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The Agency of Politics and Science

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The Agency of Politics and Science

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Abstract

Motivated by the recent concerns of the scientists participating in the elaboration of the Intergovernmental Panel on Climate Change assessment reports, we study a principal-agent relationship between a politician and a researcher that captures some stylized facts regarding the involvement of politics into scientific research. The politician contracts with a researcher in order to get some scientific advice about a policy relevant variable. The politician trades off the policy that he would implement in the absence of any reelection concerns with a desire to please voters by choosing a policy that is supported by scientific advice and that turns out to be the "right" policy ex post. As a consequence, the politician bribes the researcher to bias his scientific advice towards the ideal policy of the politician. We study the optimal contracts under symmetric and under asymmetric information about the researcher's ability and concern for reputation, as well as the selection of a researcher by the politician. Thereby we identify several conflicts between the interests of the voters and those of the politician.

JEL classification: D72, D82, D83

Keywords: incentive contracts, politics, science, reputation

1 Introduction

Scientists participating in the elaboration of the Intergovernmental Panel on Climate Change (IPCC) assessment reports have recently voiced about the involvement of politics into the drafting of the scientific results. In a column of *The Daily Caller* from May 29, 2014, Richard Tol, a climate economist, initially a lead author for the IPCC Fifth Assessment Report Working Group II, claims that it is "rare that a government agency with a purely scientific agenda takes the lead on IPCC matters" and that "as a result, certain researchers are promoted at the expense of more qualified colleagues"(The Daily Caller 2014). Similarly, Robert Stavins, a leading author in the IPCC Fifth Assessment Report Working Group III, expressed his frustration and disappointment regarding the intervention of the governments representatives in making recommendations and changes in the text of the Summary for Policymakers (SMP) "on purely political, as opposed to scientific bases"(Stavins 2014). Stavins points to the fact that the process followed by the IPCC in the approval of the SPM built political credibility by sacrificing scientific integrity.

Under such circumstances, in which the political representatives interfere with the scientific integrity of a research report, a natural question arises: "Why do, then, governments commission research at all?" One answer to this question comes from The LSE GV314 Group (2014) who suggests that politicians select research topics that have the potential to provide endorsement for their policy choice and make them "look good" and, at the same time, select researchers that are more likely to deliver the desired results. The group surveyed 205 academics that conducted governmental-commissioned research and finds that political pressure occurs at all stages of the research process, from the commissioning to the drafting of the results. The authors conclude that, nonetheless, there are persistent disincentives for researchers to compromise their scientific integrity for the sake of governmental contracts, at least for the case of the British researchers comprised in their study. Likewise, Avery (2010), discussing the manipulation of science by political interests in the health care and climate policy domains, maintains that science is used to justify political choices and preferences. Any evidence that contradicts those is suppressed or even banned by legal means. For example, he reports on a case of information leakage[1] from the government-funded Climate Research Unit of the University of East Anglia which reveals data suppression and results manipulation by the researchers, as well as their efforts to prevent the publication of contradicting evidence. Moreover, the author informs about a United States Senate-approved bill which would allow federal agencies to withhold research funding from a researcher which publishes findings that are not "within the bounds of and entirely consistent with the evidence". Avery (2010) argues that the wording of the bill creates incentives for self-censorship on the side of the research institutions.

[1]The leakage was due to hackers who downloaded the e-mails of the unit.

However, depending on the amount of concern for academic reputation, one would expect that some research professionals resist the political pressure, while others comply with the conditions of a government contract that require to deliver favorable results. By the same token, some politicians may be more interested in political ammunition while others are more concerned with quality research.

Motivated by the above-mentioned anecdotal evidence, we build a model of delegation of research which is able to reproduce the stylized facts from this evidence. The model describes the principal-agent relationship between a researcher (the agent) and a politician (the principal) who uses the researcher's remuneration to induce her to bias the scientific report towards the politician's ideology. In the model, the politician (he) offers a contract to a researcher (she) to get information about the state of the world which corresponds to the optimal policy from the point of view of the voters. At the time of contracting the state of the world is unknown to both the politician and the researcher, as well as to the voters. The contract consists of a one-time transfer, which is paid after the researcher delivers the results of the research, but before the state of the world is realized. Thus, the transfer can contingent on the report of the researcher but not on the state of the world. After the research report is made public, the politician implements a policy. Finally, the state of the world is revealed and the payoffs are realized.

When choosing a policy the politician faces a conflict between three objectives: Firstly, he would like the policy to be in line with his ideal policy that we assume to be independent of the true state of the world. For example, the politician may be intrinsically in favor of climate change policy actions or, on the contrary, could be of the opinion that climate change need not be addressed. Secondly, the politician is interested in pleasing the voters by adopting a policy which is in line with the true state of the world (e.g. a policy that mitigates climate change whenever necessary). Thirdly, we assume that the politician can be punished by the voters for implementing a policy that deviates from the scientific advice. The researcher, on the other hand, derives utility from the research grant paid by the politician, and is interested in preserving her academic reputation. Researchers may differ with respect to their concern for reputation as well as with respect to their ability. We consider both symmetric and asymmetric information concerning the researcher's type at the time of contracting.

We make the assumption that the true signal received by the researcher, i.e. the result of the research, is only observed by the researcher and the politician, but not by the voters. In effect, this assumption amounts to the politician being able to costlessly verify the researcher or that the cost of lying for the researcher is prohibitively large.

The main results are the following. Under the first best contract the politician can induce the researcher to release a biased report which is a weighted average of the politician's ideal policy and the voters' most preferred policy which we call the "optimal" policy. As it turns out, if the researchers do not differ with respect to their ability, then under symmetric information the politician contracts with the researcher who cares the least about her reputation. Conversely, if the researchers have the same concern for reputation, but differ in their ability, then the politician hires the researcher with the highest ability. While the interests of the politicians and the voters are aligned regarding the researcher's ability, the voters prefer the researcher with the highest concern for reputation. Finally, we show that if the concern for reputation is a concave and increasing function of researcher's ability, then the politician will contract with either the lowest or the highest ability researcher. Moreover, the more biased the politician's ideal policy is from an ex ante point of view, the more likely it is that the politician contracts with the lowest ability researcher.

Under asymmetric information with respect to the researcher's concern for reputation, the politician can still implement the first best contract for the researcher with a low reputational concern. However, the report of the researcher with a high reputational concern is distorted relative to the first best one which results in a policy that is closer to the voters' most preferred policy. Hence, voters prefer the politician to be uniformed about the researcher's concern for reputation. By contrast, asymmetry with respect to the researcher's ability does not create any distortion and the politician can find transfers to implement the first best contracts.

Our paper relates to the literature on the economics of expert advice with reputational concern (Morris 2001, Ottaviani & Sorensen 2006, Inderst & Ottaviani 2012) and strategic transmission of information (Szalay 2009). For example, Morris (2001) builds a repeated cheap-talk model of information transmission from an adviser to a decision-maker, who believes that the two parties have identical preferences only with some probability, i.e. the decision-maker has imperfect knowledge about the adviser's preference for one policy or another. Because the adviser has concerns about his reputation with the decision-maker and does not want to appear biased, this creates an incentive for her to lie, resulting in the decrease of social welfare. This is in contrast with our model in which the reputational concern disciplines the researcher to provide less biased result which has a positive effect on social welfare. The reason for this is that we model reputation with an outside player, for instance the academic community, rather than with the decision-maker. We also differ from Morris (2001) in that the decision-maker can observe the signal received by the adviser. Hence, while our focus is on the mechanism through which the decision-maker incentivizes the adviser to support his preferred policy through her message, in Morris (2001) the decision-maker is a benevolent one who is interested in obtaining reliable information from the adviser.

Similarly to Ottaviani & Sorensen (2006) our expert (the researcher) is concerned with his reputation. However, in our model the reputation is computed based on the distance between the published research report and the realized state of the world instead of being based on the inference made by the evaluator about the actual signal received by the expert. In fact, a fundamental difference relative to Ottaviani & Sorensen (2006) is that in our model the information transmission is compensated via a transfer from the politician which is contingent on the report, i.e. the communication is not cheap. Therefore, while the expert in Ottaviani & Sorensen (2006) biases her report towards the prior belief about the state of the world in order to maximize her expected payoff, in our model the expert reports above the signal if the politician's preferred policy is above the signal and vice versa.

