benefit χ. The total amount to be transferred to the owners is then

$$\mathcal{C} = \frac{N_j c_{ap}}{\lambda}$$

Now we consider incentives of the incumbent to undertake efforts silencing the media. Consider the two period case. If the incumbent decides to engage in silencing the media efforts, for given amount $\mathcal{C}$ to be deployed, he expects to get

$$E_t[\Upsilon_t(\varepsilon_t, \vartheta_t)|\mathcal{I}] + \chi - \mathcal{C} + \delta p^{\mathcal{I}}\left(E_t[\Upsilon_{t+1}(\varepsilon_{t+1}, \vartheta_{t+1})|\mathcal{I}] + \chi(1+\delta) + \delta E_t[\Upsilon_{t+2}(\varepsilon_{t+2}, \vartheta_{t+2})|\mathcal{I}]\right) + \delta(1 - p^{\mathcal{I}})\hat{\Upsilon}^{\mathcal{O}}$$

If he decided not to change the media's message, then he expects to get

$$E_t[\Upsilon_t(\varepsilon_t, \vartheta_t)|\mathcal{I}] + \chi + \delta\hat{\Upsilon}^{\mathcal{O}}$$

Defining $\Delta_{\mathcal{I}}$ as the difference between expected welfare derived from both actions, we have that the indifference condition $\Delta_{\mathcal{I}} = 0$ implies

$$\mathcal{C} = \delta p^{\mathcal{I}}\left(\chi(1+\delta) + \mathcal{B}\mathcal{A}(\epsilon - b)\right)$$

Notice that from this last condition we find a necessary condition on incentives to silence the media. Assuming $\mathcal{C} \geq 0$, then to have the incumbent willing to silence the owners against him, the following must be true

$$\epsilon \geq b - \frac{\chi(1+\delta)}{\mathcal{BA}} \equiv \epsilon^c$$

Using this last definition and following same steps as above the RHS of the last equation can be expressed as follows

$$\delta p^{\mathcal{I}} \left(\chi(1+\delta) + \mathcal{BA}(\epsilon - b) \right) = \delta p^{\mathcal{I}} \left(\chi(1+\delta) + \mathcal{BA}(\epsilon^c - (\epsilon^c - \epsilon) - b) \right)$$
$$= \delta p^{\mathcal{I}} \left(\chi(1+\delta) + \mathcal{BA}(\epsilon^c - b) - \mathcal{BA}(\epsilon^c - \epsilon) \right)$$

Where $\chi(1+\delta) + \mathcal{BA}(\epsilon^c - b) = 0$ by definition. So we have finally, if $p^{\mathcal{I}} > 0$,

$$\mathcal{C} = \delta p^{\mathcal{I}} \mathcal{BA}(\epsilon - \epsilon^c)$$

Which implies

$$\frac{N_j \delta p^{\mathcal{I}} \mathcal{BA}(\epsilon_L - \epsilon)}{\lambda} \leq \delta p^{\mathcal{I}} \left(\mathcal{BA}(\epsilon - \epsilon^c) \right) \Rightarrow \frac{N_j(\epsilon_L - \epsilon)}{\lambda} \leq \epsilon - \epsilon^c$$

Define $\omega \equiv \frac{N_j}{N_j + \lambda}$. Then the condition on 'silence' can be written as

$$\epsilon \geq \omega \epsilon_L + (1 - \omega)\epsilon^c \equiv \epsilon^{cap}$$

Then a necessary condition is $\epsilon^c < \epsilon_L$. This expression can also be written in the following way

$$\epsilon^{cap} = b - \frac{1}{\mathcal{BA}} \left[\omega \kappa + (1 - \omega)\chi(1+\delta) \right]$$

LOOK CAREFULLY TO TIME: show inconsistencies when assuming ex-ante contract or deal. Also show difficulties of situation where incumbent observes ϑ.

If we had an incumbent facing media against him $\kappa < 0$, then

$$c_{ap} = \delta p^{\mathcal{I}} \mathcal{BA}(\epsilon_H - \epsilon) > 0$$

So

$$\epsilon \geq \omega \epsilon_H + (1 - \omega)\epsilon^c \equiv \epsilon^{cap}$$

Then a necessary condition is $\epsilon^c < \epsilon_L$. This expression can also be written in the following way

$$\epsilon^{cap} = b + \frac{1}{\mathcal{BA}} \left[\omega\kappa - (1-\omega)\chi(1+\delta) \right]$$

If the incumbent is good $\epsilon > b$ if the media is in favour, no problem, if against, he might consider to make him speak. If $\epsilon > \epsilon_H$ the media will speak. There's another advantage: he can wait till the very end. If he gets a bad strike of luck, only then would he try winning the media. What he cannot do is of course make the media speak if the media had learnt nothing.

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