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Abstract

We develop a model of policy communication by aid agencies, NGOs and intergovernmental organizations and we show how the need for fundraising affects the policy communication strategy of these organizations. To attract more funds, organizations may bias their communication. The bias depends on the ex ante beliefs of donors and on mass media reporting.

Keywords: political economy, bias, NGOs, intergovernmental organizations, fundraising.

JEL codes: D83, D23, P16, L31

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1. Introduction

Development organizations, charities, aid agencies, non-governmental organizations (NGOs) and other institutions whose formal objective is to enhance welfare and reduce suffering around the world are regularly accused of providing biased analyses on the state of the world and to have their actions guided by their private benefits – such as attracting media attention, raising funds, or personal fame – rather than the public goods they are supposed to be after. For example, on the 23rd of January 2010, at the height of the humanitarian crisis in Haiti following the earthquake, The Lancet – an internationally renowned medical journal – in its editorial accused international aid agencies of adjusting their communication (and policies) to capture media attention and funding. The Lancet stressed how aid agencies disproportionately focus their attention on media-hyped humanitarian disasters (the Haiti cause in this case) rather than other equally serious cases: *“It is scandalous that it took a seismic shift in tectonic plates for Haiti to earn its place in the international spotlight”* (p.253). Around the same time, the Intergovernmental Panel on Climate Change (IPCC) was being accused of exaggerating the negative impacts of climate change and of biasing communication of research findings.

An interesting ‘natural experiment’ on policy communication recently occurred with the 2007 ‘food crisis’, i.e. the hausse in global food prices from 2006 to mid 2008. Before the food crisis, the widely communicated policy perspective was that *low* food prices were a curse to developing countries and the poor. The dramatic increase of food prices in 2006-2008 fundamentally altered communications on food policy. The vast majority of analyses

and reports in 2008 and 2009 state that *high* food prices have a devastating effect on developing countries and the world's poor.

The dramatic reversal of policy communications of this issue is illustrated by the following quotes from global NGOs (Oxfam) and international organizations (United Nations), both before and after the food crisis:¹

“US and Europe[’s] surplus production is sold on world markets at artificially low prices, making it impossible for farmers in developing countries to compete. As a consequence, over 900 millions of farmers are losing their livelihoods.”
Oxfam International (2005)²

“Higher food prices have pushed millions of people in developing countries further into hunger and poverty. There are now 967 million malnourished people in the world....”
Oxfam International (2008)³

“The long-term downward trend in agricultural commodity prices threatens the food security of hundreds of millions of people in some of the world's poorest developing countries.”
Food and Agricultural Organization (FAO) of the United Nations (2005)⁴

“Rising food prices are bound to worsen the already unacceptable level of food deprivation suffered by 854 million people. We are facing the risk that the number of hungry will increase by many more millions of people.”
Food and Agricultural Organization (FAO) of the United Nations (2008)⁵

¹ See Swinnen (2010) for an elaborate and detailed documentation of this reversal of policy communication and argumentation that these quotes reflect an effective and dramatic shift in policy communications by these organizations.

² OXFAM International, *International celebrities get dumped on at the WSF*, 1 November 2005. <http://www.oxfam.org/en/node/283>

³ OXFAM International, *Lessons from the food price crisis: Questions & Answers*, 15 October 2008. <http://www.oxfam.org/en/campaigns/agriculture/food-price-crisis-questions-answers>

⁴ FAO newsroom, *Agriculture commodity prices continue long-term decline*, 15 February 2005, Rome/Geneva. <http://www.fao.org/newsroom/EN/news/2005/89721/index.html>

⁵ FAO Assistant Director-General Hafez Ghane, May 2008, Rome. <http://www.fao.org/newsroom/EN/news/2008/1000845/index.html>

This reversal, of course, raises questions about the correctness of these arguments and policies. It also raises questions about the causes of this dramatic turnaround in the communication of policy conclusions.

Bias in policy communication is an important issue. Policy communication by these organizations does influence policy thinking, government strategies, development priorities, and aid flows. For example, an important element of the current WTO negotiations (the so-called Doha Development Round) is to reduce the depressing effect of rich countries' agricultural policies on global food prices – a perspective which until the recent food crisis was widely seen as negative for developing countries.

Some have explicitly linked the (bias in) policy communication of these organizations to capturing media attention and fundraising. For example, Cottle and Nolan (2007) argue that their humanitarian aim has become compromised as the focus of organizations is on their communication process: the 'media logic' of packaging information and images has become institutionalized inside aid agencies. The Lancet makes an even stronger statement: *"Polluted by the internal power politics and the unsavory characteristics seen in many big corporations, large aid agencies can be obsessed with raising money through their own appeal efforts. Media coverage as an end in itself is too often an aim of their activities. Marketing and branding have too high a profile."*⁶

This issue has, so far, received little attention in the academic literature. There is a burgeoning literature on bias in communication in mass media⁷ and its impact on government

⁶ The Lancet, *Growth of Aid and the decline of humanitarianism*, Volume 375, Issue 9711, 23 January 2010, p. 253.

⁷ Media bias can take various forms, and there is no generally accepted definition (McCluskey and Swinnen, 2010). Anand et al (2007, p. 637) write that "[t]he phenomenon of bias in the media appears to be quite different than, say, a statistician's notion of bias – because bias lies in the eyes of the beholder (consumer)." Others define bias as the "absence of balance resulting in one side of a story receiving unwarranted attention," (Baron, 2006, p.4) or in other words, "... sins of omission – cases where a journalist chose facts or stories that only one side of the ... spectrum is likely to mention" (Groseclose and Milyo, 2005, p.1205). In terms of political bias, Sutter (2001) defines media bias in terms of the media outlet's position on the political spectrum relative to

policy (see. e.g. Jacobson, 2000; Hawkins, 2002; Strömberg, 2004; Besley and Burgess, 2001; Baron, 2006; Gentzkow and Shapiro, 2006; Eisensee and Strömberg, 2007). However, studies on international organizations, such as the World Bank and the IMF, have focused almost exclusively on their lending and project implementation activities (see e.g. Aldenhoff, 2007; Dreher et al., 2009; Vaubel et al., 2007). There are a series of recent studies on fundraising by NGOs and the impact of public and private funding on NGO activities and strategies (see e.g. Rose-Ackerman, 1982; Chau and Huysentruyt, 2006; Andreoni and Payne, 2003; Aldashev and Verdier, 2010). For example, Aldashev and Verdier (2010), and Andreoni and Payne (2003) model the NGOs trade-off in allocating resources (time or funds) to fundraising. Allocation of resources to fundraising is needed to attract funds, but takes away resources from project implementation. This may lead to inefficient outcomes. However none of these studies addresses the nature of and possible bias in communication by these organizations.