The context studied in Inderst & Ottaviani (2012) also bears some analogy with our model. In their model, the adviser (the researcher in our model) is an intermediary between a supplier and a customer. As in our model, the supplier offers a commission (kickbacks) to the intermediary for giving a biased advice to the customer. The advice issued by the expert to the customer resembles the public message of the researcher in our model. The policy variable in their model is the product price set by the supplier, which takes into account the advise of the expert. Moreover, the incentives of the expert are similar to those of the researcher in our model: On the one hand, she is interested in the transfer received from the supplier and, on the other hand, she cares for her reputation with the customers. However, Inderst & Ottaviani (2012) introduce competition between suppliers which increases efficiency irrespective of the adviser's concern for reputation. In effect, the focus of this paper is on the welfare effects of the competition between the suppliers and the disclosure of the commissions to the customers. We depart from this by considering asymmetric information with respect to the adviser's concern for reputation and, thus, taking a mechanism design approach.

Szalay (2009) studies information acquisition and reporting in a principal-agent framework. The difference to our model is that when the principal commits to the menu of contracts, no party is informed about the agent's type. However, at the time of signing the contract the agent receives a noisy and private signal about her type. The quality of this signal depends on the agent's choice of costly effort, neither of which is observed by the principal. By contrast, in our model the quality of the signal received by the agent depends on her exogenously given ability. The focus in Szalay (2009) in on the incentive for information acquisition, which, as it turns out, always has a positive value to the agent, as the principal makes the payment contingent on the reported signal by the agent and on the effort level.

From a different angle, our paper also relates to Prendergast (1993) and Ewerhart & Schmitz (2000) who study the phenomenon of "yes men" behavior. The most important common element with our model is the incentive of the agent to conform with the principal. In our model the incentive for conformity is due to a monetary transfer from the principal to the agent, i.e. the principal pays the agent to conform. By contrast, in Prendergast (1993) and Ewerhart & Schmitz (2000) this incentive arises due to the subjective evaluation by the principal, in the absence of an objective one (e.g. by observing the true state of the world). In fact, in the "yes men" papers the principal prefers that the agent does not conform, i.e. that she has integrity. However, unlike in our model in which the agent has perfect knowledge about the parameter with which she wants to conform, in Prendergast (1993) and Ewerhart & Schmitz (2000) this is unknown to the agent. Moreover, the information acquisition in the "yes men" papers is costly to the agent. While Prendergast (1993) shows that no contract can be designed such that the agent both employs effort to acquire information and reveals his true signal about the state of the world, Ewerhart & Schmitz (2000) show that such contracts actually exist. Such integrity contracts consist of two parts: in the first part the agent reports her private signal and in the second part she reports her best estimate about the signal received by the principal (the conformity part). The agent's payment is then based only on the second part of the report.

The outline of our paper is the following. In Section 2 we present our model. In Section 3 we derive the contracts under symmetric information, i.e. when the politician knows the researcher's ability and concern for reputation. The case of asymmetric information concerning the researcher's type is treated in Section 4. Finally, Section 5 concludes. All proofs are in the Appendix.

2 Model

We consider an adverse selection model in which a politician (the principal) contracts with a researcher (the agent) in order to acquire information about the state of the world before implementing a policy. After the contract is signed, the researcher conducts research which produces a signal about the state of the world. In the next stage, the researcher releases a report on the results of his research (the message) which is observed both by the public (the voters) and the politician. However, we assume that the true result of the research (the signal) is observed only by the researcher and by the politician. This models a situation where the politician acquires an exclusive right to access and use the scientific data collected by the researcher on behalf of the politician so that he can verify the researcher's signal. For simplicity we assume that the verification cost is zero.

After observing the researcher's message and before the revelation of the true state of the world, the politician chooses a policy. Finally, after the state of the world is revealed, the payoffs are realized.

To fix ideas, let us introduce some notation. The politician is interested in a prediction about the state of the world $\theta \in \{\theta^L, \theta^H\}$, where L and H stand for low and high, respectively and $\theta^L < \theta^H$. Both the politician and the researcher have the same prior $P(\theta^L)$ that the state is low. Let $P(\theta^L) = p$, where $0 < p < 1$. For further reference let $\bar{\theta} = (1-p)\theta^H + p\theta^L$ denote the prior expectation about the state of the world.

The result of the research is a signal $s \in \{s^L, s^H\}$. The precision of the signal depends on the ability of the researcher, $e \in [0,1]$ in the following way: For $i = L, H$,

$$P(s^i|\theta^i) = q(e), \tag{1}$$

where $q_e > 0$, $q(0) = \frac{1}{2}$ and $q(1) \leq 1$. Hence, if the researcher's ability is zero, the signal is uninformative and the higher the ability of the researcher, the higher the precision of the signal.

Both the politician and the researcher have an expected utility function. The politician's utility U^P depends on his ideal policy (ideology) $\gamma \in \mathbb{R}$, the chosen policy $y \in \mathbb{R}$, the researcher's message $m \in \mathbb{R}$, the transfer $T \in \mathbb{R}$ he pays to the researcher and the true state of the world. More precisely, we assume that

$$U^P(y, m, T|\theta) = -\alpha_\gamma(\gamma - y)^2 - \alpha_m(m - y)^2 - \alpha_\theta(\theta - y)^2 - T, \tag{2}$$

where $\alpha_\gamma \geq 0$, $\alpha_m \geq 0$, and $\alpha_\theta \geq 0$ are the weights the politician assigns to the policy being close to his ideology, the policy being consistent with the public message and the policy being close to the true state of the world, respectively. Hence, the objective of the politician is to implement a policy which is close to his ideal policy γ, but at the same time pleases the voters who would like the policy to be equal to the true state of the world. The latter criterion would increase the politician's re-election probability, although we do not explicitly model an electoral stage in this paper. Moreover, the politician would like the researcher's public message to support his policy choice because he is punished by the voters if the chosen policy does not conform with the research findings, i.e. the public message of the researcher.[2]

The researcher, on the other hand, is interested in sending a public report (the message) which does not undermine her reputation while she is not interested in the chosen policy. The utility U^R of the researcher is given by

$$U^R(m, T|\theta) = T - \beta(\theta - m)^2, \tag{3}$$

[2]Observe that voters in fact have an incentive to punish the politician if the policy is not in line with the scientific advice even if voters are ultimately only interested in the distance of the policy to the true state of the world and even if voters know that the scientific advice may be biased. Punishing the politician for deviating from the scientific advice allows the voters to discipline the politician so that he chooses a policy that is closer to the voters' optimal policy than without this form of punishment.

where $\beta \geq 0$ is the weight she assigns to her reputation. The researcher's reputation is measured as the distance between the true state of the world and the forecast she provides in the public report.

The order of moves is the following. First, the politician offers a contract to the researcher which is given by $\left(m^i, T^i\right)_{i=H,L}$, where m^i is the message demanded from the researcher and T^i is the transfer paid to the researcher if the signal is $s^i, i = L, H$. The researcher then decides whether to accept or reject the contract in which case she receives some reservation utility U_0. If the researcher accepts the contract she produces a signal about the state of the world. Upon receiving the signal, the researcher sends her message and the politician rationally updates her beliefs about the state of the world. Finally, the politician chooses the policy y_i, $i = L, H$.

