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Journal of Environmental Economics and Management

journal homepage: www.elsevier.com/locate/jeeem

Manufacturing doubt[☆]

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ARTICLE INFO

Article history:

Received 22 May 2017

Revised 6 April 2018

Accepted 23 April 2018

Available online 22 May 2018

Jel codes:

D01

D72

D83

Keywords:

Environmental policy instruments

Populist policies

Research funding

Scientific uncertainty

ABSTRACT

In their efforts to affect regulations, firms have developed specific strategies to exploit scientific uncertainty. They have manufactured doubt by hiring and funding dissenting scientists, by producing and publicizing favorable scientific findings and by generally concealing their involvement in biased research. We propose a new model to study the interplay between scientific uncertainty, firms' miscommunication and public policies. The government is benevolent but populist, and maximizes social welfare as perceived by citizens. The industry can produce costly reports showing that its activity is not harmful. Citizens are unaware of the industry's miscommunication. We first characterize the industry's optimal miscommunication policy. The industry notably ceases miscommunicating abruptly when scientists' belief reaches a critical threshold. We identify a natural condition under which miscommunication is stronger under a tax on emissions than under command and control. We then analyze research funding. A populist government may support research to enable firms to falsely reassure citizens. Establishing an independent research agency helps limit the welfare losses induced by populist policies.

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1. Introduction

Many important government regulations have to be adopted under significant scientific uncertainty. In their efforts to affect regulations, firms have developed specific strategies to exploit this uncertainty. For instance, tobacco producers vigorously denied the adverse effects of active smoking in the 1950s and 1960s and of second-hand smoke exposure from the 1970s through the 1990s (Bero, 2013).¹ They spent large amounts of money on hiring and funding dissenting scientists, generating and publicizing favorable scientific findings, and shaping the public's perceptions through large-scale communication campaigns (Proctor, 2011). Throughout this time, the industry tried hard to conceal its involvement in biased research (Bero, 2013, p.157–158). The extent of this involvement only became known after the forced release of confidential corporate documents, as

[☆] We thank Jean-Marc Bourgeon, Mireille Chiroleu Assouline, Arnaud Dellis, Thibault Gajdos, Rachel Kranton, Juliette Rouchier, François Salanié, Jesse Shapiro, Nicolas Treich, Tanguy van Ypersele and participants in seminars and conferences for helpful comments and discussions.

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¹ For instance, a 1978 report prepared for the Tobacco Institute states that "The strategic and long-run antidote to the passive smoking issue is, as we see it, developing and widely publicizing clear-cut, credible medical reports that passive smoking is not harmful to the non-smoker's health." see Bero (2013, p.154).

part of the 1998 tobacco master settlement agreement.² On climate change, special interest groups have long exploited scientific uncertainties to promote inaction (Hoggan and Littlemore, 2009). Communication strategies outlined in a leaked 1998 memo by the American Petroleum Institute are remarkably similar to those documented for tobacco (Cushman, 1998; and Walker, 1998). Objectives included “Identifying and establishing cooperative relationships with all major scientists whose research in this field supports our position” and “Providing grants for advocacy on climate science, as deemed appropriate.” Oreskes and Conway (2010) document how, as announced in this memo, a handful of scientists were coopted by industrial lobbies. Concealing their industry ties and exploiting their scientific stature, they played an effective role in science-denying communication campaigns. On tobacco and climate change, firms have deliberately manufactured doubt in order to avoid, weaken or postpone regulations. These unscrupulous practices likely yield first-order welfare losses.³ Economic analysis of this subject is still underdeveloped, however, and our analysis aims to fill this gap.

In this paper, we propose a new model to study the interplay between scientific uncertainty, firms’ miscommunication and public policies. We assume that firms’ economic activity generates uncertain damage, and that this uncertainty can be reduced through scientific research. Firms can miscommunicate by producing favorable reports that resemble independent scientific evidence. Citizens are unaware of firms’ miscommunication and do not distinguish between industry-generated information and scientific knowledge. The government is benevolent but populist: it maximizes social welfare as perceived by citizens. It regulates firms’ activity either by imposing a maximal level of emissions or through a tax on emissions.