Our paper analyzes how communications to potential donors in fundraising affects the overall communication strategy of the organization, i.e. we analyze the *nature* of fundraising rather than its amount (in terms of either budget or time). Our model builds on the seminal work of Mullainathan and Shleifer (2005) on bias in mass media and of Andreoni and Payne (2003) on fundraising by charity organizations. We model how ‘policy organizations’ compete for donors’ funding. To receive more funding, they may introduce ‘bias’ into their policy communications by slanting the content of their reports. Bias in policy communication may draw in larger revenues through fundraising, but it may have negative welfare effects if it induces suboptimal behavior by various other agents who use this advice for their decision-making.

the views of the median voter. Gentzkow and Shapiro (2006, p.3) develop a “slant” index, which measures “*differences in news content that ... would tend to increase a reader’s support for one side of the political spectrum*”.

The paper is organized as follows. The second section presents a conceptual framework and a set of working definitions. In the third section we develop a formal model to analyze the equilibrium slanting behavior of competing policy organizations and derive a set of hypotheses on policy communication in the case of homogenous donors' beliefs. The fourth section extends the model to the case of heterogeneous donors' beliefs and the fifth section includes 'problem severity' in the donors' utility. The sixth and the seventh sections analyze the equilibrium slanting behavior when donors' beliefs are endogenous and influenced by respectively policy communication and mass media. The last section concludes.

2. Conceptual Framework

To explain possible bias in 'policy communication', we focus on the interaction between 'policy organizations' and 'donors'. We define 'policy communication' as communication of advice and results of analyses of important public policy issues. It includes rapid communications (such as interviews or press releases) and more extensive externally-released extensive reports on certain issues. It does not include news or reports from commercial media sources or internal reports of organizations.

We use the term 'policy organizations' (POs) to represent all organizations who are communicating public policy analyses and advice and who obtain a significant share of their funding from various external sources ('donors'). POs can include organizations as diverse as international NGOs (such as Oxfam, Greenpeace, Médecins sans Frontières, ...), intergovernmental organizations (such as the World Bank, United Nations organizations (such as the Food and Agricultural Organization (FAO), UNICEF, etc.), ...) and a variety of national NGOs and organizations. In our model, POs do not include commercial companies or organizations representing specific interest groups with single source funding (such as labor unions or associations of companies).

POs engage in both analysis and communication. The purposes of the POs' analysis (i.e. fact finding and various types of research) are multiple: their analysis serves to support internal decision-making on funding and project implementation. Analysis also provides the basis for policy communication. The POs' communication strategy has two objectives. The first objective is policy advice, i.e. to influence others (e.g. governments) to implement or reform certain policies. The second objective is fundraising, i.e. to influence donors to contribute funds to the POs. Policy communication by the POs is influenced by both objectives and by the agents they interact with (donors and those targeted with advice).

POs receive a significant share of their funding from a variety of 'donors'. Donors may include public entities (such as governments) or private entities (such as foundations or households). POs are not guaranteed external funding but have to raise funds by convincing potential donors that it is worthwhile to contribute funds to their activities. POs need to invest in fundraising activities in an environment where various POs compete for attention and funding of donors. This assumption is consistent with the observation that all international organizations use to some extent funds from public or private donors to operate and implement their projects, or that subgroups within large organizations have to compete internally for funding.

For some of the POs, such as many NGOs, fundraising means actually writing to potential donors or going door-to-door to raise funds. Here communication and fundraising are used directly to influence donors (e.g. Andreoni and Payne, 2003; Rose-Ackerman, 1982). Other POs may have a more structural source of external funding (such as some of the intergovernmental organizations). While their funding sources may differ, in a world where financial means are limited and where there is continuous pressure to demonstrate relevance and importance of budget spending on particular items, or on projects or divisions within large organizations, all these organizations face a demand to demonstrate the importance and

relevance of their projects and activities. Policy communication is part of such strategy to show relevance and importance – and may thus help in securing and raising funds.⁸

3. The Model

The variable t represents the true state of the economy, e.g. the impact of an earthquake, global warming, or rising food prices. We normalize the true state of the economy to zero ($t = 0$). Donors, indexed by i , hold certain beliefs b_i about this situation t , and these beliefs may be biased. If $b_i > 0$ donor i has an optimistic belief about the state of the economy, whereas if $b_i < 0$ the donor holds a pessimistic belief. To start, we assume that these beliefs are exogenous; later we relax this assumption and allow for beliefs to be endogenously determined.

Two POs, indexed by $j \in \{A, B\}$, collect (the same) data on the state of the economy t . We assume that POs perform correct analyses, i.e. they gather the necessary information and use appropriate methodologies to arrive at the correct conclusion d about the state of the economy ($d = t$). The POs communicate their conclusions to the external world by means of ‘reports’, containing information n_j . We assume POs may introduce an amount of slanting s_j in their policy communications, so their reports contain information $n_j = d + s_j$.

3.1 Donors

We follow Andreoni and Payne (2003)’s key assumptions on donor behavior. Donors have a latent demand to donate. Unless asked, this demand goes unexpressed. This implies that a

⁸ A related argument is that the donors may expect (or even demand) that these organizations focus their attention on and communicate policy options for issues and problems which the donors consider important. If they would not publicly react (‘communicate’) on these problems, it would hurt their “legitimacy” as policy organizations. This could undermine overall support for their existence. The following quote from a regional AICF coordinator (Action International contre la Faim) illustrates this: “An NGO simply must be in certain areas that the donors are paying attention to. If they are not, there is the sense that they are doing something wrong, that perhaps their projects are after all really not so worthwhile” (Rieff, 1995, p5).

donor does not give money to a PO unless solicited. Donors support at most one PO and the amount to donate, D_j , is set by the PO. We extend this framework by assuming that solicitation of donors' support by POs occurs through the POs' reports. A donor selects which PO to support based on a comparison of the POs' reports' contents n_j and their requested donations D_j .