3 The first best

As a benchmark we first study the case where the politician knows the researcher's type, i.e. her ability e and her concern for reputation β. Let p^H be the probability that the researcher receives signal s^H, i.e.

$$p^H = P(s^H|e) = P(s^H|\theta^H)P(\theta^H) + P(s^H|\theta^L)P(\theta^L) = p + (1-2p)q(e) \quad (4)$$

By σ^H (σ^L) we denote the updated probability of the high state of the world after receiving a high (low) signal, i.e.

$$\sigma^H = P(\theta^H|s^H) = \frac{P(s^H|\theta^H)P(\theta^H)}{P(s^H|\theta^H)P(\theta^H) + P(s^H|\theta^L)P(\theta^L)} = \frac{(1-p)q(e)}{p + (1-2p)q(e)} \quad (5)$$

and

$$\sigma^L = P(\theta^H|s^L) = \frac{P(s^L|\theta^H)P(\theta^H)}{P(s^L|\theta^H)P(\theta^H) + P(s^L|\theta^L)P(\theta^L)} = \frac{(1-p)(1-q(e))}{1-p-(1-2p)q(e)} \quad (6)$$

Finally, let us denote by $\bar{\theta}^i = \sigma^i\theta^H + (1-\sigma^i)\theta^L$ the posterior expected state of the world given signal $s^i, i = H, L$.

In the first best contract the politician observes the researcher's characteristics, i.e. her ability e and her reputation type β. Thus, the politician can condition the transfer on the public message sent by the researcher. Let m^i, y^i, and T^i be the message, the policy and the transfer if the signal is

$s^i, i = H, L$. Then P solves the following optimization problem

$$\max_{(m^i, y^i, T^i)_{i=H,L}} \mathbb{E}[U^P] \tag{7}$$

under the researcher's participation constraint

$$\mathbb{E}[U^R] \geq U_0. \tag{8}$$

It is straightforward to see that the researcher's participation constraint (8) is binding in the optimal contract which is derived in Appendix A.1. In the optimal contract the messages and policies are

$$m^i = \frac{[\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m \alpha_\theta]\bar{\theta}^i + \alpha_m \alpha_\gamma \gamma}{\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m \alpha_\theta + \alpha_m \alpha_\gamma}, i = L, H \tag{9}$$

and

$$y^i = \frac{\alpha_\theta \bar{\theta}^i + \alpha_m m^i + \alpha_\gamma \gamma}{\alpha_\theta + \alpha_m + \alpha_\gamma}, i = L, H, \tag{10}$$

and the transfers T^H and T^L are such that the researcher's participation constraint is binding. Observe that only expected transfers are determined in the optimal contract.

Hence, the politician induces the researcher to send a biased public report which is a weighted average of the ex-post expectation about the state of the world, $\bar{\theta}^i$ and the politician's ideal policy, γ. In fact, the researcher sends a message larger than $\bar{\theta}^i$ if the politician's ideal policy is larger than the posterior about the state of the world and sends a message lower than $\bar{\theta}^i$ in the opposite case. Similarly, the policy choice is a weighted average of the ex-post expected state of the world, the public report and the politician's ideal policy, with the weights exactly matching the corresponding weights in the politician's utility function. Substituting (9) into (10) yields

$$y^i = \lambda \bar{\theta}^i + (1 - \lambda)\gamma, i = L, H, \tag{11}$$

where

$$\lambda = \frac{\beta(\alpha_\theta + \alpha_m) + \alpha_m \alpha_\theta}{\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m(\alpha_\theta + \alpha_\gamma)}. \tag{12}$$

Let us now do some comparative statics with respect to the parameters of our model. From (9), (11) and (12) it is easy to verify that the distance of both the message and the policy, to the optimal policy $\bar{\theta}^i$ is decreasing in the researcher's concern for reputation. We state this result in the following proposition.

Proposition 1 *The higher the researcher's concern for reputation β, the closer is the optimal policy to the expected state of the world.*

The intuition for this result is simple: The more the researcher cares for her reputation (the higher β), the higher the weight on the expected state in her report and, consequently in the policy induced by this report. If the researcher completely disregards her reputation ($\beta = 0$), then the report coincides with the policy and they are both equal to the weighted average of the ex-post expected state of the world and the politician's preferred policy, with the corresponding weights from the politician's utility function. Conversely, if the researcher is very concerned with her reputation ($\beta \to \infty$), then she publishes an unbiased report, i.e. $m_i = \bar{\theta}^i$, while the politician still chooses a policy which is a weighted average of the ex-post state of the world and his ideal policy.

Proposition 1 implies that voters, who are interested in the adoption of the optimal policy, would prefer a researcher with a high concern for reputation. However, the interests of the voters are conflicting with those of the politician, as stated in the following proposition.

Proposition 2 *Under the first best contract, the politician's utility decreases in the researcher's concern for reputation.*

Hence, unlike the voter, the politician prefers to contract with the researcher with the lowest concern for reputation. Concerning ability, however, the voters and politician's interests are aligned: Both prefer to hire the researcher with the highest ability. For the voters this follows from the fact that the precision of the signal increases in the researcher's ability so that the expected state and hence the chosen policy (cf. (11) move closer to the true state of the world. For the politician we state the result in the following proposition.

Proposition 3 *Under the first best contract, the politician's utility increases in the ability of the researcher.*

The researcher reports truthfully if the politician is not punished for deviating from the public report ($\alpha_m = 0$) or if the politician disregards her ideal policy ($\alpha_\gamma = 0$), or if he assigns an infinitely large weight to the policy correctly addressing the state of the world ($\alpha_\theta \to \infty$). However, only in the last two cases would the politician be forced to also implement the optimal policy $y^i = \bar{\theta}^i$, while in the first case he implements a policy which is a weighted average of the ex-post expected state and his ideal policy. Conversely, when the politician gives an infinitely large weight to the policy being close to the message ($\alpha_m \to \infty$), then he chooses a policy that perfectly matches the researcher's report, which is again a weighted average of the ex-post expected state of the world and the politician's preferred policy. Similarly, if the politician's concern for his ideal policy is infinitely large compared to his concern for punishment by the voters ($\alpha_\gamma \to \infty$), then he implements exactly this policy. In this case the researcher publishes a biased report which is a weighted average of the ex-post expected state and the politician's preferred policy, with the weights given by β and α_m, respectively. Finally, if the politician is not concerned with addressing the optimal policy ($\alpha_\theta = 0$), then both the message and the policy are biased.

4 Asymmetric information

4.1 The researcher's concern for reputation

In this section we consider the case in which the researcher has private information about her concern for reputation β, but her ability is known to the politician. We also maintain the assumption that the politician can observe the signal received by the researcher. For simplicity we restrict to the case where there are only two types of researchers: a researcher with a high concern for reputation, characterized by β^h, and a researcher with a low concern for reputation, characterized by β^ℓ, where $\beta^\ell < \beta^h$. While the politician does not know which type of researcher he faces, he knows the probability that a researcher has a high concern for reputation. We denote this probability by p_β, i.e.

$$P(\beta^h) = p_\beta, \quad 0 < p_\beta < 1. \tag{13}$$

Under asymmetric information concerning the researcher's reputational concern, the politician offers a menu of contracts such that the high-reputation researcher and the low-reputation researcher select themselves into the appropriate contract. Let the menu of contracts be (C^h, C^ℓ), where $C^j = (T^{ij}, m^{ij})_{i=H,L}$, is the contract for type $j, j = h, \ell$, and $i = H, L$ refers to the signal, s^H or s^L, received by the researcher. The politician chooses the policies $(y^{ij})_{i=H,L,j=h,\ell}$ and the contracts C^h, C^ℓ to maximize his expected utility subject to the participation and incentive compatibility constraints of the two types of researchers. By $\mathbb{E}[U^R(C)|\beta]$ we denote the expected utility of a researcher under contract C given that his reputational concern is β. The politician then solves the following optimization problem:

$$\max_{(m^{ij}, y^{ij}, T^{ij})_{i=H,L,j=h,\ell}} \mathbb{E}[U^P] \tag{14}$$

s.t.

$$(PC_h): \quad \mathbb{E}[U^R(C^h)|\beta^h] \geq U_0 \tag{15}$$

$$(PC_\ell): \quad \mathbb{E}[U^R(C^\ell)|\beta^\ell] \geq U_0 \tag{16}$$

$$(IC_h): \quad \mathbb{E}[U^R(C^h)|\beta^h] \geq \mathbb{E}[U^R(C^\ell)|\beta^h] \tag{17}$$

$$(IC_\ell): \quad \mathbb{E}[U^R(C^\ell)|\beta^\ell] \geq \mathbb{E}[U^R(C^h)|\beta^\ell] \tag{18}$$

Following the usual argument, (PC_h) and (IC_ℓ) bind. The proofs are found in Appendix A.5 and A.6, respectively. Note that from the binding incentive constraint for the low type, (IC_ℓ), the fact that $\beta^h > \beta^\ell$ and (PC_h) it follows that (PC_ℓ) always holds. In Appendix A.7 we verify that (IC_h) is satisfied if we maximize the politician's expected utility subject to the binding constraints (PC_h) and (IC_ℓ).

