Political Economy of Shelter-in-Place Compliance

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MAY 2020
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Arda Gitmez,1,2 Konstantin Sonin,1 and Austin L. Wright,1

1Harris School of Public Policy, University of Chicago
2Department of Economics, Bilkent University

May 18, 2020

Abstract

We propose a model in which agents with heterogeneous incomes decide whether to comply with shelter-in-place orders or gain additional income at the risk of getting the disease. There is a negative externality of non-compliance as the risk of catching COVID-19 is a function of the number of non-compliers. Drawing on evidence collected during the first months of the 2020 pandemic, we show theoretically that the level of compliance is higher in richer communities, and the effect of inequality on compliance is non-monotonic in the severity of pandemic. Slanted media affect compliance as well: if the media de-emphasizes the threat, compliance falls. At the same time, the demand for such media is higher among those who are less likely to comply.

JEL Classification: D72, L82, H12, I18.
Keywords: COVID-19, shelter-in-place, compliance, media slant, income inequality.
1 Introduction

The spread of COVID-19 represents a major public health challenge. To slow the growth rate of infections, a number of governments have adopted shelter-in-place (quarantine) policies. These policies range in severity from voluntary social distancing (e.g., Sweden) to in-place lockdowns (e.g., China and South Korea). Most governments, including the United States and countries across Europe, have adopted shelter-in-place policies, which mandate only minimal movement for essential activities (grocery shopping, hospitalization).

Compliance with these policies, however, has been uneven. In the United States, compliance is driven by local income (Wright et al., 2020; Chiou and Tucker, 2020), partisanship and polarization (Painter and Qiu, 2020; Gadarian, Goodman and Pepinsky, 2020; Allcott et al., 2020; Grossman et al., 2020), and beliefs in science (Brzezinski et al., 2020; Sailer et al., 2020). Wealthier households may leave high risk environments, while racial and ethnic minorities remain (Coven and Gupta, 2020). In Europe, trust in government also influences changes in population movement after governments enact physical distancing policies (Bargain and Aminjonov, 2020).

Shelter-in-place policies have also triggered deliberate non-compliance and protests (Dyer, 2020). Local officials have amended mask requirements after store employees were threatened with physical violence. Protests in more than a dozen US states have erupted as demands for relaxed standards have grown. In Michigan, protesters stormed the state capital to demand the governor revoke the state-wide shelter-in-place order. Similar movements have emerged in Australia, Brazil, Canada, Germany, India, Italy, Pakistan, Poland, and United Kingdom.

We offer a simple model of compliance with government orders during a pandemic. To highlight the relevance of the model to the current crisis, the exposition mirrors the specific language of the COVID-19 pandemic (i.e., social distancing, shelter-in-place). More formally, compliance involves reduced population movement and social interaction after the

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1 See https://bit.ly/2Z58xYT.
2 See https://bbc.in/2STNyUX.
introduction of local shelter-in-place orders. In our model, individuals are heterogeneous in their incomes and are exposed to an exogenous threat from the pandemic. Our starting point is that compliance is costly, the costs of non-compliance are heterogeneous and depend on others’ compliance behavior, and the information that agents choose to consume matters.

Our first result is that compliance is increasing in local health risks, household income, and healthcare costs (Proposition 1). At an aggregate meso-level (e.g., county), our second result implies the share of complying individuals is increasing in average income, which lowers health risks for the population overall (Proposition 2). Third, we identify the conditions under which the share of complying individuals is increasing in inequality (Proposition 3). Finally, income influences preferences over the level of enforcement of social distancing such as use of fines and arrests to deter non-compliance. In particular, high health individuals prefer a complete shutdown, with strict social distancing enforcement (Proposition 4).

We investigate the role of information in shaping compliance in Propositions 5-7. Posterior beliefs are influenced by the public reports about pandemic severity. Yet the information obtained from such a report is valuable to the extent that it changes the behavior of an individual, which means that demand for information depends on the strategic considerations of the individual. An agent who is inclined to be non-compliant finds the reports about the severity of threat valuable only if it leads to a strong adjustment of beliefs, causing her to change her behavior. As a result, individuals who are more likely to be non-compliant prefer slanted media sources. In particular, low-income individuals prefer media sources that downplay the risks of COVID-19 while high-income individuals prefer media sources that exaggerate risks (Proposition 6). Moreover, an increase in inequality is associated with individuals preferring the media sources that exaggerate risks even further (Proposition 7).

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3In political science, this is known as the “Nixon to China” phenomenon, in which individuals only trust a like-minded politician to implement a controversial reform because the information value of such actions are higher (Cukierman and Tommasi, 1998). The same force appears in Calvert (1985) and Suen (2004) where people prefer to receive advice from like-minded experts, in Burke (2008), Oliveros and Várdy (2015) and Yoon (2019) where people choose media sources, in Meyer (1991) when designing dynamic contests, and in Gill and Sgroi (2012) when designing tests for a product. For recent applications of this idea to dynamic decision making, see Che and Mierendorff (2019) and Zhong (2019).
Our model provides a novel perspective on the findings of Bursztyn et al. (2020) who focus on the impact of slanted media coverage on COVID-19 deaths across the United States. They find that exposure to content that downplays the severity of the crisis (compared to content that more accurately depicts the threat) significantly increases fatalities. Our model suggests that endogenous media consumption might be the channel that provides a feedback loop: biased viewership may be a consequence of preferences for non-compliance rather than a cause.

In addition to providing a framework for studying compliance and its relation to consumption of information, our model is tractable and leads to a range of intuitive comparative statics. The basic framework can be extended to account for intermediate (above the individual agent) level variation as well as income inequality within communities. The model could also be extended to study how polarization and partisanship influence information acquisition about a broader class of community threats (e.g., disinformation campaigns, foreign influence operations, fraudulent voting). It provides a framework to study political dynamics of anti-government protests related to shelter-in-place policies and counter-pandemics measures more broadly, where individuals make the joint decision to engage in non-compliance and a risky behavior (e.g., coming in close contact with other non-compliers). In Section 2 we describe early evidence on economic and informational factors of shelter-in-place compliance during the 2020 pandemic, which is consistent with our theoretical model.

As information consumption plays the critical role in our theory, our paper is related to various studies of slanted media and biased information (Gentzkow and Shapiro, 2006, 2008; DellaVigna and Gentzkow, 2010). In the pioneering work of Mullainathan and Shleifer (2005) and Baron (2006), the heterogeneous demand for media slant is driven by exogenous factors. In our model, the demand is endogenous as those who strategically choose not to comply are interested in a higher slant towards de-emphasizing the threat. We use the concavification

4Other models where media sources strategically choose their slants include Strömberg (2004); Bernhardt, Krasa and Polborn (2008); Anderson and McLaren (2012); Chan and Suen (2008); Duggan and Martinelli (2011). Gentzkow, Shapiro and Stone (2015) provides a comprehensive summary of the literature.
approach in the Bayesian persuasion problem offered in Kamenica and Gentzkow (2011) to determine what amount of slant an agent prefers. (See Bergemann and Morris, 2019, and Kamenica, 2019, for a recent survey.) In a departure from Kamenica and Gentzkow (2011), we focus on a limited set of information structures available to the sender. At the same time, the presence of externalities, natural in the models with health risks, implies that the receiver’s persuasion problem has a nontrivial solution.