In line with Mullainathan & Shleifer (2005), we assume that on the one hand donors dislike slanted reports because it is costly both in effort and time to read a slanted report and 'to figure out the truth'. On the other hand, donors get disutility from reading reports that are inconsistent with their beliefs. Formally, a donor i 's utility of reading the report of PO j and consequently donating to PO j is:

$$U_{ij} = \begin{cases} u^w - \mu s_j^2 - \phi(n_j - b_i)^2 - D_j & \text{if donor } i \text{ reads the report of} \\ & \text{and donates to PO } j; \\ 0 & \text{if the donor does not donate,} \end{cases} \quad (1)$$

where u^w is the 'warm glow' a donor receives from donating (see Andreoni and Payne, 2003). If a donor does not read any report, and consequently does not donate, he receives zero utility. The constant $\mu > 0$ is a measure for a donor's sensitivity to slanting; therefore μs_j^2 represents the disutility from reading a slanted report issued by PO j . $\phi > 0$ represents a donor's preference for reading a report consistent with his beliefs, where consistency is modeled as the distance between the report's content n_j and the donor's beliefs b_i , i.e. $(n_j - b_i)^2$.

3.2 Policy Organizations

As discussed before, the POs' policy communication has two objectives. On the one hand, POs' reports serve the purpose of fundraising; on the other hand they aim at improving

government policy through their reports. The PO chooses its slanting strategy s_j and the donation D_j it requests to maximize its objective function $W_j(n_j)$, which is the weighted sum of revenues, $R_j(n_j)$ and policy impact, $I_j(n_j)$. The objective function of PO j is

$$W_j(n_j) = \omega_R R_j(n_j) + \omega_I I_j(n_j), \quad (2)$$

where ω_R and ω_I are the respective weights of revenues and policy impact. The revenues $R_j(n_j)$ are the funds collected from donors who decide to donate to PO j after reading its report. The policy impact, $I_j(n_j)$ is specified as $I_j(n_j) = G - (n_j - t)^2$, with $G > 0$ being the policy impact of a report that is not slanted. We abstract from the complexities of the decision-making process of governments and assume they choose better policies when receiving better (i.e. less slanted) information from the reports. The policy impact is decreasing in the distance between the report's contents n_j and the true situation t .

The sequence of the game is the same as in Mullainathan & Shleifer (2005). First, the POs simultaneously announce their slanting strategies s_j . Second, they simultaneously announce their requested donations D_j , after the POs have revealed their slanting strategy. Third, donors decide whether and to which PO to donate, based on the utilities associated with the respective strategies s_j and requested donations D_j . Fourth, POs finish their analyses of the state of the world, i.e. they find d , and report information $n_j = d + s_j$. Fifth, if donors support a PO, they read the report and receive utility.

3.3 Equilibrium with Homogeneous Biased Donors

In this section we discuss the POs' optimal slanting strategy when all donors hold the same beliefs, i.e. $b_i = b$ for all i , where b may be different from t . The number of donors is normalized to one. The POs' equilibrium slanting strategy when donors have homogenous beliefs, $s_{j,hom}^*$, is summarized by the following proposition:

Proposition 1: *If donors have homogenous beliefs, the equilibrium slanting strategy of both POs $j = A, B$ is:*

$$s_{j,hom}^* = \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} b, \quad (3)$$

If donors' beliefs are unbiased, POs do not slant the information in their reports: $s_{j,hom}^ = 0$ for $b = 0$. If beliefs are biased, POs slant the content of their reports in the direction of donors' beliefs: $s_{j,hom}^* > 0$ for $b > 0$ and $s_{j,hom}^* < 0$ for $b < 0$.*

Proof:

See Appendix for all proofs.

Proposition 1 holds the important result that, if donors' beliefs are biased, POs slant the information in their reports to be more consistent with donors' beliefs and thus to attract more donations. Because donors' beliefs are homogenous, POs select the same equilibrium slanting strategy, i.e. $s_{A,hom}^* = s_{B,hom}^*$. Consider the case that, for whatever reason, donors perceive the world to be worse than it actually is ($b < 0$). If this is the case, our model shows that POs slant their reports such that $s_j^* < 0$, and hence report the situation to be more negative (or less positive) than the actual state ($n_j^* < d = t = 0$).

From Proposition 1 it is possible to formally derive the impact of several factors (besides donors' beliefs), on the extent of slant in the POs' policy communications. First, if the weight attached to revenues in the POs' objective function increases, the amount of slanting increases $\left(\frac{\partial |s_{j,hom}^*|}{\partial \omega_R} > 0\right)$, while if the weight attached to policy impact increases, the

amount of slanting decreases $\left(\frac{\partial |s_{j,hom}^*|}{\partial \omega_I} < 0\right)$ ⁹. This illustrates the trade-off between the two objectives of the POs and the conflicting impact of slanting on the POs' different objectives. When POs' reports are more consistent with biased donors' beliefs and thus more slanted, POs attract more donations. Hence when the revenue objective is more important (ω_R relatively higher), POs add more slant to their policy communications. However, reports that are slanted more cause more negative impact on policy, which reduces the POs' policy impact objective. Therefore if the latter objective is relatively more important (ω_I relatively higher), POs slant their policy communication less.¹⁰

Second, changes in the donors' utility function's parameters affect the equilibrium slanting by POs as well. If donors are more sensitive to slanting, the amount of slanting decreases $\left(\frac{\partial |s_{j,hom}^*|}{\partial \mu} < 0\right)$. For higher μ , POs have less incentives to publish slanted reports since slanting has a larger negative effect on donors' willingness to donate and thus on revenues.

Third, if donors have higher preferences for reading reports consistent with their beliefs, the amount of slanting increases $\left(\frac{\partial |s_{j,hom}^*|}{\partial \phi} > 0\right)$ because POs then have a higher incentive to slant their policy communication in order to attract more revenues.

In the next sections, we extend the model in three directions. First, we introduce heterogeneity in donors' beliefs and derive the POs' equilibrium slanting strategy. Second, we examine how the POs' slanting strategy is affected when the donors' willingness to

⁹ The absolute value of $s_{j,hom}^*$ reflects the fact that the impact of these factors is symmetric for $s_{j,hom}^* > 0$ and for $s_{j,hom}^* < 0$. Notice also that these factors have no impact when $s_{j,hom}^* = 0$.

¹⁰ One could make this trade-off more explicit by assuming that $\omega_R + \omega_I = c$ where c is a constant. This would make the trade-off even stronger since a change in one of the weights would simultaneously imply an opposing change in the other weight. The effect of a change in one weight would hence be reinforced by the effect of the subsequent change in the other weight.

donate is affected by the nature of the policy and by economic conditions. Finally, we analyze the impact of endogenous beliefs on POs' slanting strategies, both when beliefs are influenced by policy communication and by mass media.