The optimal contract menu is as follows. The messages demanded from the high and low type are

$$m^{ih} = \frac{\bar{\theta}^i[(\beta^h - (1-p_\beta)\beta^\ell)(\alpha_\gamma + \alpha_\theta + \alpha_m) + p_\beta \alpha_m \alpha_\theta] + \gamma p_\beta \alpha_m \alpha_\gamma}{(\beta^h - (1-p_\beta)\beta^\ell)(\alpha_\gamma + \alpha_\theta + \alpha_m) + p_\beta \alpha_m(\alpha_\theta + \alpha_\gamma)}, i = L, H \tag{19}$$

and

$$m^{i\ell} = \frac{\bar{\theta}^i[\beta^\ell(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m \alpha_\theta] + \gamma \alpha_m \alpha_\gamma}{\beta^\ell(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m(\alpha_\theta + \alpha_\gamma)}, i = L, H. \tag{20}$$

The policies are given by

$$y^{ij} = \frac{\alpha_\theta \bar{\theta}^i + \alpha_m m^{ij} + \gamma \alpha_\gamma}{\alpha_\theta + \alpha_m + \alpha_\gamma}, i = L, H, j = h, \ell. \tag{21}$$

Again only the expected transfers are determined in the optimal contract menu.

Comparing (20) with (9) one can easily see that the low-reputation researcher sends the same message as in the first best case in which the politician could observe her type, but the transfer is now such that she gets a positive surplus. However, the message for the high-reputation researcher is distorted as compared to the first best message, but her surplus is kept at zero. Moreover, this distortion is such that the high-reputation researcher reports closer to the signal. The intuition for this is simple. Because the low-reputation researcher would pretend to be of high type, the politician has to distort the contract for the high-reputation researcher and pay an information rent to the low-reputation researcher in order to induce her to reveal her true type. Hence, the high-reputation researcher is not compensated enough to bias her report as in the first-best case.

From (19) and (21), on the one hand and from (9) and (10), on the other hand, it follows that a researcher with high concern for reputation ($j = h$) sends a message which induces a policy closer to the optimal policy $\bar{\theta}^i$ when the politician cannot observe her reputational concern (asymmetric information about β) than when the politician can identify the type of the researcher. Hence, the following result is immediate.

Proposition 4 *For any given level of ability, the voters prefer the politician to be uninformed about the researcher's concern for reputation.*

In addition, note that $m^{iH} > m^{iL}$ ($m^{iH} < m^{iL}$) if and only if $\bar{\theta}^i > \gamma$ ($\bar{\theta}^i < \gamma$). Similarly to the case of symmetric information, from equations (20) and

(19) it is easy to see that the messages are weighted averages of the expected state of the world $\bar{\theta}^i$ and the politician's ideal policy γ. Moreover, it is easy to verify that for the high β type the weight on the expected state of the world is larger than for the low β type. Hence, if the expected state is larger than the ideal policy, then the message of the high-reputational type must be larger than the message of the low type and vice-versa for the expected state being smaller than the ideal policy.

4.2 The researchers' ability

We now assume that the politician can observe the researcher's concern for reputation, β, as well as the researcher's signal, but he cannot observe her research ability e. Again, for simplicity let there be two types or researchers in the economy: a low-ability type with $e = e_\ell$ and a high-ability type with $e = e_h$, such that $e_\ell < e_h$. The politician only knows the probability that a researcher has a high ability which we denote by p_e, i.e.

$$P(e_h) = p_e, \tag{22}$$

where $0 < p_e < 1$. We shortly write $p^{ij} = P(s^i|e^j)$ and $\sigma^{ij} = P(\theta^H|s^i, e^j)$, $i = H, L$, $j = h, \ell$.

As in the case of asymmetric information with respect to β, the politician designs a contract menu (C^h, C^ℓ), where $C^j = (T^{ij}, m^{ij})_{i=H,L}$, is the contract for type $j, j = h, \ell$, and $i = H, L$ refers to the signal, s^H or s^L, received by the researcher. The politician chooses the policies $(y^{ij})_{i=H,L,j=h,\ell}$ and the contracts C^h, C^ℓ to maximize his expected utility subject to the participation and incentive compatibility constraints of the two types of researchers. By $\mathbb{E}[U^R(C)|e]$ we denote the expected utility of a researcher under contract C given that his ability is e. The politician then solves the following optimization problem:

$$\max_{(m^{ij}, y^{ij}, T^{ij})_{i=H,L,j=h,\ell}} \mathbb{E}[U^P] \tag{23}$$

s.t.

$$(PC_h^e): \quad \mathbb{E}[U^R(C^h)|e^h] \geq U_0 \tag{24}$$

$$(PC^e_\ell): \quad \mathbb{E}[U^R(C^\ell)|e^\ell] \geq U_0 \tag{25}$$

$$(IC^e_h): \quad \mathbb{E}[U^R(C^h)|e^h] \geq \mathbb{E}[U^R(C^\ell)|e^h] \tag{26}$$

$$(IC^e_\ell): \quad \mathbb{E}[U^R(C^\ell)|e^\ell] \geq \mathbb{E}[U^R(C^h)|e^\ell] \tag{27}$$

The first best messages and policies given by (9) and (10), respectively, maximize (23) under the binding participation constraints (24) and (25). These contracts are given by

$$m^{ij} = \frac{\bar{\theta}^{ij}[\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m\alpha_\theta] + \gamma\alpha_m\alpha_\gamma}{\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m(\alpha_\theta + \alpha_\gamma)}, i = L, H, j = h, \ell, \tag{28}$$

and

$$y^{ij}(m^{ij}) = \frac{\alpha_\theta\bar{\theta}^{ij} + \alpha_m m^{ij} + \gamma\alpha_\gamma}{\alpha_\theta + \alpha_m + \alpha_\gamma}, i = L, H, j = h, \ell, \tag{29}$$

where $\bar{\theta}^{ij} = \sigma^{ij}\theta^H + (1-\sigma^{ij})\theta^L$. It turns out that there are transfers such that the first best contracts also satisfy the incentive compatibility constraints (26) and (27), i.e. we can state the following result:

Theorem 1 *If the politician does not observe the researcher's ability, then there are transfers such that the politician can implement the first best contracts given by* (28) *and* (29)*.*

4.3 The optimal researcher

Let us now return to the first best contract, in which case the politician can observe both the concern for reputation of the researcher and her ability. We have seen that in this situation the politician prefers to hire a researcher with a low concern for reputation, but with high ability for research. However, in the real world it is unlikely that high-ability researchers are not concerned with their reputation. Hence, in the context of our model the politician faces a trade-off between reliable information about the state of the world, which is offered by a high-ability researcher and cheap manipulation of the research report, which is offered by a researcher with a low concern for reputation.

In this section we analyze the optimal researcher from the point of view of the politician, assuming that the researcher's concern for reputation is positively correlated with her ability. More precisely, in the following we assume that β is a twice continuously differentiable, increasing and strictly concave function in e, i.e. $\beta_e > 0$ and $\beta_{ee} < 0$. Moreover, we assume that the probability $q(e)$ that a researcher with ability e receives the right signal is given by

$$q(e) = \frac{1+e}{2}, \text{ for } e \in [0,1].$$

Under these assumptions, the optimal researcher from the point of view of the politician is given in the following proposition.

Proposition 5 *If the researcher's concern for reputation is a twice continuously differentiable, increasing and strictly concave function in e, and if $q(e) = \frac{1+e}{2}$ for all $e \in [0,1]$, then the politician will always choose to contract with either the lowest ability researcher ($e = 0$) or with the highest ability researcher ($e = 1$).*

The result is illustrated in Figure 1 for certain parameter values. This is the case in which the politician chooses the highest-ability researcher and, consequently, the one with the highest reputational concern.