Our theoretical model considers a participation game with negative externalities. A similar dynamic is analyzed in the literature on status games (e.g., Robson, 1992). The most salient application is the conspicuous consumption, where some goods are observable and individuals’ payoffs depend on their relative position in the consumption of such goods. The idea originates from Veblen (1899), and Frank (1985); Ireland (1994); Hopkins and Kornienko (2004) are more recent treatments. Our main difference with such models is that in our model, beliefs about the severity of externalities is the object of interest and we consider information disclosure policies affecting such beliefs.

Finally, our model provides a theoretical framework for the emerging literature on heterogeneous effects on social distancing of partisanship, political polarization, and distrust of science (or authority more broadly). Brzezinski et al. (2020) provide evidence that compliance is significantly lower in counties with a high concentration of climate change skeptics. The link between belief in science and compliance is also documented by Sailer et al. (2020) using a large US survey. Our model provides micro- and political foundations for these results, highlighting how income influences compliance behavior and endogenous information acquisition.

The rest of the paper is organized as follows. Section 2 collects the stylized facts relating to economic and informational determinants of shelter-in-place compliance. Section 3 presents the theoretical setup. Section 4 analyses basic factors of compliance. Section 5 discusses the impact of and demand for media slant, while Section 6 concludes.
2 Social Distancing and Media During COVID-19

In this section, we provide a series of stylized facts that relate economic factors that affect compliance such as income and inequality and informational ones such as access to media. These facts help us assess the plausibility of the model’s structure, its core assumptions, and predictions.

Figure 1: Income and compliance with COVID-19 local shelter-in-place policies.

(a) Heterogeneous effects of income (median threshold).
(b) Flexible marginal effects of residualized income.

Notes: (a) Event study design plots showing heterogeneous effects of income on compliance with local shelter-in-place policies. For additional details on data and model specifications see Wright et al. (2020). For methodology on calculating (b), see Hainmueller, Mummolo and Xu (2019).

First, we observe that low income communities and those exposed to slanted media coverage comply less with shelter-in-place policies. Wright et al. (2020) use county-day level data on population movement and the staggered roll-out of local social distancing policies to estimate compliance and heterogeneous responses to policy onset via an income mechanism. We reproduce these event study results in Figure 1(a). Notice that below median counties do not engage in social distancing while above median counties engage in substantial social distancing (reduction in physical movement) after the onset of a local policy. Figure 1(b) shows the flexible marginal effects of residualized income using the approach introduced by Hainmueller, Mummolo and Xu (2019). Chiou and Tucker (2020) and Lou and Shen (2020) confirm the negative relationship between county-level average income and compliance.
using alternative data sources and methodology. Propositions 1 and 2 establish this result theoretically.

Second, using the cell-phone data described in Wright et al. (2020) as well as census-based measures of economic inequality (Gini index), we calculated the heterogeneous and marginal effects of inequality in Figure 2. In Figure 2(a), we replicate the event study design using the median threshold for splitting inequality distribution. Notice that compliance is relatively stronger in high inequality counties (approximately 3%), though the distinction is not as sharp as the income channel. In Figure 2(b), we residualized the Gini index and plot the marginal effects. These results provide similar evidence, suggesting that compliance is increasing with within-county inequality. Across the inequality distribution, the shift in marginal effects is approximately five percent (similar to the flexible marginal effects of income). The marginal effect flattens above the 75\textsuperscript{th} percentile. Proposition 3 works out the mechanics of this effect.

A number of studies reported effects of heterogeneous access to media and media slant on compliance. Wright et al. (2020); Chiou and Tucker (2020) demonstrated that access
Figure 3: Heterogeneous effects of slanted media exposure on compliance.

Notes: Event study design plots showing heterogeneous effects of exposure to Fox News stations via Sinclair Group on compliance with local shelter-in-place policies from Wright et al. (2020). Since our measure of slant exposure is an extensive margin parameter (0/1), we do not produce flexible marginal effects.

and exposure to different media sources has a significant impact on compliance. Using a novel IV approach, Bursztyn et al. (2020) documented the downstream health effect of exposure to differently slanted Fox News prime-time programs (i.e., increased COVID-related mortality). Figure 3 demonstrates that exposure to slanted media significantly reduces compliance. Communities where this source of slanted media is not present see a significant decline in population movement starting the first day after the onset of a local shelter-in-place policy. There are no meaningful changes in social distancing in exposed communities. Proposition 5 shows formally that exposure to reports that downplay the coronavirus threat reduces compliance.

Figures 4 and 5 are based on survey data collected as part of the Pew Research Center’s American Trends Panel to assess the association between Fox News viewership and public attitudes related to the COVID-19 pandemic. Wave 66, collected from April 20-26, 2020, includes information about perceived exaggeration of the COVID-19 by news outlets and public health officials (e.g., the Centers for Disease Control and Prevention, CDC). In particular, respondents were asked to give information about how closely they are following developments related to COVID-19 and whether they have a (self-reported) firm grasp
Figure 4: Fox News Viewers Believe COVID-19 Risks are Exaggerated and News Coverage is Too Negative and Inaccurate

Notes: Fox News Viewership status depicted as binary (primary news source). Base category (=0) is respondents that rely on cable news that is not Fox News or mainstream non-televised sources (i.e., National Public Radio, New York Times). Data drawn from 2020 PEW Research Center’s American Trends Panel, Wave 66 (Pathways & Trust in Media Survey). Survey was fielded from April 20-26, 2020.

on information related to the dangers of COVID-19.\(^5\) This data is useful for assessing the impact of and demand for slanted media that we analyse in Propositions 5 and 6.

Regression-based evidence is presented in the Table A-1. Fox News viewers are presented in the second horizontal bar (=1) of each plot. Figures 4(a) and 4(b) suggest Fox News viewers are significantly more likely to think news coverage and public health statements about COVID-19 exaggerate the severity of the pandemic. These individuals are also more

\(^5\)Details about the data and detailed information about surveys questions are available here: https://pewrsr.ch/2WXCD7i.
Figure 5: Fox News Viewers Report Following and Grasping News about COVID-19 Pandemic

(a) Grasp COVID-19 Information

(b) Follow COVID-19 Developments

Notes: Fox News Viewership status depicted as binary (primary news source). Base category (=0) is respondents that rely on cable news that is not Fox News or mainstream non-televised sources (i.e., National Public Radio, New York Times). Data drawn from 2020 PEW Research Center’s American Trends Panel, Wave 66 (Pathways & Trust in Media Survey). Survey was fielded from April 20-26, 2020.

likely to believe COVID-19 has been ‘overblown’ (Figure 4(c)) and is inaccurate (Figure 4(d)). This is what predicted by a combination of our Propositions 1 and 6: those who are the least likely to comply with the policy, either because their income is low or their ex ante perception of the threat is low, express demand for more slanted news.

Importantly, the fact that an agent has lower incentives to comply, she is rationally more interested in a higher media slant (Propositions 6 and 7). Fox News viewers are more skeptical of the severity of the threat and how it is being depicted by news organizations and public officials. Despite these attitudes, Fox News viewers report a particularly strong grasp of information about the pandemic (Figure 5(a)), though they are slightly less attentive to COVID-19 related developments than non-viewers (Figure 5(b)).