4. Equilibrium with Heterogeneous Donors

In the previous section we assumed that all donors hold the same beliefs. In reality donors may vary in their beliefs and may disagree on the interpretation of a situation or on how a PO should handle it. Such heterogeneity could come from ideological differences or from being based on different information sources.

To formally model this heterogeneity, we assume that donors' beliefs are uniformly distributed between b_A and b_B where $b_A < b_B$. \bar{b} denotes the average of b_A and b_B . The number of donors is normalized to one. In line with Mullainathan and Shleifer (2005), we make the following two simplifying assumptions. First, we only consider linear slanting strategies of the form $s_j = \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} z_j$, where z_j is the point around which PO j slants. This linear strategy is based on a PO's optimal slanting strategy when donor beliefs are homogenous (see Equation (3)).¹¹ Second, we assume that $\bar{b} = 0$, i.e. that the beliefs of the average donor are unbiased. Since b_i is uniformly distributed and $\bar{b} = 0$, this implies that $b_A = -b_B$.

Proposition 2 summarizes the optimal donation $D_{j,het}^*$ and POs' slanting behavior $s_{j,het}^*$ when donors have heterogeneous beliefs.

¹¹ As Mullainathan & Shleifer (2005) prove, this linear strategy is always optimal for a monopolist PO when donor beliefs are heterogeneous.

Proposition 2: *If POs face a donor landscape with heterogeneous beliefs and choose linear strategies of the form $s_j = \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} z_j$, and $\bar{b} = 0$, there exists a constant*

$$C = \left[\frac{2}{3} \omega_R(\mu + \phi) + 2\omega_I \right] \sqrt{\frac{u^w}{\omega_R \phi^2 \left[\frac{11}{3} \omega_R(\mu + \phi) + 8\omega_I \right]}}$$

such that if $b_B < C$, POs choose¹²:

$$s_{A,het}^* = \frac{\omega_R \phi}{\frac{2}{3} \omega_R(\mu + \phi) + 2\omega_I} b_A, \quad (4)$$

$$s_{B,het}^* = \frac{\omega_R \phi}{\frac{2}{3} \omega_R(\mu + \phi) + 2\omega_I} b_B, \quad (5)$$

$$D_{j,het}^* = \frac{2\omega_R \phi^2}{\frac{1}{3} \omega_R(\mu + \phi) + \omega_I} b_B^2. \quad (6)$$

Proposition 2 implies both POs slant their reports but no longer in the same direction as with homogeneous donors. PO *A* reports the situation to be more negative than it is in reality whereas PO *B* reports the situation to be more positive. Importantly, unlike in the case of homogenous donors, even when donors' beliefs are unbiased on average ($\bar{b} = 0$), both POs always slant their reports when donors' beliefs are heterogeneously distributed: $s_{A,het}^* < 0 = t < s_{B,het}^*$; and with $b_A = -b_B$: $s_{A,het}^* = -s_{B,het}^*$.

The size of the slanting depends on the same factors as discussed in the previous section. When choosing how to slant, POs maximally differentiate themselves to increase donations.

¹² Without loss of generality, we assume that PO *A* introduces a negative slant and PO *B* a positive slant.

Proposition 2 implies that POs position the content of their reports as far away from each other as the donors' sensitivity to slanting and the POs' policy impact objective permit, in order to attract as many donations as possible. An important implication is that when donors' sensitivity to slanting is sufficiently low, POs may slant their policy communications such that their reports are even more extreme than the most extreme beliefs of donors in the population. From equations (4) and (5), it follows that for $\mu < \phi/2 - 3\omega_I/\omega_R$, $s_{A,het}^* < b_A$ and $s_{B,het}^* > b_B$. As b_A (b_B) is the most pessimistic (optimistic) belief in the donor population, PO A's (PO B's) report $s_{A,het}^*$ ($s_{B,het}^*$) is more negative (positive) than the most pessimistic (optimistic) belief. Extreme slanting is more likely when donors' slanting sensitivity is sufficiently low, ω_R sufficiently high and ω_I sufficiently low.

5. Problem Severity

So far we have assumed that donors' direct utility of donating, the 'warm glow' u^w , is independent from the severity of the problems on which POs report and solicit donations for. This implicitly assumes that donors draw the same 'warm glow' from, for example, helping the victims of a local flood that made a few rich people having to leave their house for a few days and an earthquake that killed thousands of people and made millions of poor homeless. As this example illustrates, it is not unconceivable that donors draw more utility if their donations have larger welfare impacts. We therefore extend our model with homogenous donor beliefs to account for 'problem severity' in the donors' 'warm glow' utility of donating.

POs' inform donors about the severity of the problems for which they solicit donations through their reports' contents $n_j = d + s_j$. Formally, we assume that the warm glow component in the donors' utility function equals $u^w(n_j) = u_0^w - \alpha n_j$, where α is a scalar

which measures the donors' warm glow from supporting a PO that addresses more severe problems. For example, if PO j reports that it deals with a more negative situation ($n_j < 0$ and larger in absolute value), utility from donating to this PO is higher.¹³ The POs' optimal slanting behavior when donors care about 'problem severity' and their beliefs are homogenous, $s_{j,\alpha}^*$, is summarized in Proposition 3. To focus specifically on the impact of the extensions in the next sections, we consider homogenous donors.

Proposition 3: *If donors care about contributing to solving more severe problems, the equilibrium slanting strategy of PO j , with $j = A, B$, is:*

$$s_{j,\alpha}^* = \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} \left[\phi b - \frac{\alpha}{2} \right], \quad (7)$$

and POs depict situations as being more negative: $s_{j,\alpha}^ < s_{j,hom}^*$*

Comparing the optimal slanting strategies in Proposition 1 and Proposition 3 indicates that, when donors derive more utility from contributing to more severe situations, POs tend to make the content of their policy communications more negative (or less positive). Even if homogenous donors' beliefs are unbiased or slightly positive ($0 \leq b < \alpha/2\phi$), POs report the situation as negative ($n_{j,\alpha}^* = s_{j,\alpha}^* < 0$). This effect is stronger if the marginal impact of problem severity on donor utility is larger ($\frac{\partial s_{j,\alpha}^*}{\partial \alpha} < 0$).

6. Endogenous Beliefs

So far, we have assumed that donors' beliefs are exogenously determined. However, it is more realistic to consider that donors' beliefs are not static. People may change their opinion

¹³ For simplicity, we have assumed a linear impact of problem severity on utility, but any function that is increasing in $-n_j$ would have the same effect.

on a certain issue, for example, because they receive additional information that is not in line with their beliefs. Such new information may come from the POs' communication themselves, or from other sources, such as the mass media. We first consider the impact of POs' communication and then of mass media on beliefs.