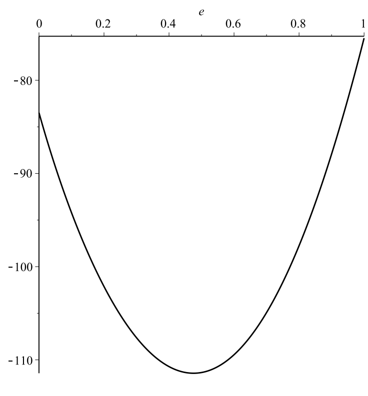

Figure 1: Politician's utility: $\alpha_m = \alpha_\gamma = \alpha_\theta = 1$, $\gamma = 20$, $p = 0.3$, $\theta^H = 15$, $\theta^L = 1$, $\beta(e) = -e^2 + 2e$

Hence, the trade-off between informative research results and the possibility for inducing biased research report leads the politician to either hire the least able researcher who can also be more easily manipulated to deliver a biased report or, on the contrary, the most able researcher who also has the highest concern for academic reputation. It is, therefore, important to understand under which conditions the politician will hire one or the other of the researchers. The following proposition states this condition.

Proposition 6 *Assume that β is a twice continuously differentiable, increasing and strictly concave function in e and that $q(e) = \frac{1+e}{2}$ for all $e \in [0, 1]$. Then the politician prefers the most able researcher if γ is sufficiently close to the prior $\bar{\theta}$ of the state of the world.*

The intuition for this result is straightforward: the lower the bias of the politician the more he prefers to learn the true state of the world and, thus, to hire the more able researcher. Conversely, as his bias is larger (γ is further from the prior) the more he prefers the ability to manipulate the researcher towards the desired report to quality information about the state of the world.

5 Conclusion

In this paper we presented an adverse selection model which captures some stylized facts regarding the involvement of politics into the production of policy research. We explored the outcome of contracting between a politician who hires a researcher to find information about the state of the world. In our model the politician has preference for a certain policy which is independent of the state. However, he is punished by the voters if the adopted policy is not in line with the public research report. Finally, the politician is also interested in correctly addressing the state of the world (for example, in order to increase the probability of re-election). The researchers, on the other hand, may differ with respect to their ability for research or their concern for academic reputation. We, therefore, consider both the case of symmetric and asymmetric information with respect to the researcher's ability and concern for reputation, respectively, but we assume that the politician can always observe the research results.

Although in the first-best contract all researchers bias their research reports to support the politician's preferred policy, the politician prefers to contract with the researcher who has the lowest concern for reputation.

This is in contrast with the voters preference, as a researcher with a high concern for reputation induces a policy closer to the optimal policy. However, the politician's and the voter's preferences are aligned when it comes to researcher's ability: A high ability researcher is preferred by both parties.

The first important result derived from our model is obtained in the case of asymmetric information with respect to the researcher's concern for reputation. It turns out that voters prefer that the politician is uninformed about the type of the researcher. This is due to the fact that, while the low-reputation researcher reports as in the first-best contract, the message of the high-reputation researcher is now distorted such that it is closer to the true signal. Consequently, the induced policy is closer to the optimal policy.

Finally, it seems plausible that a researcher's concern for reputation is positively correlated with her ability. This leads us to the second result of the paper: Under symmetric information the politician prefers either the lowest ability researcher or the highest ability researcher. In particular, if the politician's preferred policy is close enough to the prior about the state of the world, then he has little need to manipulate the research results. Therefore, the politician prefers to learn quality information about the state of the world and, thus, hires the most able researcher. If, on the contrary, his ideal policy is far from the prior, then the trade-off between reputation and ability makes the lowest ability researcher more attractive since she is more cheaply manipulated to write a biased report.

Two implications for the process of commissioning policy research can be formulated from our results. First, in order to protect voters' interests, whenever possible the tender for research contracts should be conducted anonymously such that information about academic reputation remains hidden. Second, our results suggest that it is, indeed, the case that, everything else constant, low-integrity researchers may be preferred by the policy-makers. Moreover, we show that fears that in certain cases less qualified researchers are promoted at the expense of the more qualified ones in government-commissioned projects, are not undue. Unsurprisingly though, the reason for sacrificing competency is the greater manipulative power of the politics over the former than over the latter.

While our model is general and it refers to any type of research meant to guide the formulation of policy actions, climate change research is a prominent application. It is notorious that doctrines, ideologies and beliefs outside the scientific evidence often guide the policy agenda on climate change. As we showed in the introduction, the latest IPCC reports have witnessed an alarming lead of the politics in summarizing the results of the climate change research. This is more of a serious concern as these reports inform the international negotiations on climate change, which involve enormous amounts of money and ultimately affect all the inhabitants of our planet.

A Proofs

A.1 The optimal contract under symmetric information

The politician solves

$$\max_{(m^i,y^i,T^i)_{i=H,L}} \mathbb{E}[U^P] = -\alpha_\gamma \left[p^H(\gamma - y^H)^2 + (1-p^H)(\gamma - y^L)^2\right]$$
$$- \alpha_\theta \left[p^H \sigma^H(\theta^H - y^H)^2 + p^H(1-\sigma^H)(\theta^L - y^H)^2 \right.$$
$$\left. + (1-p^H)\sigma^L(\theta^H - y^L)^2 + (1-p^H)(1-\sigma^L)(\theta^L - y^L)^2\right]$$
$$- \alpha_m \left[p^H(m^H - y^H)^2 + (1-p^H)(m^L - y^L)^2\right]$$
$$- p^H T^H - (1-p^H)T^L \tag{A.1}$$

s.t.

$$\mathbb{E}[U^R] = p^H T^H + (1-p^H)T^L$$
$$- \beta \left[p^H\sigma^H(\theta^H - m^H)^2 + p^H(1-\sigma^H)(\theta^L - m^H)^2 \right. \tag{A.2}$$
$$\left. + (1-p^H)\sigma^L(\theta^H - m^L)^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^L)^2\right] \geq U_0$$

It is straightforward to see that the researcher's participation constraint (A.2) is binding in the optimal contract. From the binding participation constraint we obtain T^L:[3]

$$T^L = T^L(T^H, m^H, m^L) = \frac{U_0}{1-p^H} - \frac{p^H}{1-p^H}T^H$$
$$+\beta \frac{p^H}{1-p^H}\left[\sigma^H(\theta^H - m^H)^2 + (1-\sigma^H)(\theta^L - m^H)^2\right]$$
$$+\beta\left[\sigma^L(\theta^H - m^L)^2 + (1-\sigma^L)(\theta^L - m^L)^2\right] \tag{A.3}$$

Substituting $T^L(T^H, m^H, m^L)$ into (A.1) and maximizing over m^H, m^L, y^H, y^L, yields the following messages

$$m^i = \frac{[\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m\alpha_\theta]\bar{\theta}^i + \alpha_m\alpha_\gamma\gamma}{\beta(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m\alpha_\theta + \alpha_m\alpha_\gamma}, i = L, H \tag{A.4}$$

and policies

$$y^i = \frac{\alpha_\theta\bar{\theta}^i + \alpha_m m^i + \alpha_\gamma\gamma}{\alpha_\theta + \alpha_m + \alpha_\gamma}, i = L, H \tag{A.5}$$

[3] Note that only the expected transfer is determined while the individual transfers are undetermined.

A.2 Proof of Proposition 1

The distance of the policy from the expected state of the world is given by:

$$\delta(\beta) = \left|y^i - \bar{\theta}^i\right| = \frac{\left|\gamma - \bar{\theta}^i\right| (\alpha_m + \beta)\alpha_\gamma}{\beta(\alpha_m + \alpha_\gamma + \alpha_\theta) + \alpha_m(\alpha_\gamma + \alpha_\theta)},$$

where $|x|$ denotes the absolute value of x. Then,

$$\frac{\partial\delta(\beta)}{\partial\beta} = \frac{-\left|\gamma - \bar{\theta}^i\right| \alpha_m^2\alpha_\gamma}{(\beta(\alpha_m + \alpha_\gamma + \alpha_\theta) + \alpha_m(\alpha_\gamma + \alpha_\theta))^2} < 0$$

A.3 Proof of Proposition 2

By the envelope theorem

$$\frac{d\mathbb{E}[U^P]}{d\beta} = -(1 - p^H)\frac{dT^L(T^H, m^H, m^L)}{d\beta}$$

where m^L, m^H, y^L and y^H are the first best policies and messages and $T^L(T^H, m^H, m^L)$ is given by (A.3). From (A.3) it is obvious that $\frac{dT^L(T^H,m^H,m^L)}{d\beta} > 0$ which proves the claim.