We analyze a sequential game with the following timing. First, either the government or an independent research agency decides how much research to finance. Scientists then run experiments and form their belief. Second, the industry miscommunicates. Scientific knowledge and the industry’s communication determine the citizens’ belief. Third, the government regulates firms’ activity. We develop our analysis in two stages. For a given scientific belief, we characterize the industry’s optimal miscommunication and its impact on citizens’ beliefs, regulations and welfare. We study how these outcomes depend on the type of environmental regulation implemented. We then analyze how firms’ miscommunication affects research funding under different institutions.

Our analysis yields novel insights. We first show that the industry’s miscommunication effort is a non-monotonic and discontinuous function of scientific belief. As scientists become increasingly convinced that the activity is harmful, the industry first devotes more and more resources to falsely reassuring the citizens. This yields increasingly large welfare losses. When scientists’ belief reaches a critical threshold, however, countering the scientific consensus becomes too costly and the industry abruptly ceases its miscommunication. This qualitative pattern is robust to the type of instrument used (command and control or tax on emissions).

This result sheds light on some documented tendencies. It is consistent with the large time lags typically observed between when scientists reach a consensus on the need for regulation and when an effective public policy is implemented.⁴ It can help explain people’s persistent underestimation of the scientific consensus on climate change (Ding et al., 2011). Our finding helps explain sudden reversals in the official positions of special interest groups, as observed in the past on tobacco and recently on climate change. It also helps explain episodes of abrupt awakening to the dangers posed by some industrial activity.

We then look at the impact of the type of environmental regulation implemented. We identify a natural condition that leads to more industry miscommunication under a tax on emissions than under command and control. Since the industry’s payoff is lower under a tax on emissions, due to the added fiscal burden relative to command and control, the industry has more to gain from influencing public opinion and regulation.

Next, we show that the wedge driven by the industry between scientists’ and citizens’ beliefs has important implications for research funding. We analyze different institutions’ incentives to support research. Since a populist government cares about perceived welfare, its utility increases when citizens are falsely reassured. This may lead to a partial alignment of interests between the government and the industry. We find that a populist government may support research to allow the industry to miscommunicate more effectively. We show that a partial answer to this problem is to establish an independent funding agency, not unlike the current National Science Foundation and European Research Council. Interestingly, the independent agency may decide to provide more or less research funding than under the first-best. Either strategy may provide the best way to limit the damaging effects of firms’ miscommunication. Our analysis thus provides a new rationale for the establishment of independent scientific agencies.

A key assumption is that citizens are unaware of the industry’s involvement in biased research. This assumption is consistent with evidence of dissimulation of negative scientific findings by the tobacco industry and with the documented tendency of industry-funded scientists to conceal their funding sources (Bero, 2013; Proctor, 2011). The many scandals in the medical sector brought to light this concealment, leading to the adoption of disclosure rules by academic journals. These rules do not appear to be very effective, however, and corporate-funded ghostwriting is still suspected of being a major problem in biomedical research (Bero et al., 2005; PLoS Medicine Editors, 2009; Thacker, 2014).⁵ This may help explain why citizens hold incorrect beliefs on

² These documents can be consulted at <https://www.industrydocumentslibrary.ucsf.edu/tobacco/>.

³ Proctor (2011) argues that early doubt manufactured by the tobacco industry on the link between smoking and cancer caused an excess 8000 billion smoked cigarettes and 8 million premature deaths.

⁴ See European Environment Agency (2013), which notably shows that ‘false positives’, where preventive actions undertaken due to early scientific warnings turn out to be unnecessary, are much less frequent than ‘false negatives’, where no action is taken despite early warnings that are confirmed ex-post.

⁵ Relatedly, Monsanto has recently been accused of ghostwriting scientific articles vouching for the safety of its Roundup herbicide, see Waldman et al. (2017).

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