6.1 Beliefs Influenced by Policy Communication

The POs' communication may influence donors' beliefs if the report differs from the donors' beliefs. Such changes in donors' beliefs will, in turn, induce changes in the equilibrium slanting. In this section we therefore analyze the dynamic effects of slanting when donors' beliefs are endogenous, i.e. when donors update their previous periods' beliefs with the content of the POs' policy communications. We extend the model of the previous section, i.e. we assume a donor population with homogenous beliefs where donors draw utility from donating to more severe problems.

Consider a simple updating rule where donors' beliefs of the current period are the average of their previous period's beliefs and the PO's report's content. Formally, we assume $b_{\tau+1} = \frac{b_{\tau} + n_{j,\tau}}{2}$, with $\tau = 0, 1, 2, \dots$ indicating the time period, b_0 the exogenous initial belief, and b_{τ} the donors' belief in period τ . Suppose the actual situation does not change over time ($t_{\tau} = 0 \forall \tau = 0, 1, 2, \dots$). The long run equilibrium belief and slanting can then be derived.

Proposition 4: *When donors prefer contributing to more severe problems and update their beliefs based on POs' reports, $b_{\tau+1} = \frac{b_{\tau} + n_{j,\tau}}{2}$, in the long run donor beliefs and slanting converge to a biased equilibrium:*

$$\lim_{\tau \rightarrow \infty} b_{\tau} = \lim_{\tau \rightarrow \infty} s_{j,\tau}^* = \frac{-\alpha/2}{\mu + \omega_I/\omega_R} < 0. \quad (8)$$

Equation (8) implies that beliefs converge to a finite and negative value after a sufficiently long time period, given that all other factors remain constant. Because POs slant their reports in a negative direction to attract more support from donors that prefer contributing to more severe problems, donors' beliefs converge to some negative value. In the long run, the equilibrium slanting by POs converges to the same value as the long run beliefs, i.e. $\lim_{\tau \rightarrow \infty} s_{j,\tau}^* = \lim_{\tau \rightarrow \infty} b_{\tau}$.

A very important implication of Proposition 4 is that the initial exogenous beliefs b_0 do not matter in the long run. The impact of b_0 decreases over time and eventually disappears. This also implies that even if initial beliefs are correct ($b_0 = 0$), beliefs become biased over time and converge to some negative value, due to the fact that unbiased beliefs are updated with slanted reports.

The result in Proposition 4 depends on the assumption that donors prefer to contribute to more serious problems. Because POs are aware of this preference, they depict situations as more problematic than they are to draw in more donations, which in turn alters the beliefs of donors. From Equation (8) it follows that if donors do not value giving to more severe situations ($\alpha = 0$), beliefs converge to the actual situation ($b_{\tau} = t = 0$) and slanting disappears as well.

6.2 Beliefs Influenced by Mass Media

We now analyze how slanting by POs is influenced when donors update their beliefs with information provided by other sources. We focus on mass media.¹⁴

Media attention is typically concentrated around ‘events’ or ‘shocks’ (Swinnen and Francken, 2006).¹⁵ Mass media’s impact on donors’ beliefs is determined by its broad audience and the relative speed of mass media coverage. Typically mass media can bring news reports much faster than a report from a PO that may require substantially more time for a thorough analysis of the situation and corresponding policy communications.

To analyze this, define m as the content of the mass media’s reports. Given the fact that mass media are faster at covering sudden events, we assume that mass media reports have a strong influence on shaping donors’ initial beliefs. To simplify the analysis, we further assume (a) that donors have no prior beliefs on the issue before the media reports, (b) that they discount media reporting, expecting a certain exaggeration, and (c) that media only influence initial beliefs. In this case, $b_0 = \gamma_0 m$ where $\gamma_0 > 0$ is a ‘discount factor’, and $\gamma_\tau = 0$ for $\tau > 0$. For $\tau > 0$, donors update their beliefs with the POs’ reports’ content according to $b_{\tau+1} = \frac{b_\tau + n_{j,\tau}}{2}$ as in the previous section. Proposition 5 summarizes the POs optimal slanting behaviour in the short run ($\tau = 0$) and in the long run.

¹⁴ In general, there are two important, but distinct, mechanisms at work in the interaction between POs and the mass media. The first mechanism is the desire of POs to appear in the mass media in order to raise funds and strengthen their legitimacy. The second mechanism is the impact of stories that appear in the mass media on the policy communications of POs through their impact on donors’ beliefs. Mass media may play an important role in shaping donors’ beliefs about situations in the world. In this paper we focus only on the second mechanism. A rapidly growing literature documents other effects of mass media on development such as its effect on political accountability (e.g. Besley and Burgess, 2001; Djankov et al., 2003) and its impact on reducing corruption in public policy (Francken et al., 2008; Reinikka and Svensson, 2005).

¹⁵ For example, Swinnen and Francken (2006) find that virtually all the attention to globalization, trade and development issues in mass media is concentrated around ‘international summits’.

Proposition 5: *If donors care about contributing to solving more severe problems, if mass media reports shape donors' initial beliefs ($b_0 = \gamma_0 m$), and if donors update their beliefs based on POs' reports ($b_{\tau+1} = \frac{b_{\tau+n_{j,\tau}}}{2}$), the equilibrium slanting strategy of PO j , with $j = A, B$, at $\tau = 0$ is:*

$$s_{j,\tau=0}^* = \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} [\phi \gamma_0 m - \alpha/2]. \quad (9)$$

In the long run donor beliefs and slanting converge to a biased equilibrium:

$$\lim_{\tau \rightarrow \infty} b_{\tau} = \lim_{n \rightarrow \infty} s_{j,\tau}^* = \frac{-\alpha/2}{\mu + \omega_I/\omega_R} < 0. \quad (10)$$

Equation (9) implies that mass media reports influence the POs' initial policy communications since $\frac{ds_{j,\tau=0}^*}{dm} = \frac{\omega_R \phi \gamma_0}{\omega_R(\mu + \phi) + \omega_I} > 0$. This simple comparative statics result shows that POs slant their reports in the same direction as media attention. As a consequence, the generally recognized tendency of the mass media to focus on the negative aspects of a story ($m < 0$) induces POs to slant their reports negatively, i.e. $s_{j,\tau=0}^* < 0$. However, in the long run the effect of the media reports on slanting disappears (Equation (10)). Thus, in the long run when mass media no longer report on the situation, the mass media's effect on slanting fades out. Hence, negative mass media reports on a situation initially induce POs to slant their reports' contents negatively, but in the long run this impact wanes.¹⁶