We now briefly summarize the stylized facts. First, compliance with pandemic quarantine policies is increasing with income and inequality. Second, exposure to slanted media that downplays the threat of COVID-19 is associated with decreased compliance. Third, exposure to a prominent slanted media source, Fox News, is associated with increased skepticism about the severity of the COVID-19 threat and beliefs that news coverage and statements by public
health officials exaggerate public health threats. These individuals also believe news coverage generally is too negative, inaccurate, and hurts the country (Figure A-1). Fourth, Fox News viewers report having a stronger grasp on COVID-19 related facts despite viewing following the slightly less attentively than non-viewers.

3 Setup

Our model considers an environment where a “shelter-in-place” ordinance is issued, and agents decide whether to comply with the order. Agents are heterogeneous in their incomes, and receive information about the health risks associated with not complying with the order. The health risks depend on the exogenous state of the world and the share of population who do not comply with the order. The information about the state of the world is provided by a media source that might be slanted towards downplaying or exaggerating the extent of health risks.

**Coronavirus threat**  There are two possible states of the world $s \in S = \{C, N\}$, where $s = C$ stands for *coronavirus threat* and $s = N$ stands for *no threat*. The ex ante probability of coronavirus threat is $\Pr(s = C) = \theta \in (0, 1)$. Throughout Section 4, we will fix the information $\mathcal{I}$ about the state. Let

$$q \equiv \Pr(s = C|\mathcal{I}) \in (0, 1)$$

denote the probability attached to coronavirus threat given the information $\mathcal{I}$.

**Income distribution**  There is a continuum of agents, denoted by $I$; the measure of $I$ is normalized to one. Agent $i \in I$ has income $w_i$, distributed according to $w_i \sim_{iid} F(\cdot)$, where $\text{supp}(F(\cdot)) \subseteq [0, \infty)$. 
Decision to comply  Each agent $i \in I$ makes a decision on whether or not to comply with the ordinance, denoted by $a_i \in A = \{c, n\}$, where $a_i = c$ corresponds to complying and $a_i = n$ corresponds to not complying. If agent $i$ complies, she consumes her income $w_i$. If she does not comply, she receives an additional income of $r > 0$, but she subjects herself to the increased risk of catching the disease. Parameter $r$ incorporates, in addition to benefits of non-compliance, the expected costs, e.g., fines.

Agent $i$’s probability of catching the disease $p(s, a_i, \gamma)$ depends on the state of the world $s$, $i$’s action $a_i$, and the measure of agents who do not comply with the order $\gamma = \int_{j \in I} I_{a_j = n} dj$. If the agent catches the disease, she incurs a health cost $H > 0$.

The following assumption summarizes the structure we impose on $p(\cdot, \cdot, \cdot)$, the function that describes the individual’s probability of catching the disease as a function of the underlying risk, her personal compliance behavior, and the number of others who comply.

**Assumption 1.** $p : S \times A \times [0, 1] \rightarrow [0, 1]$ satisfies the following:

(i) $p(N, a_i, \gamma) = 0$ for all $a_i \times \gamma \in A \times [0, 1]$, i.e., there are no health risks when there is no coronavirus threat.

(ii) $p(C, a_i, \gamma) > 0$ for all $a_i \times \gamma \in A \times (0, 1]$, i.e., agents are subject to health risks when there is coronavirus threat, regardless of their actions.

(iii) $p(C, n, \gamma) > p(C, c, \gamma)$ for all $\gamma \in (0, 1]$, i.e., the health risks are higher when an agent does not comply.

(iv) $p(C, a_i, \gamma)$ is strictly increasing in $\gamma \in [0, 1]$ for all $a_i \in A$, i.e., health risks are higher when more agents do not comply.

(v) The function $\Delta p : [0, 1] \rightarrow [0, 1]$ defined as

$$\Delta p(\gamma) \equiv p(C, n, \gamma) - p(C, c, \gamma)$$
is increasing in $\gamma \in [0,1]$, i.e., the relative health risk of not complying is higher when more agents do not comply.

Every element of Assumption 1 is a natural condition for function $p$. By (ii), an agent is subject to health risks even when she complies with the ordinance. Moreover, by (iv), such health risks are increasing in the number of people who do not comply. This captures the indirect effects of non-compliers on compliers through contact in public spaces, essential services, etc. (v) imposes a crucial supermodularity feature, which implies that the additional risk of non-compliance is decreasing in the share of compliers.

An example of a function that satisfies Assumption 1 is a function in which the probability of catching the disease for a non-complier is proportional to the share of non-compliers:

$$p(s, a_i, \gamma) = \mathbb{I}_{s = C} \cdot (t + (1 - t)\mathbb{I}_{a_i = n}) \cdot \gamma, \quad t \in (0,1)$$

**Utility functions** The utility function of agent $i$ is quasilinear and is given by:

$$u_i(s, \{a_j\}_{j \in I}) = v(w_i + \mathbb{I}_{a_i = n} \cdot r) - p(s, a_i, \int_{j \in I} \mathbb{I}_{a_j = n} dj) \cdot H$$

We assume that $v(\cdot) : \mathbb{R}^+ \to \mathbb{R}^+$ is strictly increasing, strictly concave, and satisfies the Inada conditions: $\lim_{x \to 0} v'(x) = \infty$ and $\lim_{x \to \infty} v'(x) = 0$. Functions $v(x) = \ln x$ and $v(x) = \sqrt{x}$ are standard examples. To guarantee having an interior solution, we also assume that

$$v(r) > H. \quad (1)$$

The agents are expected utility maximizers. Given information $\mathcal{I}$ that induces beliefs $q = \Pr(s = C|\mathcal{I})$, agent $i$’s expected utility is

$$\mathbb{E}_s[u_i(s, \{a_j\}_{j \in I})] = \begin{cases} v(w_i) - q \cdot p(C, c, \int_{j \in I} \mathbb{I}_{a_j = n} dj) \cdot H, & \text{if } a_i = c, \\ v(w_i + r) - q \cdot p(C, n, \int_{j \in I} \mathbb{I}_{a_j = n} dj) \cdot H & \text{if } a_i = n \end{cases}$$
**Equilibrium** Given information $\mathcal{I}$ that induces beliefs $q = \Pr(s = C|\mathcal{I})$, an equilibrium is an action profile $\{a_i^*(q)\}_{i \in I}$ such that,

$$a_i^*(q) \in \arg \max_{a \in A} \mathbb{E}_s[u_i(s, (a, \{a_j^*(q)\}_{j \in I \setminus \{i\}}))] \quad \text{for all } i \in I$$ (2)

**Media** Our definition of an equilibrium has agent receiving information $\mathcal{I}$ without specifying a source. To analyse the role of media exposure, in Section 5 we assume that agents receive information $\mathcal{I}$ from a media outlet, which operates as follows. It observes an informative signal $x \in [0, 1]$ about the state of the world $s$, where

$$x \sim G_s(\cdot), \quad s \in \{C, N\}$$

We assume that both c.d.f.s $G_C(\cdot)$ and $G_N(\cdot)$ are differentiable, have full support on $[0, 1]$, and their densities satisfy the monotone likelihood ratio property:

$$\frac{g_C(x)}{g_N(x)} \text{ is increasing in } x \in [0, 1].$$

That is, higher values of $x$ indicate a higher likelihood of $s = C$. To ensure an interior solution, we also assume that $\lim_{x \to 0} \frac{g_C(x)}{g_N(x)} = 0$ and $\lim_{x \to 1} \frac{g_C(x)}{g_N(x)} = \infty$. This is satisfied, for instance, when $g_C(x)$ is strictly increasing with $g_C(0) = 0$ and $g_N(x)$ is strictly decreasing with $g_N(1) = 0$.