A.4 Proof of Proposition 3

The result follows again from the envelope theorem, after some algebraic manipulations:

$$\frac{\partial\mathbb{E}[U^P]}{\partial e} = \frac{\partial\mathbb{E}[U^P]}{\partial e}(m^H, m^L, y^H, y^L) =$$

where m^L, m^H, y^L and y^H are the first best policies and messages. Hence,

$$\frac{\partial\mathbb{E}[U^P]}{\partial e} = \frac{\partial q(e)}{\partial e}\frac{p^2(\theta^H - \theta^L)^2(1-p)^2((\alpha_\gamma + \alpha_m + \alpha_\theta)\beta^2 + \alpha_m\alpha_\theta^2 + 2\alpha_m\alpha_\theta\beta + \alpha_\theta^2\beta)(2q(e) - 1)}{(2pq(e) - q(e) - p + 1)^2(2pq(e) - q(e) - p)^2(\alpha_m(\alpha_\gamma + \alpha_\theta) + (\alpha_m + \alpha_\theta + \alpha_\gamma)\beta)}.$$

Since $q(e)$ is increasing in e and $q(0) > \frac{1}{2}$ it immediately follows that $\frac{\partial\mathbb{E}[U^P]}{\partial e} > 0$ and, thus, $\mathbb{E}[U^P]$ is increasing in e.

A.5 (15) binds in equilibrium.

Suppose it does not, i.e. it is slack. This means that:

$$\begin{aligned}(PC_h):& p^H T^{Hh} + (1-p^H)T^{Lh} - \\ &- \beta^h[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\ &- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] > U_0\end{aligned} \quad \text{(A.6)}$$

Then, using (IC_ℓ) and the fact that $\beta^h > \beta^\ell$ we have the following:

$$\begin{aligned}
&p^H T^{H\ell} + (1-p^H)T^{L\ell} - \beta^\ell[p^H\sigma^H(\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2] = \\
&= p^H T^{Hh} + (1-p^H)T^{Lh} - \beta^\ell[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] > \\
&> p^H T^{Hh} + (1-p^H)T^{Lh} - \beta^h[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] > U_0,
\end{aligned} \tag{A.7}$$

This means that the politician can increase his expected utility by decreasing each of $T^{H\ell}$, $T^{L\ell}$, T^{Hh}, T^{Lh} by a small $\epsilon > 0$, without violating any of the participation constraints. Again, this is a contradiction to the fact that these were the optimal transfers. Therefore, (PC_h) binds in equilibrium.

A.6 (18) binds in equilibrium

Suppose it does not, i.e. it is slack. This means that:

$$\begin{aligned}
&p^H T^{H\ell} + (1-p^H)T^{L\ell} - \beta^\ell[p^H\sigma^H(\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2] > \\
&> p^H T^{Hh} + (1-p^H)T^{Lh} - \beta^\ell[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] > \\
&> p^H T^{Hh} + (1-p^H)T^{Lh} - \beta^h[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2],
\end{aligned} \tag{A.8}$$

where the last inequality follows from $\beta^h > \beta^\ell$. Note that the last term in (A.8) is greater or equal to U_0 by (PC_h). Therefore, it follows that:

$$\begin{aligned}
&p^H T^{H\ell} + (1-p^H)T^{L\ell} - \beta^\ell[p^H\sigma^H(\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2] > U_0,
\end{aligned} \tag{A.9}$$

i.e., (PC_ℓ) is slack. This means that the politician can increase his expected utility by decreasing $T^{H\ell}$ and $T^{L\ell}$, without violating any constraints. This contradicts the fact that $T^{H\ell}$ and $T^{L\ell}$ were optimal payments. Therefore, it must be that (IC_ℓ) binds.

A.7 The optimal contract menu under asymmetric information w.r.t. β

The politician solves

$$
\begin{aligned}
&\max_{(m^{ij},y^{ij},T^{ij})_{i=H,L,j=h,\ell}} \mathbb{E}[U^P] = \\
&= -\alpha_\gamma[p^H p_\beta(\gamma - y^{Hh})^2 + p^H(1-p_\beta)(\gamma - y^{H\ell})^2] - \\
&- \alpha_\gamma[(1-p^H)p_\beta(\gamma - y^{Lh})^2 + (1-p^H)(1-p_\beta)(\gamma - y^{L\ell})^2] - \\
&- \alpha_\theta[p^H\sigma^H(p_\beta(\theta^H - y^{Hh})^2 + (1-p_\beta)(\theta^H - y^{H\ell})^2)] - \\
&- \alpha_\theta[p^H(1-\sigma^H)(p_\beta(\theta^L - y^{Hh})^2 + (1-p_\beta)(\theta^L - y^{H\ell})^2)] - \\
&- \alpha_\theta[(1-p^H)\sigma^L(p_\beta(\theta^H - y^{Lh})^2 + (1-p_\beta)(\theta^H - y^{L\ell})^2)] - \\
&- \alpha_\theta[(1-p^H)(1-\sigma^L)(p_\beta(\theta^L - y^{Lh})^2 + (1-p_\beta)(\theta^L - y^{L\ell})^2)] - \\
&- \alpha_m[p^H p_\beta(m^{Hh} - y^{Hh})^2 + p^H(1-p_\beta)(m^{H\ell} - y^{H\ell})^2] - \\
&- \alpha_m[(1-p^H)p_\beta(m^{Lh} - y^{Lh})^2 + (1-p^H)(1-p_\beta)(m^{L\ell} - y^{L\ell})^2] - \\
&- p^H p_\beta T^{Hh} - p^H(1-p_\beta)T^{H\ell} - (1-p^H)p_\beta T^{Lh} - (1-p^H)(1-p_\beta)T^{L\ell}
\end{aligned}
\tag{A.10}
$$

s.t.

$$
\begin{aligned}
(PC_h) : &p^H T^{Hh} + (1-p^H)T^{Lh} - \\
&- \beta^h[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] \geq U_0
\end{aligned}
\tag{A.11}
$$

$$
\begin{aligned}
(PC_\ell) : &p^H T^{H\ell} + (1-p^H)T^{L\ell} - \\
&- \beta^\ell[p^H\sigma^H(\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
&- \beta^\ell[(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2] \geq U_0
\end{aligned}
\tag{A.12}
$$

$$
\begin{aligned}
(IC_h) : &p^H T^{Hh} + (1-p^H)T^{Lh} - \\
&- \beta^h[p^H\sigma^H(\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
&- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2] \geq \\
&\geq p^H T^{H\ell} + (1-p^H)T^{L\ell} - \\
&- \beta^h[p^H\sigma^H(\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
&- \beta^h[(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2]
\end{aligned}
\tag{A.13}
$$

$$
\begin{aligned}
(IC_\ell): & p^H T^{H\ell} + (1-p^H)T^{L\ell} - \\
& - \beta^\ell [p^H \sigma^H (\theta^H - m^{H\ell})^2 + p^H(1-\sigma^H)(\theta^L - m^{H\ell})^2] - \\
& - \beta^\ell [(1-p^H)\sigma^L(\theta^H - m^{L\ell})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{L\ell})^2] \geq \\
& \geq p^H T^{Hh} + (1-p^H)T^{Lh} - \\
& - \beta^\ell [p^H \sigma^H (\theta^H - m^{Hh})^2 + p^H(1-\sigma^H)(\theta^L - m^{Hh})^2] - \\
& - \beta^\ell [(1-p^H)\sigma^L(\theta^H - m^{Lh})^2 + (1-p^H)(1-\sigma^L)(\theta^L - m^{Lh})^2]
\end{aligned} \tag{A.14}
$$