¹⁶ This argument is related to the agenda setting effect of the media in international and aid policy, sometimes referred to as the 'CNN factor' (Hawkins, 2002). It refers to the process by which the media influences policy by invoking responses in their audiences through concentrated and emotionally based coverage, which in turn applies pressure to governments to react (potentially through POs). Similarly, the absence of media coverage reduces priority in agenda-setting (Jakobson, 2000). In this logic, public officials react to media news because they see it as a reflection of public opinion (Kim, 2005). Some have questioned the importance of these effects (Natsios, 1996) and argue that the media is more likely to follow politics than lead it (Strobel, 1996). A more nuanced argument is forwarded by Robinson (2001) who explains that the media can be a powerful source in leading policy makers but primarily when there is great uncertainty or limited information. This is consistent with our argument that media is more likely to influence initial beliefs. Several studies have analyzed the impact of media coverage of poverty, humanitarian crises, and natural disasters on humanitarian and foreign aid flows. Van Belle, Rioux and Potter (2004) and Kim (2005) find that a higher level of media attention to developing

6.3 Media and POs: Discussion

This causal relationship of mass media affecting donors' beliefs and consequently influencing POs' policy communications depends on the nature of the problem/policy. For longer term or structural problems, mass media may not play a role in affecting initial conditions. On such issues, it may rather be that the mass media report on an issue because of a PO's report. In this case, the donors' initial beliefs would not be affected by the mass media, and neither would the POs' initial policy communications. If beliefs in future periods are then updated with the PO's report's content through the media who report on it, the effect would be as summarized in Proposition 4. Formally, for structural problems, $m_\tau = n_{j,\tau}$ and hence the beliefs updating rule $b_{\tau+1} = \frac{b_\tau + m_\tau}{2}$ is the same as in the previous section and the results of Proposition 4 apply.

7. Conclusion

NGOs and intergovernmental organizations are accused of providing biased and incorrect policy analyses in pursuit of their private interest. To analyze this issue formally, we have modeled competition by 'policy organizations' for donors funding. To receive more funding, policy organizations may introduce 'bias' into their policy communications by slanting the content of their reports. Bias in policy communications may draw in larger revenues through fundraising, but it may have negative effects as policy advice is also biased.

Our analysis shows that policy organizations do not slant their reports only under very restrictive, and unrealistic, conditions. Only when (1) donors' beliefs are homogenous; (2) donors' beliefs are unbiased; and (3) donors' utility is not affected by the severity of the problem, policy organizations do not slant their reports. However, in all other cases POs will

countries problems leads to more aid in several developed countries. Eisensee and Strömberg (2007) argue that disaster relief decisions and aid allocations are driven by media coverage of disasters but that other newsworthy events may crowd out this news coverage.

slant their communications.

First, if donors' beliefs are biased, policy organizations slant their policy communication in the direction of the donors' beliefs. The level of the optimal slanting is affected by several factors, such as the relative importance of respectively fundraising and policy impact in the policy organizations' objective function, and the donors' sensitivity to slanting and to reading reports that are inconsistent with their beliefs.

Second, with heterogeneity in donors' beliefs, policy organizations differentiate themselves in the policy communication market. They slant their reports in different directions to increase donations from a subgroup of the population. When donors' slanting sensitivity is sufficiently low, the policy organizations' reports are even more extreme than the most extreme donors' beliefs in the population.

Third, when accounting for problem severity, i.e. when donors prefer donating to policy organizations that (claim to) address more severe problems, our model showed that policy organizations depict situations as being more negative than they actually are, even when donors' beliefs are unbiased.

Fourth, when donors' beliefs are endogenous this affects slanting. When donors update their beliefs with the policy communications of the organizations, both donors' beliefs and the policy organizations' slanting converge to a biased equilibrium. An important finding is that the initial beliefs do not matter, and that even if these initial beliefs were correct they become biased over time.

Mass media may play an important role in influencing donors' beliefs, in particular initial beliefs. When initial beliefs are influenced by mass media reports, these mass media reports induce POs to slant their reports. In the long run this impact disappears if donors update their beliefs with information from other sources.

Appendix

Proof of Proposition 1

We solve the game by backward induction. We first determine the optimal donation D_j^* and then proceed to find the optimal slanting strategy s_j^* .

Consider the donation-setting stage. Let V_{ij} be a donor i 's utility, gross of the requested donation, from donating to PO j and reading its report ($V_{ij} = U_{ij} + D_j$). Suppose that $V_{ij} \geq V_{ik}$, with $j, k \in \{A, B\}$. The price equilibrium for PO j is to request a donation equal to $D_j = V_{ij} - V_{ik}$ to capture the full market for donations.

In the slanting strategy-setting stage, PO j optimizes its objective function $W_j(n_j)$ by setting its slanting strategy s_j , holding constant the other PO's strategy, i.e.

$$\max_{s_j} W_j(n_j) = \omega_R R_j(n_j) + \omega_I I_j(n_j). \quad (\text{A.1})$$

Because the number of donors is normalized to one, optimizing R_j is equivalent to optimizing D_j . Therefore PO j 's objective function is increasing in the donors' utility from donating to PO j , since $D_j = V_{ij} - V_{ik}$ and V_{ik} (the utility from donating to the other PO) is constant. Consequently it is an optimal strategy for each PO to maximize donor utility. The first order condition from Equation (A.1) is then

$$\omega_R [-2\mu s_j - 2\phi(n_j - b)] - 2\omega_I s_j = 0. \quad (\text{A.2})$$

Since $W_j(n_j)$ is concave in s_j , this first order condition determines a global maximum and the equilibrium slanting strategy of both POs is

$$s_{j,hom}^* = \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} b. \quad (\text{A.3})$$

Proof of Proposition 2

The proof of Proposition 2 resembles the proof of a Hotelling model where firms compete on prices after choosing their location, and transportation costs are quadratic (see also Mullainathan & Shleifer, 2005). We consider only the situation where the POs choose linear slanting strategies. Define

$$s_j = \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} z_j \quad (\text{A.4})$$

to be the strategy of PO j that slants around point z_j .

We proceed with backward induction.