The media source commits to a cutoff $m \in (0, 1)$ and sends a public report $\hat{s} \in \{\hat{C}, \hat{N}\}$ according to:

$$\hat{s} = \begin{cases} \hat{C}, & \text{if } x > m, \\ \hat{N}, & \text{if } x \leq m \end{cases}$$

\footnote{We rule out $m \in \{0, 1\}$ to get rid of a potential equilibrium multiplicity: $m = 0$ and $m = 1$ both correspond to fully uninformative messages. Given the assumption that $\lim_{x \to 0} \frac{g_C(x)}{g_N(x)} = 0$ and $\lim_{x \to 1} \frac{g_C(x)}{g_N(x)} = \infty$, there is always an interior solution.}
Agents receive the report from the media and update their beliefs about the probability of the threat before deciding on their actions. Given cutoff $m$, the belief $q^m(\hat{s})$ induced by report $\hat{s} \in \{\hat{C}, \hat{N}\}$ is calculated according to the Bayes’ Rule. Now, an equilibrium is an action profile $\{a^*_i(q^m(\hat{s}))\}_{i \in I}$ that satisfies (2) for each $\hat{s} \in \{\hat{C}, \hat{N}\}$.

Finally, note that a higher value of $m$ means $\hat{s} = \hat{N}$ signal is sent less frequently. A media source with higher cutoff therefore downplays the coronavirus threat, compared to a media source with lower $m$. We refer to $m$ as the slant of the media source, and a media source with higher $m$ is more slanted towards downplaying the coronavirus threat.

4 Determinants of Compliance

We start by analyzing individual behavior, which is a function of agent’s income, information she has, and behavior of other agents via probability of catching the disease. Proposition 1 describes the equilibrium in our model. All proofs are relegated to the Appendix.

**Proposition 1.** Given $q = \Pr(s = C|I) \in (0, 1)$, the equilibrium is characterized by a unique pair $(w^*, \gamma^*)$. $w^*$ is the threshold income such that agents with lower income than the threshold do not comply, whereas the agents with higher income shelter in place:

$$a^*_i(q) = \begin{cases} n, & \text{if } w_i < w^*, \\ c, & \text{if } w_i > w^*. \end{cases}$$

and

$$\gamma^* = \int_{j \in I} \mathbb{I}_{a^*_j(q) = n} dj$$

is the measure of non-compliers. Moreover,

(i) $\gamma^*$ is decreasing in $q$, i.e., more people shelter in place when the coronavirus threat is more likely.
(ii) \( \gamma^* \) is increasing in \( r \), i.e., fewer people shelter in place when non-compliance generates higher additional income.

(iii) \( \gamma^* \) is decreasing in \( H \), i.e., more people shelter in place when health costs are higher.

By Proposition 1, agents are split into two groups by income: those who have income above the critical threshold \( w^* \) comply with shelter-in-place policy, while those with income below \( w^* \) do not. An increase in the expected probability that there is a coronavirus threat, \( q \), or the cost of catching the disease, \( H \), has two consequences. First, agent \( i \)'s incentives to comply increase as the expected cost of non-compliance rises. Second, the same effect applies to every agent in the community, so that everyone has more incentives to comply. This in turn, makes non-compliance more attractive, as with other agents marginally more compliant the probability of catching the disease decreases. However, the individual effect dominates, so the net result of an increase in \( q \) or \( H \) is increasing compliance.

The effect of an increase in \( r \), the additional income from non-compliance, also has a general equilibrium component. When \( r \) rises, every agent’s incentives not to comply increase, thereby increasing the probability to catch the disease for everyone. Still, the direct effect dominates: a higher \( r \) leads to lower compliance. Vice versa, increased fines or other punishments for non-compliance, which correspond do a lower \( r \) in the model, result, naturally, in higher compliance.

In addition to results about individual decisions as a function of income, ex ante expectations, and expected costs of disease, one can do comparative statics with respect to the aggregate income distribution. The next result, Proposition 2, compares two communities with one community wealthier than the other one. For example, suppose that community 1 is wealthier than community 2; e.g., community 2 is more affected by a trade war. Mathematically, this corresponds to the distribution of income with c.d.f. \( F_1 (\cdot) \) first-order stochastically dominating the distribution with c.d.f. \( F_2 (\cdot) \): for any \( w \), \( F_1 (w) \leq F_2 (w) \) (Mas-Colell, Whinston and Green, 1995).
Proposition 2. Take two distributions of income $F_1(\cdot)$ and $F_2(\cdot)$ such that $F_1(\cdot)$ first-order stochastically dominates $F_2 (\cdot)$, and let $\gamma_i^*$ denote the measure of non-compliers when the income distribution is $F_i(\cdot), i \in \{1, 2\}$. Then $\gamma_1^* \leq \gamma_2^*$. That is, if community 1 is wealthier than community 2, then there is a larger share of sheltering in place in community 1, and the health risks imposed on the population are lower in community 1.

The results of Proposition 2 are consistent with the evidence based on difference-in-difference estimation of the effect of income on compliance in the U.S. This reported in Figures 1(a) and in 1(b) in Section 2: counties with above median income comply with shelter-in-place policies by reducing movement by an additional 72% relative the baseline policy impact.

To obtain comparative statics with respect to income inequality, we consider two income distributions $F_2(\cdot)$ and $F_1(\cdot)$ where the former is a mean-preserving spread of the latter. That is, $\mathbb{E}_{w \sim F_1}[w] = \mathbb{E}_{w \sim F_2}[w]$ and there exists a $z > 0$ such that

$$F_2(w) \geq F_1(w) \text{ if } w \leq z, \quad \text{and} \quad F_2(w) \leq F_1(w) \text{ if } w \geq z$$

Intuitively, $F_2(\cdot)$ is a “spread out” version of $F_1(\cdot)$, and thus $F_2(\cdot)$ is “more unequal” than $F_1(\cdot)$.

Proposition 3. Take two distributions $F_2(\cdot)$ and $F_1(\cdot)$ such that $F_2(\cdot)$ is a mean-preserving spread of $F_1(\cdot)$. Then, there exists a $q^* \in [0, 1]$ such that

$$\gamma_2^* \leq \gamma_1^* \text{ if } q \leq q^*, \quad \text{and} \quad \gamma_2^* \geq \gamma_1^* \text{ if } q \geq q^*$$

For a given $F_1(\cdot)$, $q^*$ rises with $z$. Moreover, there exists a $z > 0$ such that, if $z < z$, $q^* = 1$.

Proposition 3 demonstrates that non-compliance is higher in counties with more inequality only when the beliefs about the severity of coronavirus threat are high enough. By part

\footnote{This is a sufficient condition for $F_1(\cdot)$ to second-order stochastically dominate $F_2(\cdot)$ (Rothschild and Stiglitz, 1970).}
(i) of Proposition 1, an increase in $q$ unambiguously increases compliance rate. The magnitude of the effect, however, depends on the income distribution. In particular, an increase in $q$ from some $q_0 < q^*$ to $q_1 > q^*$ has a larger effect on the compliance rate of the more equal county. Intuitively, this is because the more equal county has more agents with incomes close to the mean income, so there is a stronger response to an increase in $q$ for intermediate values of $q$. Therefore, following such an increase in $q$, agents in the more unequal county are subject to higher health risks compared to agents in the more equal county.