In Appendix A.5 and A.6 we have shown that (A.11) and (A.14) are binding. Together with $\beta^h > \beta^\ell$ this implies that (A.12) is satisfied. We ignore (A.13) for the moment and later verify that it holds in the contract menu we derive. From (A.11) we can solve for $T^{Lh} = T^{Lh}(T^{Hh})$ and from (A.14) we can solve for $T^{L\ell} = T^{L\ell}(T^{H\ell})$ and substitute in (A.10), which is then maximized over m^{ij}, y^{ij}, $i = L, H, j = h, \ell$:[4]

$$
\begin{aligned}
T^{L\ell} = & \frac{U_0 - p^H T^{H\ell}}{1-p^H} + (\beta^h - \beta^\ell)\left(\frac{p^H}{1-p^H} m^{Hh}\left(m^{Hh} - 2\bar{\theta}^H\right) + m^{Lh}(m^{Lh} - 2\bar{\theta}^L)\right) + \\
& + \frac{(p^H\sigma^H + (1-p^H)\sigma^L)((\theta^H)^2 - (\theta^L)^2)}{1-p^H}\beta^h + \\
& + \left(\frac{p^H}{1-p^H} m^{H\ell}(m^{H\ell} - 2\bar{\theta}^H) + m^{L\ell}(m^{L\ell} - 2\bar{\theta}^L)\right)\beta^\ell
\end{aligned} \tag{A.15}
$$

and

$$
\begin{aligned}
T^{Lh} = & \frac{U_0 - p_H T^{Hh}}{1-p_H} + \beta^h\left(\frac{p_H}{1-p_H} m^{Hh}(m^{Hh} - 2\bar{\theta}^H) + m^{Lh}(m^{Lh} - 2\bar{\theta}^L)\right) + \\
& + \frac{(p^H\sigma^H + (1-p^H)\sigma^L)((\theta^H)^2 - (\theta^L)^2)}{1-p_H}\beta^h + \frac{(\theta^L)^2}{1-p_H}\beta^h
\end{aligned} \tag{A.16}
$$

We substitute $T^{L\ell}$ and T^{Lh} from (A.15) and (A.16) into (A.10) and maximize over m^{ij}, y^{ij}, $i = H, L, j = \ell, h$, which yields the following messages and policies:

$$
m^{ih} = \frac{\bar{\theta}^i[(\beta^h - (1-p_\beta)\beta^\ell)(\alpha_\gamma + \alpha_\theta + \alpha_m) + p_\beta\alpha_m\alpha_\theta] + \gamma p_\beta \alpha_m \alpha_\gamma}{(\beta^h - (1-p_\beta)\beta^\ell)(\alpha_\gamma + \alpha_\theta + \alpha_m) + p_\beta\alpha_m(\alpha_\theta + \alpha_\gamma)}, i = L, H, \tag{A.17}
$$

$$
m^{i\ell} = \frac{\bar{\theta}^i[\beta^\ell(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m\alpha_\theta] + \gamma\alpha_m\alpha_\gamma}{\beta^\ell(\alpha_\gamma + \alpha_\theta + \alpha_m) + \alpha_m(\alpha_\theta + \alpha_\gamma)}, i = L, H, \tag{A.18}
$$

[4] Again, only the expected transfers given the reputational type are determined.

and

$$y^{ij} = \frac{\alpha_\theta \bar{\theta}^i + \alpha_m m^{ij} + \gamma \alpha_\gamma}{\alpha_\theta + \alpha_m + \alpha_\gamma}, i = L, H, j = h, \ell. \tag{A.19}$$

Finally, we verify that (IC_h) holds. Substituting $T^{L\ell}$ and T^{Lh} from (A.15) and (A.16) into (IC_h), the latter is equivalent to: $\left(p^H (m^{Hh} - m^{H\ell})(m^{Hh} + m^{H\ell} - 2\bar{\theta}^H) + (m^{Lh} - m^{L\ell})(m^{Lh} + m^{L\ell} - 2\bar{\theta}^L)(1 - p^H)\right)(\beta_H - \beta_L) < 0$. Next, using the expressions for m^{ij} it can be shown that

$$(m^{ih} - m^{i\ell})(m^{ih} + m^{i\ell} - 2\bar{\theta}^i) =$$
$$= \frac{-\alpha_\gamma^2 \alpha_m^2 (\gamma - \bar{\theta}^i)^2 (\beta^h - \beta^\ell)(\alpha_\gamma + \alpha_m + \alpha_\theta)((2\beta_L p_\beta + \beta^h - \beta^\ell)(\alpha_\gamma + \alpha_m + \alpha_\theta) + 2p_\beta \alpha_m (\alpha_\gamma + \alpha_\theta))}{((\beta_L p_\beta + \beta^h - \beta^\ell)(\alpha_\gamma + \alpha_m + \alpha_\theta) + p_\beta \alpha_m (\alpha_\gamma + \alpha_\theta))^2 ((\alpha_\gamma + \alpha_m + \alpha_\theta)\beta_L + \alpha_m (\alpha_\gamma + \alpha_\theta)^2)} < 0$$

for $i = H, L$. Therefore, $p^H (m^{Hh} - m^{H\ell})(m^{Hh} + m^{H\ell} - 2\bar{\theta}^H) + (m^{Lh} - m^{L\ell})(m^{Lh} + m^{L\ell} - 2\bar{\theta}^L)(1 - p^H) < 0$ and this completes the proof.

A.8 Proof of Theorem 1

It suffices to show that there are transfers such that for the messages and policies given by (28) and (29) we can find transfers $T^{Hh}, T^{H\ell}, T^{Lh}$ and $T^{L\ell}$ such that the equations (24), (25), (26) and (27) are satisfied with equality (i.e. both the participation and the incentive compatibility constraints are binding). This amounts to solving the following linear equation system:

$$\begin{aligned}
(i) :\ & p^{Hh} T^{Hh} + (1 - p^{Hh}) T^{Lh} \\
& -\beta \left(p^{Hh} \sigma^{Hh} (\theta^H - m^{Hh})^2 + p^{Hh} (1 - \sigma^{Hh})(\theta^L - m^{Hh})^2 \right) \\
& -\beta \left((1 - p^{Hh}) \sigma^{Lh} (\theta^H - m^{Lh})^2 + (1 - p^{Hh})(1 - \sigma^{Lh})(\theta^L - m^{Lh})^2 \right) = U_0
\end{aligned} \tag{A.20}$$

$$\begin{aligned}
(ii) :\ & p^{H\ell} T^{H\ell} + (1 - p^{H\ell}) T^{L\ell} \\
& -\beta \left(p^{H\ell} \sigma^{H\ell} (\theta^H - m^{H\ell})^2 + p^{H\ell} (1 - \sigma^{H\ell})(\theta^L - m^{H\ell})^2 \right) \\
& -\beta \left((1 - p^{H\ell}) \sigma^{L\ell} (\theta^H - m^{L\ell})^2 + (1 - p^{H\ell})(1 - \sigma^{L\ell})(\theta^L - m^{L\ell})^2 \right) = U_0
\end{aligned} \tag{A.21}$$

$$\begin{aligned}
(iii) :\ & p^{Hh} T^{Hh} + (1 - p^{Hh}) T^{Lh} \\
& -\beta \left(p^{Hh} \sigma^{Hh} (\theta^H - m^{Hh})^2 + p^{Hh} (1 - \sigma^{Hh})(\theta^L - m^{Hh})^2 \right) \\
& -\beta \left((1 - p^{Hh}) \sigma^{Lh} (\theta^H - m^{Lh})^2 + (1 - p^{Hh})(1 - \sigma^{Lh})(\theta^L - m^{Lh})^2 \right) \\
& = p^{Hh} T^{H\ell} + (1 - p^{Hh}) T^{L\ell} \\
& -\beta \left(p^{Hh} \sigma^{Hh} (\theta^H - m^{H\ell})^2 + p^{Hh} (1 - \sigma^{Hh})(\theta^L - m^{H\ell})^2 \right) \\
& -\beta \left((1 - p^{Hh}) \sigma^{Lh} (\theta^H - m^{L\ell})^2 + (1 - p^{Hh})(1 - \sigma^{Lh})(\theta^L - m^{L\ell})^2 \right)
\end{aligned} \tag{A.22}$$