- i. We calculate $x(D_A, D_B; z_A, z_B)$, i.e. the bias of the donor who is indifferent between donating to the two POs if PO j charges D_j and slants around point z_j (chosen in the first stage of the game and taken as given in this stage).
- ii. We then calculate $D_A^R(D_B; z_A, z_B)$ and $D_B^R(D_A; z_A, z_B)$, the best response functions for PO A and B respectively.
- iii. Using these response functions, we calculate the equilibrium donations $D_A^*(z_A, z_B)$ and $D_B^*(z_A, z_B)$ and market share $x^*(z_A, z_B)$ that result from the choice of slant in the first stage.
- iv. We then use these equilibrium donations to show that in the first stage, at $z_B^* = \frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_B$ and $z_A^* = \frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_A = -\frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_B$, the POs are indifferent between lowering and raising z_j , and thus in equilibrium.
- v. Finally, we show that all participation constraints for the donor are satisfied at the equilibrium.

i. The utility that a donor with bias x receives from donating D_j to PO j that slants around z_j is:

$$u^w - \mu s_j^2 - \phi(s_j - x)^2 - D_j. \quad (\text{A.5})$$

Inserting the definition of s_j and rearranging produces

$$u^w - \left[\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right]^2 z_j^2 (\mu + \phi) - \phi x^2 \quad (\text{A.6})$$

$$+ 2\phi^2 z_j x \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} - D_j.$$

If the donor with bias x is indifferent between these two POs, then the utilities from donating to the two POs are equal:

$$u^w - \left[\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right]^2 z_A^2 (\mu + \phi) - \phi x^2 \quad (\text{A.7})$$

$$+ 2\phi^2 z_A x \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} - D_A$$

$$= u^w - \left[\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right]^2 z_B^2 (\mu + \phi) - \phi x^2$$

$$+ 2\phi^2 z_B x \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} - D_B.$$

This can be simplified to

$$x(D_A, D_B; z_A, z_B) = \frac{\omega_R(\mu + \phi) + \omega_I}{2\omega_R\phi^2} \left(\frac{\Delta D}{\Delta Z} \right) + \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z}, \quad (\text{A.8})$$

with $\Delta D = D_B - D_A$, $\Delta Z = z_B - z_A$, $\bar{z} = (z_A + z_B)/2$.

ii. Since the indifferent donor is located at x , the POs' objective functions are given by

$$W_A(D_A, D_B; z_A, z_B) = \omega_R D_A \frac{x - b_A}{b_B - b_A} + \omega_I \left[I - \left(\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 z_A^2 \right], \quad (\text{A.9})$$

$$W_B(D_A, D_B; z_A, z_B) = \omega_R D_B \frac{b_B - x}{b_B - b_A} + \omega_I \left[I - \left(\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 z_B^2 \right]. \quad (\text{A.10})$$

PO j 's best response function can be derived by differentiating its objective function with respect to its own donation D_j . For PO A , this first-order condition is

$$\frac{\delta W_A}{\delta D_A} = \frac{\omega_R}{b_B - b_A} \left[x - b_A + D_A \frac{\delta x}{\delta D_A} \right] = 0. \quad (\text{A.11})$$

Using that $b_B = -b_A$, the best response function of PO A is

$$D_A^R(D_B; z_A, z_B) = \frac{D_B}{2} + \frac{\omega_R \phi^2 \Delta z}{\omega_R(\mu + \phi) + \omega_I} \left[b_B + \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z} \right]. \quad (\text{A.12})$$

Similarly, the best response function of PO B is

$$D_B^R(D_A; z_A, z_B) = \frac{D_A}{2} + \frac{\omega_R \phi^2 \Delta z}{\omega_R(\mu + \phi) + \omega_I} \left[b_B - \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z} \right]. \quad (\text{A.13})$$

iii. The equilibrium donations can be calculated from the best response functions by solving

$$D_A^* = D_A^R(D_B^*(D_A^*, z_A, z_B)), \quad (\text{A.14})$$

$$D_B^* = D_B^R(D_A^*(D_B^*, z_A, z_B)). \quad (\text{A.15})$$

Calculating these equations result in respectively

$$D_A^*(z_A, z_B) = \frac{\omega_R \phi^2 \Delta z}{\omega_R(\mu + \phi) + \omega_I} \left[2b_B + \frac{2}{3} \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z} \right], \quad (\text{A.16})$$

$$D_B^*(z_A, z_B) = \frac{\omega_R \phi^2 \Delta z}{\omega_R(\mu + \phi) + \omega_I} \left[2b_B - \frac{2}{3} \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z} \right]. \quad (\text{A.17})$$

Using these equilibrium donations, the equilibrium market share is

$$x^*(z_A, z_B) = \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \frac{\bar{z}}{3}. \quad (\text{A.18})$$

iv. These equilibrium donations and market share allow to examine the POs' decisions in the first stage. Specifically, taking the other PO's slanting as given, they can be used to calculate each PO's objective function for each chosen slant:

$$W_A(z_A, z_B) = \omega_R D_A^*(z_A, z_B) \frac{(x^*(z_A, z_B) - b_A)}{b_B - b_A} \quad (\text{A.19})$$

$$+ \omega_I \left[I - \left(\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 z_A^2 \right],$$

$$W_B(z_A, z_B) = \omega_R D_B^*(z_A, z_B) \frac{(b_B - x^*(z_A, z_B))}{b_B - b_A} \quad (\text{A.20})$$

$$+ \omega_I \left[I - \left(\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 z_B^2 \right].$$

Differentiation of PO A's objective function with respect to z_A gives

$$\frac{\delta W_A}{\delta z_A} = \frac{\omega_R}{b_B - b_A} \frac{\delta D_A^*}{\delta z_A} \left(b_B + \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \bar{z} \right) \quad (\text{A.21})$$

$$+ \frac{\omega_R}{b_B - b_A} \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \frac{D_A^*}{6}$$

$$- 2\omega_I \left(\frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 z_A.$$

Supposing that we are in a symmetric case where $z_A = -z_B$ so that $\bar{z} = 0$ and $\Delta z = -2z_A$, putting this first derivative equal to zero results in

$$-\frac{(\omega_R \phi)^2}{\omega_R(\mu + \phi) + \omega_I} \left[b_B + z_A \left(\frac{2}{3} \frac{\omega_R(\mu + \phi)}{\omega_R(\mu + \phi) + \omega_I} \right) \right] \quad (\text{A.22})$$

$$+ z_A \left(\frac{2\omega_I}{\omega_R(\mu + \phi) + \omega_I} \right) \Big] = 0.$$

Rewriting shows that in equilibrium of the first stage, $z_A^* = -\frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_B =$