The following is an example with an analytical solution to illustrate the economic intuition behind the second part of Proposition 3. Take $F_1(\cdot)$ such that

$$w_i \sim F_1(\cdot) \implies w = \begin{cases} w_1, & \text{w.p. } \alpha \\ w_1, & \text{w.p. } 1 - \alpha \end{cases} \alpha \in (0, 1)$$  \hspace{1cm} (3)

Define $z > 0$ such that

$$\frac{v(z + r) - v(\bar{z})}{\Delta p(\alpha) \cdot H} = 1$$

and assume that

$$w_1 < z$$ \hspace{1cm} (4)

Let

$$q_1 \equiv \frac{v(\bar{w}_1 + r) - v(\bar{w}_1)}{\Delta p(1) \cdot H}$$

$$\bar{q}_1 \equiv \frac{v(w_1 + r) - v(w_1)}{\Delta p(\alpha) \cdot H}$$
When (4) holds, the measure of non-compliers in equilibrium is

$$
\gamma^*_1 = \begin{cases} 
1, & \text{if } q \leq q_1, \\
\Delta p^{-1}\left(\frac{u(w_1+r)-u(w_1)}{qH}\right), & \text{if } q \in [q_1, \overline{q_1}], \\
\alpha, & \text{if } q \geq \overline{q}_1 
\end{cases}
$$

For sufficiently low values of $q$, no one complies and for sufficiently high values of $q$ only high-income agents comply. For intermediate values of $q$, the high-income agents are indifferent between complying and non-complying. Note that in any equilibrium under any $q$, low-income agents always non-comply. This is ensured by (4): their income levels are low enough so that they always have strong incentives to obtain the extra income $r$.

Now, take a mean-preserving spread of $F_1(\cdot)$. Consider $F_2(\cdot)$ such that

$$
w_i \sim F_2(\cdot) \implies w_i = \begin{cases} w_2, & \text{w.p. } \alpha \\
\overline{w}_2, & \text{w.p. } 1 - \alpha
\end{cases}
$$

with $\alpha \cdot w_1 + (1 - \alpha) \cdot \overline{w}_1 = \alpha \cdot w_2 + (1 - \alpha) \cdot \overline{w}_2$, and $w_2 < w_1 < \overline{w}_2 < \overline{w}_1$. The measure of non-compliers under $F_2(\cdot)$ is therefore given by (5), with the substitution of subscripts. Moreover, $\overline{w}_2 > \overline{w}_1$ implies that $q_2 < \overline{q}_1$, $\overline{q}_2 < \overline{q}_1$, and $\gamma^*_2 \leq \gamma^*_1$. Figure 6 illustrates the effect of inequality on compliance.

Panel (a) of Figure 6 shows that the second part of Proposition 3 applies to this case. As long as the income of low-income agents is below $\overline{w}_2$, such agents never comply. $\overline{w}_2 > \overline{w}_1$ means that a lower value of $q$ is sufficient to convince agents with income $\overline{w}_2$ for compliance. This is the reason why $\gamma^*_2 < \gamma^*_1$ for intermediate values of $q$, as shown in Panel (b) of Figure 6. Intuitively, the mean-preserving spread removes some agents who do not comply and replaces them with the agents with lower-income agents, who still do not comply. It also takes some high-income agents and replaces them with higher-income agents, who are more inclined to comply. The net effect is an increase in compliance rate. This is consistent with
Preferences over Enforcement Level  A policy tool available for the government is increasing the enforcement of the order or the fines for not complying with the order. This corresponds to a decrease in $r$. To study potential effects of such a policy, let us consider the following modification of the basic setup. Fix the beliefs about the state of the world, $q = \Pr (s = C|\mathcal{I}) \in (0, 1)$. The government chooses a level of enforcement, which translates into an $\hat{r} \in [0, r]$. As in the basic model, $r$ is the additional income from non-compliance without any enforcement by the government. Any $\hat{r} < r$ corresponds to some level of enforcement, whose equilibria is analyzed above. Lower values of $\hat{r}$ correspond to higher enforcement levels. $\hat{r} = 0$ is the case where the government orders a complete lockdown and fully enforces it. Each agent $i \in I$ has preferences over $\hat{r}$, with their most preferred enforcement level being the $\hat{r} \in [0, r]$ that maximizes the agent’s expected utility in equilibrium.

The next result suggests that there is substantial polarization in agents’ most preferred enforcement level. For analytical convenience in proving the proposition, we present the result assuming that $F(\cdot)$ is continuous. This in particular implies that $\gamma^* = F(w^*)$ in equilibrium. We state our results in terms of agents’ preferences over policy; the application of the pivotal voter approach (e.g., Persson and Tabellini, 2002) is straightforward.
Proposition 4. Suppose $F(\cdot)$ is continuous. Given $q \in (0,1)$ and $r > 0$, there exists some $\hat{w} > 0$ such that

(i) For $w_i < \hat{w}$, the most preferred enforcement level is $r_i^* = r$, i.e. low-income agents prefer no enforcement.

(ii) For $w_i > \hat{w}$, the most preferred enforcement level is $r_i^* = 0$, i.e. high-income agents prefer a complete shutdown.

The proof of Proposition 4 goes through showing that an individual’s preferences over $r$ are single-dipped. By part (ii) of Proposition 1, $w^*$ is increasing in $r$. This means, for every individual $i$, there is an $r_i^*$ such that if $r < r_i^*$ she complies with the order in equilibrium, and if $r > r_i^*$ she does not comply. Whenever an individual complies with the order, she prefers an $r$ that is as low as possible to minimize the number of non-compliers. On the contrary, when an individual does not comply with the order, a local increase in $r$ has two effects: (i) the direct positive effect of increased income from non-compliance, and (ii) the indirect negative effect of having more non-compliers. The direct effect always dominates, so an increase in $r$ leaves the individual better off. This results in single-dipped preferences, with the expected utility being minimized at $r_i^*$. Therefore, individuals have extreme preferences over $r$: their most preferred enforcement levels are either $\hat{r} = 0$ or $\hat{r} = r$. Due to the fact that utility function is concave in income, individuals with lower wealth levels, i.e., those are the least likely to comply, tend to prefer $\hat{r} = r$ over $\hat{r} = 0$.

5 The Role of Information

Evidence reported in Bursztyn et al. (2020); Painter and Qiu (2020); Wright et al. (2020); Anderson et al. (2020) demonstrates that sources of information played an important role determining the compliance behavior during the COVID-19 pandemics. In Section 2 we provided additional survey-based evidence about media consumption and attitudes towards
sources of information during the crisis. In this section, we analyze the mechanism that relate compliance decision to decisions about media consumption and use of information.

**Equilibrium with Slanted Media** We now consider the equilibria when information is provided by a media source with a cutoff $m \in (0, 1)$. Agents receive the report from the media outlet before deciding on their actions. Given a cutoff $m$, the beliefs induced by report $\hat{s}$, $q^m(\hat{s})$, are given by the Bayes’ Rule:

$$q^m(\hat{C}) \equiv \Pr(s = C | \hat{s} = \hat{C}) = \frac{\theta(1 - G_C(m))}{\theta(1 - G_C(m)) + (1 - \theta)(1 - G_N(m))}$$ (6)

$$q^m(\hat{N}) \equiv \Pr(s = C | \hat{s} = \hat{N}) = \frac{\theta G_C(m)}{\theta G_C(m) + (1 - \theta)G_N(m)}$$ (7)

The monotone likelihood ratio property implies first-order stochastic dominance, so that $G_C(m) \leq G_N(m)$. This in turn yields

$$q^m(\hat{C}) \geq \theta \geq q^m(\hat{N})$$

Therefore, upon hearing report $\hat{s} = \hat{C}$, agents adjust their beliefs about the coronavirus threat upwards. Similarly, $\hat{s} = \hat{N}$ makes people adjust their beliefs downwards.