$$\begin{aligned}(iv):\ & p^{H\ell}T^{H\ell}+(1-p^{H\ell})T^{L\ell}\\ &-\beta\left(p^{H\ell}\sigma^{H\ell}(\theta^H-m^{H\ell})^2+p^{H\ell}(1-\sigma^{H\ell})(\theta^L-m^{H\ell})^2\right)\\ &-\beta\left((1-p^{H\ell})\sigma^{L\ell}(\theta^H-m^{L\ell})^2+(1-p^{H\ell})(1-\sigma^{L\ell})(\theta^L-m^{L\ell})^2\right)\\ &=p^{H\ell}T^{Hh}+(1-p^{H\ell})T^{Lh}\\ &-\beta\left(p^{H\ell}\sigma^{H\ell}(\theta^H-m^{Hh})^2+p^{H\ell}(1-\sigma^{H\ell})(\theta^L-m^{Hh})^2\right)\\ &-\beta\left((1-p^{H\ell})\sigma^{L\ell}(\theta^H-m^{Lh})^2+(1-p^{H\ell})(1-\sigma^{L\ell})(\theta^L-m^{Lh})^2\right)\end{aligned} \tag{A.23}$$

This linear equation system has a unique solution which can easily be checked by computing the determinant of the corresponding matrix: $-(p^{Hh}-p^{H\ell})^2 \neq 0$, because $e_\ell < e_h$. Thus, there exist transfers which support the first best contracts under asymmetric information.

A.9 Proof of Proposition 5

For convenience, let us denote $\mathbb{E}[U^P] = f(e,\beta)$, where $\mathbb{E}[U^P]$ is given by (A.1) evaluated at the first best contract, and $F(e) = f(e,\beta(e))$. Since f is a continuous function of both e and β and β is continuous in e, then F is continuous in e. Further, since $e \in [0,1]$, which is a compact interval, then F is bounded and by the extreme value theorem it has at least one maximum.

The first derivative of F with respect to e is:

$$\frac{\partial F}{\partial e} = \underbrace{\frac{\partial f}{\partial e}}_{+} + \underbrace{\frac{\partial f}{\partial \beta}}_{-}\underbrace{\frac{\partial \beta}{\partial e}}_{+}. \tag{A.24}$$

Hence, F can be both increasing and decreasing function of e.

The second derivative of F is:

$$\frac{\partial^2 F}{\partial e^2} = \underbrace{\frac{\partial^2 f}{\partial e^2}}_{+} + \underbrace{\frac{\partial^2 f}{\partial \beta^2}}_{?}\underbrace{\left(\frac{\partial \beta}{\partial e}\right)^2}_{+} + \underbrace{\frac{\partial f}{\partial \beta}}_{-}\underbrace{\frac{\partial^2 \beta}{\partial e^2}}_{-} \tag{A.25}$$

The signs of the factors in the last term of (A.25) are obvious due to the concavity of $\beta(e)$ and Proposition 2. Next, the first term in (A.25) is:

$$\frac{\partial^2 f}{\partial e^2} =$$

$$= -\frac{8p^2\left(\theta^H-\theta^L\right)^2(-1+p)^2\left(\alpha_\gamma\beta^2+\alpha_m\alpha_\theta^2+2\alpha_m\alpha_\theta\beta+\alpha_m\beta^2+\alpha_\theta{}^2\beta+\alpha_\theta\beta^2\right)\left(4e^2(2p-1)^2+1\right)}{(2ep-e+1)^3\left(\alpha_m\alpha_\gamma+\alpha_\gamma\beta+\alpha_m\alpha_\theta+\alpha_m\beta+\alpha_\theta\beta\right)(2ep-e-1)^3} > 0$$

because $2ep-e-1<0$ for $(e,p)\in[0,1]\times[0,1]$. It only remains to determine the sign of $\dfrac{\partial^2 f}{\partial \beta^2}$.

$$\frac{\partial^2 f}{\partial \beta^2} = \frac{2\alpha_\gamma^2 \alpha_m^2(\alpha_\gamma + \alpha_m + \alpha_\theta)}{(2pe - e + 1)(2pe - e - 1)(\beta(\alpha_\gamma + \alpha_m + \alpha_\theta) + \alpha_m(\alpha_\gamma + \alpha_\theta))^3}\Omega \quad \text{(A.26)}$$

where

$$\begin{aligned}\Omega =&(2pe - e + 1)(2pe - e - 1)\gamma(\gamma - 2\bar{\theta}) - \\ &- \underbrace{(1-p)^2(4pe^2 - e^2 + 1)(\theta^H)^2}_{+} - \underbrace{2p(1-p)(1-e^2)\theta^L\theta^H}_{+} - \underbrace{p^2(1 - 4pe^2 + 3e^2)(\theta^L)^2}_{+},\end{aligned} \quad \text{(A.27)}$$

A necessary condition for F to be concave in e is that $\dfrac{\partial^2 f}{\partial \beta^2}$ is negative. For this Ω has to be positive. If we regard Ω as a function of γ, since $2pe - e - 1 < 0$, Ω has a maximum and this is reached at $\gamma = \bar{\theta}$. However, for $\gamma = \bar{\theta}$ we have $\Omega = -4e^2p^2(\theta^H - \theta^L)^2(p-1)^2 < 0$. Therefore, $\frac{\partial^2 f}{\partial \beta^2} > 0$. Thus, F is globally convex in e and being defined on the compact interval $[0, 1]$, it reaches the maximum at either $e = 0$, $e = 1$ or both.

A.10 Proof of Proposition 6

Let $b = \beta(0)$ and $B = \beta(1)$. Since β is increasing in e, $b < B$. Then, the politician prefers the most able researcher if $\Delta(\gamma) = F(1) - F(0) = C_1(-\gamma^2 + 2\bar{\theta}\gamma) + C_2 > 0$, where C_1 and C_2 are combinations of parameters and b and B, with $C_1 > 0$. Hence, Δ is concave in γ and its maximum is reached at $\gamma = \bar{\theta}$. Moreover, it is positive for γ in the interval $\bar{\theta} - \sqrt{\bar{\theta}^2 + C_2/C_1}$ and $\bar{\theta} + \sqrt{\bar{\theta}^2 + C_2/C_1}$. Hence, the politician prefers $e = 1$ if his ideal policy γ is around the prior.

References

Avery, G. (2010), 'Scientific Misconduct: The Manipulation of Evidence for Political Advocacy in Health Care and Climate Policy', *CATO Institute Briefing Series* (117).

Ewerhart, C. & Schmitz, P. W. (2000), ''Yes men', integrity, and the optimal design of incentive contracts', *Journal of Economic Behavior & Organization* **43**, 115–125.

Inderst, R. & Ottaviani, M. (2012), 'Competition through Commissions and Kickbacks', *American Economic Review* **102**(2), 780–809.

Morris, S. (2001), 'Political correctness', *Journal of Political Economy* **109**(2).

Ottaviani, M. & Sorensen, P. N. (2006), 'Professional advice', *Journal of Economic Theory* **126**, 120–142.

Prendergast, C. (1993), 'A Theorey of "Yes Men"', *The American Economic Review* **83**(4), 757–770.

Stavins, R. (2014), 'Is the IPCC Government Approval Process Broken?'.
URL: *http://www.robertstavinsblog.org/2014/04/25/is-the-ipcc-government-approval-process-broken-2/*

Szalay, D. (2009), 'Contracts with endogenous information', *Games and Economic Behavior* **65**, 586–625.

The Daily Caller (2014), 'Scientists say IPCC puts politics before science, needs reform'.
URL: *http://dailycaller.com/2014/05/29/scientists-say-ipcc-puts-politics-before-science-needs-reform/*

The LSE GV314 Group (2014), 'Evaluation under Contract: Government Pressure and the Production of Policy Research', *Public Administration* **92**(1), 224–239.