$\frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_A$ and a similar derivation leads to $z_B^* = \frac{\omega_R(\mu+\phi)+\omega_I}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_B$. For these choices of

z_j^* , donations equal $\frac{2\omega_R\phi^2}{\frac{1}{3}\omega_R(\mu+\phi)+\omega_I} b_B^2$. Therefore, the equilibrium slanting of both POs is

$$s_A^* = \frac{\omega_R\phi}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_A, \quad (\text{A.23})$$

$$s_B^* = \frac{\omega_R\phi}{\frac{2}{3}\omega_R(\mu+\phi)+2\omega_I} b_B. \quad (\text{A.24})$$

v. We must verify that in equilibrium the participation constraints of the donors are satisfied. It suffices to show that the donor located at zero receives non-zero utility from donating to either PO, i.e.

$$u^w - (\mu + \phi) \left(\frac{\omega_R\phi}{\omega_R(\mu + \phi) + \omega_I} \right)^2 \frac{9}{4} b_B^2 - 6 \left(\frac{\omega_R\phi^2}{\omega_R(\mu + \phi) + \omega_I} \right) b_B^2 > 0, \quad (\text{A.25})$$

which is equivalent to

$$b_B < \left[\frac{2}{3}\omega_R(\mu + \phi) + 2\omega_I \right] \sqrt{\frac{u^w}{\omega_R\phi^2 \left[\frac{11}{3}\omega_R(\mu + \phi) + 8\omega_I \right]}}, \quad (\text{A.26})$$

which is what was assumed in the statement of the proposition.

Proof of Proposition 3

The extended ‘warm glow’ component, $u^w(n_j) = u_0^w - \alpha n_j$, modifies the donors’ utility function to:

$$U_{ij} = u_0^w - \alpha n_j - \mu s_j^2 - \phi(n_j - b)^2 - D_j. \quad (\text{A.27})$$

The POs' equilibrium slanting strategy is determined through the same backward induction as described in the proof of Proposition 1. Again maximizing donor utility, the first order condition of the PO's maximization problem is

$$\omega_R[-2\mu s_j - 2\phi(n_j - b) - \alpha] - 2\omega_I s_j = 0. \quad (\text{A.28})$$

Collecting terms produces

$$s_{j,\alpha}^* = \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} \left[\phi b - \frac{\alpha}{2} \right]. \quad (\text{A.29})$$

Proof of Proposition 4

From Proposition 3, we know that

$$s_{j,\tau}^* = \frac{\omega_R(\phi b_\tau - \alpha/2)}{\omega_R(\mu + \phi) + \omega_I}. \quad (\text{A.30})$$

To simplify the notation, we define $\theta \equiv \frac{\omega_R \phi}{\omega_R(\mu + \phi) + \omega_I}$ and $\psi \equiv \frac{-\omega_R \alpha/2}{\omega_R(\mu + \phi) + \omega_I}$, hence $s_{j,\tau}^* = \psi + \theta b_\tau$. Inserting this expression in the updating rule, $b_{\tau+1} = \frac{b_\tau + n_{j,\tau}}{2}$, we have that $b_{\tau+1} = \frac{\psi + (1 + \theta)b_\tau}{2}$. After τ periods, donors' beliefs are equal to

$$b_\tau = \left[\frac{1 + \theta}{2} \right]^\tau b_0 + \sum_{k=0}^{\tau-1} \frac{\psi}{2} \left(\frac{1 + \theta}{2} \right)^k. \quad (\text{A.31})$$

Since we are interested in the long run equilibrium beliefs and slanting, we need to verify whether Equation (A.31) converges to a finite number for τ going to infinity, and if so, to which value. A necessary condition for convergence is that $\left| \frac{1 + \theta}{2} \right| < 1$, such that the first term of the right hand side of Equation (A.31) converges to 0. Using the definition of θ , we find that

$$0 < \frac{1 + \theta}{2} = 1 - \frac{1}{2} \frac{\omega_R \mu + \omega_I}{\omega_R(\mu + \phi) + \omega_I} < 1. \quad (\text{A.32})$$

Hence $\lim_{\tau \rightarrow \infty} \left[\frac{1+\theta}{2} \right]^\tau b_0 = 0$. Taking the limit of the second term on the right hand side of Equation (A.31) for τ going to infinity, given that $\left| \frac{1+\theta}{2} \right| < 1$, we find that

$$\lim_{\tau \rightarrow \infty} \sum_{k=0}^{\tau-1} \frac{\psi}{2} \left(\frac{1+\theta}{2} \right)^k = \frac{\psi}{1-\theta}. \quad (\text{A.33})$$

Using the definitions of ψ and θ , the long run donors' beliefs thus converge to a negative value:

$$\lim_{\tau \rightarrow \infty} b_\tau = \frac{-\alpha/2}{\mu + \omega_I/\omega_R} < 0. \quad (\text{A.34})$$

Inserting the expression for $\lim_{\tau \rightarrow \infty} b_\tau$ from (A.34) into Equation (A.30), we find that

$$\lim_{\tau \rightarrow \infty} s_{j,\tau} = \frac{-\alpha/2}{\mu + \omega_I/\omega_R} < 0, \quad (\text{A.35})$$

and hence

$$\lim_{\tau \rightarrow \infty} b_\tau = \lim_{\tau \rightarrow \infty} s_{j,\tau}. \quad (\text{A.36})$$

Proof of Proposition 5

From Proposition 3 we know that

$$s_{j,\tau}^* = \frac{\omega_R(\phi b_\tau - \alpha/2)}{\omega_R(\mu + \phi) + \omega_I}. \quad (\text{A.37})$$

Thus, at $\tau = 0$, the equilibrium slanting strategy of both POs $j = A, B$ is

$$s_{j,\tau=0}^* = \frac{\omega_R}{\omega_R(\mu + \phi) + \omega_I} [\phi \gamma_0 m - \alpha/2], \quad (\text{A.38})$$

Since $b_0 = \gamma_0 m$.

In the long run, donors update their beliefs according to the updating rule $b_{\tau+1} = \frac{b_\tau + n_{j,\tau}}{2}$.

Since Proposition 4 demonstrated that in this case the initial beliefs do not matter in the long run, and hence the media reports do not matter in the long run, the same result as in

Proposition 4 holds for $\tau \rightarrow \infty$. Donors' beliefs and slanting converge to the biased equilibrium:

$$\lim_{\tau \rightarrow \infty} b_\tau = \lim_{\tau \rightarrow \infty} s_{j,\tau}^* = \frac{-\alpha/2}{\mu + \omega_I/\omega_R} < 0. \quad (\text{A.39})$$

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