Proposition 5 provides some preliminary findings about the equilibrium. They directly follow from the properties of equilibrium discussed in Proposition 1.

**Proposition 5.** Suppose that agents get their information from a media with a reporting threshold $m \in (0, 1)$. Each message $\hat{s} \in \{\hat{C}, \hat{N}\}$ induces a measure of non-compliers: $\gamma^*(\hat{C})$ and $\gamma^*(\hat{N})$. Moreover,

(i) $\gamma^*(\hat{C}) \leq \gamma^*(\hat{N})$, i.e., more people shelter in place when the media report is $\hat{C}$.

(ii) $\gamma^*(\hat{C})$ and $\gamma^*(\hat{N})$ are decreasing in $\theta$, i.e., more people shelter in place when the coronavirus threat is ex ante more likely.
(iii) $\gamma^*(\hat{C})$ and $\gamma^*(\hat{N})$ are decreasing in $m$, i.e., following a given report, more people shelter in place when the media source is more slanted towards downplaying the threat.

A discussion about Part (iii) of Proposition 5 is in order. At first, it may seem puzzling that a more slanted media source generates more compliance, fixing the report. This is indeed a very natural consequence of agents being Bayesian updaters. By (6), a higher $m$ means that $q^m(\hat{C})$ is larger: when a slanted media source sends a report about the severity of the coronavirus threat, it is a convincing signal in favor of $s = C$. Consequently, agents respond more and compliance is higher. Moreover, by (7), a higher $m$ means that $q^m(\hat{N})$ is larger as well. Individuals expect a slanted media source to send a report downplaying the coronavirus threat anyway, so beliefs do not adjust strongly following the occurrence of such an event. As a result, the non-compliance following $\hat{s} = \hat{N}$ is lower when such a report comes from a more slanted media source.

More crucially, part (iii) of Proposition 5 does not claim that the expected compliance is higher when the media is more slanted. A media source with a higher $m$ sends the $\hat{s} = \hat{N}$ report more frequently. Because $\gamma^*(\hat{N}) \geq \gamma^*(\hat{C})$, the expected compliance may still be higher. Indeed, the empirical findings reported in Figure 3, as well as in Bursztyn et al. (2020) and Painter and Qiu (2020), suggest that the frequency effect dominates: in U.S. counties with a higher share of viewership of media slanted against the coronavirus threat, the compliance is lower.

**Demand for Slanted Media** To analyze the expected impact of a change in media exposure, we will focus on an income distribution with two mass points. Take $F(\cdot)$ such that

$$
  w_i = \begin{cases} 
  \frac{w}{w}, & \text{w.p. } \alpha \\
  \frac{w}{\bar{w}}, & \text{w.p. } 1 - \alpha 
  \end{cases} \quad \alpha \in (0, 1) \quad (8)
$$
Moreover, assume that

\[
\frac{v(w + r) - v(w)}{\Delta p(\alpha) \cdot H} > 1 
\]

(9)

\[
\frac{v(\bar{w} + r) - v(\bar{w})}{\Delta p(\alpha) \cdot H} < \theta 
\]

(10)

Note that (9) is the same condition as in (4): it holds when \( w \) is low enough. Under this condition, the measure of non-compliers in equilibrium has an analytical solution, given in (5): low-income agents never comply, and high-income agents comply when \( q \) is high enough. The inequality in (10) holds when \( \bar{w} \) is sufficiently high. This condition ensures \( \bar{q} < \theta \); that is, in the absence of any information (i.e. when \( q = \theta \)), high-income agents comply with the order.

Given the equilibrium behavior of agents, the expected utility of an agent with income
\(w_i = \bar{w}\) in equilibrium when beliefs are \(q\) is

\[
U(\bar{w}, q) \equiv \begin{cases} 
  v(\bar{w} + r) - q \cdot p(C,n,1) \cdot H, & \text{if } q \leq \bar{q}, \\
  v(\bar{w}) - q \cdot p(C,n,\Delta p^{-1} \left( \frac{v(\bar{w} + r) - v(\bar{w})}{q \cdot H} \right)) \cdot H, & \text{if } q \in [\bar{q}, \bar{q}], \\
  v(\bar{w}) - q \cdot p(C,c,\alpha) \cdot H, & \text{if } q \geq \bar{q}
\end{cases}
\]

and the expected utility of an agent with income \(w_i = \bar{w}\) in equilibrium is

\[
U(\bar{w}, q) \equiv \begin{cases} 
  v(\bar{w} + r) - q \cdot p(C,n,1) \cdot H, & \text{if } q \leq \bar{q}, \\
  v(\bar{w} + r) - q \cdot p(C,n,\Delta p^{-1} \left( \frac{v(\bar{w} + r) - v(\bar{w})}{q \cdot H} \right)) \cdot H, & \text{if } q \in [\bar{q}, \bar{q}], \\
  v(\bar{w} + r) - q \cdot p(C,n,\alpha) \cdot H, & \text{if } q \geq \bar{q}
\end{cases}
\]

Figure 7 illustrates the utility functions.

Any level of slant \(m \in (0,1)\) generates a distribution of \(q\), which we denote by \(q \sim H^m\).

Then, the possible values of \(q\) are \(\{q^m(\hat{C}), q^m(\hat{N})\}\):

\[
q = \begin{cases} 
  q^m(\hat{C}), & \text{w.p. } \theta(1 - G_C(m)) + (1 - \theta)(1 - G_N(m)) \\
  q^m(\hat{N}), & \text{w.p. } \theta G_C(m) + (1 - \theta)G_N(m)
\end{cases}
\]

Note that, by Bayes’ Rule, \(E_{q \sim H^m}[q] = \theta\) for all \(m\). Moreover, \(q^m(\hat{N})\) and \(q^m(\hat{C})\) are increasing in \(m\) and

\[
\lim_{m \to 0} q^m(\hat{N}) = 0, \quad \lim_{m \to 0} q^m(\hat{C}) = \theta \\
\lim_{m \to 1} q^m(\hat{N}) = \theta, \quad \lim_{m \to 1} q^m(\hat{C}) = 1
\]

An agent with income \(w_i\) chooses from the family of distributions \(\{H^m\}_{m \in (0,1)}\). This setup then reduces to a restricted version of Kamenica and Gentzkow (2011), in which the sender can commit to only a family of disclosure rules. The optimization problem defines
the agent’s most-preferred cutoff:

$$m^*(w_i) = \arg \max_{m \in (0, 1)} \mathbb{E}_{q \sim H^m}[U(w_i, q)]$$  \hspace{1cm} (13)$$

Figure 8 illustrates a representative choice for agents between two media cutoffs $m_1$ and $m_2$, with $m_1 < m_2$. In this particular figure, both agents prefer $m_1$ over $m_2$.

Figure 8: Agents’ choices between $m_1$ and $m_2$, for $m_1 < m_2$.

It is possible for the maximizer to be multi-valued. In general, the most-preferred cutoff is a correspondence $m^* : \text{supp}(F(\cdot)) \rightarrow (0, 1)$. Whenever we compare two multi-valued objects, we use the natural generalization of greater-than order, the strong set order. Formally, for any two subsets $A, B \subseteq (0, 1)$,

$$A \geq_S B \quad \text{if for any} \ a \in A, b \in B, \ \min\{a, b\} \in B \ \text{and} \ \max\{a, b\} \in A.$$  

For singleton sets, this reduces to the usual order on real numbers. For intervals, this is equivalent to both upper and lower bounds of $A$ being greater than the respective bounds of $B$.

Proposition 6 shows that agents’ preferences towards a media source’s slant is inversely
related to their income levels.

**Proposition 6.** Suppose the income distribution is given by (8), and (9)-(10) are satisfied. Then,

(i) \( m^*(\mathbf{w}) \geq m^*(\mathbf{w}) \). That is, low-income agents prefer more slanted media sources compared to high-income agents.

(ii) \( m^*(\mathbf{w}) \) is decreasing in \( \mathbf{w} \) in the strong set order. That is, as the high-income agents’ income increases, these agents prefer less slanted media sources.

Part (i) of Proposition 6 suggests that there is a disparity among agents’ preferred slant levels. Low-income agents prefer a media source with higher \( m \). These media sources send \( \hat{s} = \hat{N} \) more frequently compared to the preferred media sources of high-income agents. Therefore, these media sources downplay the coronavirus threat compared to the preferred media sources of high-income agents.

Intuitively, the preferred slant of high-income agents reflects their desire for an informative media: they want a report that changes their behavior in equilibrium. Because their optimal choice without any information is compliance, they prefer a media source that sends a convincing \( \hat{s} = \hat{N} \) report. This is achieved only when \( \hat{s} = \hat{N} \) is sent infrequently, which requires a low value of \( m \). In contrast, low-income agents do not comply in any equilibrium, so they only care about the behavior of high-income agents. Due to the externalities generated by non-compliers, low-income agents prefer a media that minimizes the probability of high-income agents not complying. This is achieved only when the \( \hat{s} = \hat{N} \) report is not convincing enough to change the behavior of high-income agents, which requires a high value of \( m \).

Technically, the second part of Proposition 6 is reminiscent of Proposition 1 of Suen (2004), and uses a similar proof technique that relies on the submodularity of expected utility in \( \mathbf{w} \) and \( m \). Intuitively, as an agent becomes wealthier, she requires even stronger
\( \hat{s} = \hat{N} \) report not to comply. This translates into a media source with lower \( m \), i.e. one that overstates the coronavirus threat even further.

The proof of Proposition 6 also establishes that \( m^*(w_i) \) is independent of \( w \). Moreover, \( m^*(\bar{w}) = [\bar{m}, 1) \) with \( \bar{m} \) strictly decreasing in \( \bar{w} \). This suggests an easy comparison between the two economies whose income distributions are ranked in the sense of second-order stochastic dominance. In our context, this corresponds to comparing two communities with the same average income, with one income distribution being more unequal than the other.

**Proposition 7.** Take two distributions of income \( F_1(\cdot) \) and \( F_2(\cdot) \) that both satisfy (9) and (10). Suppose \( F_1(.) \) second-order stochastically dominates \( F_2(.) : \alpha \cdot w_1 + (1 - \alpha) \cdot w_1 = \alpha \cdot w_2 + (1 - \alpha) \cdot w_2, \) and \( w_2 < w_1 < w_1 < w_2. \) Then,

\[
m_1^*(w_1) \geq m_2^*(w_2) \quad m_1^*(w_1) \geq m_2^*(w_2)
\]

That is, if community 2 has more inequality than community 1, then individuals in community 2 prefer less slanted media sources compared to individuals in community 1.

Consider a local media source that responds to the distribution of agents’ most preferred media policies (e.g. by choosing the median or some weighted average of preferred policies). Proposition 7 implies that as the distribution of income becomes more unequal, the local media adopts a policy that the “overstates” the coronavirus threat, which implies a higher frequency of \( \hat{s} = \hat{C} \) reports. This results in \( \hat{s} = \hat{N} \) reports being sent rarely, but convincingly – convincing enough so that high-income agents do not comply after such reports.

An implication of this reasoning is the following. Suppose the media source chooses some \( m \in m^*(\bar{w}) \).\(^8\) Then, the occurrence of \( \hat{s} = \hat{N} \) reports are lower, and the expected non-compliance is lower. This is consistent with the findings reported in Figure 2: higher income inequality is associated with higher compliance rates. Our theory suggests that endogenous preferences towards less slanted media may be a driver of this empirical regularity.

\(^8\)This will be true, for instance, when the media source chooses the median demand and \( \alpha < \frac{1}{2} \).
6 Conclusion

We present a simple model of the political economy of compliance with government policies during a pandemic. The model is introduced in the context of the current COVID-19 crisis, where compliance with social distancing policies (shelter-in-place) is essential to limit interpersonal viral spread. We study how income influences compliance. Preferences for non-compliance, which is marginally decreasing with income, influences endogenous media consumption. Individuals for whom non-compliance is economically beneficial on the margin have a preference for information sources that downplay the severity of the pandemic threat. These results are consistent with empirical evidence which suggests that compliance is increasing with income and decreasing with exposure to slanted media. Results also highlight how meso-level factors, such as community income in levels or regional economic inequality, may influence compliance and, as a consequence, risks of transmission.

The model produces a more general set of results relevant to work on disinformation and slanted media. These results suggest endogenous preferences may partially explain the strong correlation between partisanship, polarization, disbelief of science and risky behaviors that may cause growth in COVID-19 exposure that is difficult to track (i.e., in low income communities where the ability to engage in active testing or contact tracing is lacking). Our model provides a theoretical microfoundation for this research agenda and could be extended to a range of alternative settings where political or economic factors impact risky behaviors and, in turn, the acquisition of information that reinforces these decisions.
References


Appendix

A1 Regression-based Assessment of Exposure to Slanted Media

Research Design  We leverage survey data collected as part of the Pew Research Center’s American Trends Panel to assess the association between Fox News viewership and public attitudes related to the COVID-19 pandemic. Wave 66, collected from April 20-26, 2020, is particularly useful as it includes information about perceived exaggeration of the COVID-19 by news outlets and public health officials (e.g., the Centers for Disease Control). The survey also asks respondents about their overall assessment of whether COVID-19 has been exaggerated or downplayed. Respondents are also asked whether news coverage is too negative sentiment, inaccurate, or hurts the country. Respondents were asked to given information about how closely they are following developments related to COVID and whether they have a firm grasp on information related to the dangers of COVID-19. Details about the data and detailed information about surveys questions are available here: https://pewrsr.ch/2WXCd7i. This data is most useful in assessing the descriptive association between viewership and attitudes towards news coverage of the pandemic. We extend the main figure in Figure A-1, which supplements the finding in 4(d) (regarding in accuracy).

Figure A-1: Fox News Viewers Believe News Coverage of COVID-19 is Too Negative and Hurts Country

Notes: Fox News Viewership status depicted as binary (primary news source). Base category (=0) is respondents that rely on cable news that is not Fox News or mainstream non-television sources (i.e., National Public Radio, New York Times). Data drawn from 2020 PEW Research Center’s American Trends Panel, Wave 66 (Pathways & Trust in Media Survey). Survey was fielded from April 20-26, 2020.

However, to rule out a set of confounding factors, we introduce regression-based evidence to clarify the results presented visually in the main text as Figures 4 and 5.

Our benchmark specification battery of demographic fixed effects, including urban/rural residence, region of residence, age, sex, education, ethnicity, citizenship, marital status, and religious affiliation. We study equation (A1):
\[ y_i = \alpha + \beta_1 fox_{\text{news}}_{i} + \omega r u r a l_i + \phi region_i + \lambda a g e_i + \theta s e x_i + \kappa e d u c_i + \delta e t h n i c_i \\
+ \zeta c i t i z e n_i + \eta m a r t i a l\_s t a t u s_i + \nu r e l i g i o n_i + \epsilon_i \]  

(A1)

where \( y_i \) is a model specific outcome variable that measures respondent attitudes. The specific parameter of interest is noted in the column headings of Table A-1, where we present the descriptive results. \( fox_{\text{news}}_i \) indicates whether a respondent reported Fox News as their primary source of political information in Wave 57 of the panel survey. This is the primary quantity of interest. The fixed effects are reported in the parameters between \( \omega \) and \( \nu \). Heteroskedasticity-robust standard errors are reported.

**Regression-based Descriptive Results**  Fox News viewership is associated with significantly higher level of skepticism towards news coverage of the pandemic overall. The results estimated using equation (A1) are reported in Table A-1. These results align closely with the descriptive patterns in Figures 4 and 5. Columns 1 and 2 suggest Fox News viewers are significantly more likely to report that news coverage and public health officials have exaggerated the threat of COVID-19. They also report that the overall threat has been largely overstated (Column 3). Fox News viewers also believe news coverage of COVID-19 is too negative in tone, inaccurate in its assessment of COVID-19, and hurts the country as a whole (Columns 4-6). Fox News viewers report following developments related to the pandemic slightly less closely than respondents getting their information from other sources (Column 7). Fox News viewers also state that they have a firmer grasp of information related to the threat posed by COVID-19 (Column 8). Taken together, these regression-based results suggest the visual descriptive evidence presented in the main text is robust to accounting for a battery of confounding factors. We emphasize interpreting these findings with care. These results illustrate robust descriptive patterns, not causal effects.
Table A-1: Association between Fox News viewership and perceptions of COVID-19 risks and news consumption/comprehension

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**SUMMARY STATISTICS**

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**MODEL FIXED EFFECTS**

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<td>Yes</td>
<td>Yes</td>
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**MODEL STATISTICS**

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Notes: Outcome of interest varies by column and is noted in each column heading. Columns 1 and 2 are five point scales centered at zero. Columns 3 through 6 are three point scales centered at zero. Column 7 is a four point scale from 1-4. Column 8 is a binary outcome. Fox News viewership is the quantity of interest. Results in Columns 1-6 correspond to Figure 4. Results in Columns 7-8 correspond to Figure 5. Additional parameters included in models indicated in table notes (included as fixed effects). Heteroskedasticity robust standard errors are reported in parentheses. Fox News Viewership status depicted as binary (primary news source). Base category (=0) is respondents that rely on cable news that is not Fox News or mainstream non-televised sources (i.e., National Public Radio, New York Times). Data drawn from 2020 PEW Research Center’s American Trends Panel, Wave 66 (Pathways & Trust in Media Survey). Survey was fielded from April 20-26, 2020. Stars indicate *** p < 0.01, ** p < 0.05, * p < 0.1.
A2 Proofs

Proof of Proposition 1. Given \( q \in (0, 1) \), by (2), in any equilibrium,

\[
a_i^*(q) = \begin{cases} n, & \text{if } q \cdot \Delta p(\gamma^*) \cdot H < v(w_i + r) - v(w_i) \\ c, & \text{if } q \cdot \Delta p(\gamma^*) \cdot H > v(w_i + r) - v(w_i) \end{cases} \tag{A2}
\]

Note that any equilibrium defines a unique \( \gamma^* \). We first show that for any \((q, \gamma^*)\) pair, there is a unique \( \omega(q, \gamma^*) \geq 0 \) such that

\[
\gamma^* = \begin{cases} n, & \text{if } w_i < \omega(q, \gamma^*) \\ c, & \text{if } w_i > \omega(q, \gamma^*) \end{cases}
\]

Since \( v(\cdot) \) is strictly concave, \( v(w_i + r) - v(w_i) \) is strictly decreasing in \( w_i \). Since \( v(r) > H \) by (1), \( q \cdot \Delta p(\gamma^*) \cdot H < v(0 + r) - v(0) \). Since \( \lim_{x \to \infty} v'(x) = 0 \), \( v(w_i + r) - v(w_i) \) converges to zero as \( w_i \to \infty \). Then,

- If \( q \cdot \Delta p(\gamma^*) \cdot H > 0 \), there is a unique \( w^* > 0 \) that satisfies
  \[
  q \cdot \Delta p(\gamma^*) \cdot H = v(w^* + r) - v(w^*) \tag{A3}
  \]
  Let this quantity be defined as \( \omega(q, \gamma^*) > 0 \).

- If \( q \cdot \Delta p(\gamma^*) \cdot H = 0 \), then
  \[
  q \cdot \Delta p(\gamma^*) \cdot H < v(w_i + r) - v(w_i)
  \]
  for all \( w_i \), and every agent finds it optimal not to comply. In this case, \( \omega(q, \gamma^*) = \infty \).

Note that, since the right-hand side of (A3) is continuous and strictly decreasing, \( \omega(q, \gamma^*) \) is continuous and strictly decreasing in \( q \) and \( \gamma^* \).

By (A2), \( a_i^* = n \) if \( w_i < \omega(q, \gamma^*) \) and \( a_i^* = c \) if \( w_i > \omega(q, \gamma^*) \). Therefore, in any equilibrium there is a threshold \( w^* \) such that those with wealth below \( w^* \) do not comply, whereas those with wealth above \( w^* \) comply. Then,

\[
\gamma^* \in \left[ \lim_{w \to w^*-} F(w), \lim_{w \to w^*+} F(w) \right] \tag{A4}
\]

Therefore, in any equilibrium the following must be satisfied:

\[
w^* \in \left[ \lim_{w \to w^*+} \omega(q, F(w)), \lim_{w \to w^*-} \omega(q, F(w)) \right] \tag{A5}
\]

Also, since \( \omega(q, \gamma) > 0 \) for any \( \gamma, w^* > 0 \) in any equilibrium.

Finally, we show that the equilibrium is unique for any \( q \in (0, 1) \). Since \( \omega(\cdot, \cdot) \) is strictly decreasing in its second argument, \( \omega(q, F(x)) - x \) is strictly decreasing in \( x \). Also, \( \omega(q, F(0)) - 0 > 0 \) and \( \lim_{x \to \infty} \omega(q, F(x)) - x < \omega(q, 1) - \lim_{x \to \infty} x < 0 \). Therefore, for any \( q \in (0, 1) \), there is a unique \( w^* \) that satisfies

\[
\lim_{w \to w^*+} \omega(q, F(w)) - w^* \leq 0 \leq \lim_{w \to w^*-} \omega(q, F(w)) - w^*
\]
By (A5), this is the unique threshold given \( q \).

The final step is proving the uniqueness of \( \gamma^* \). If \( \lim_{w \to w^*} F(w) = \lim_{w \to w^*} F(w) \), by (A4), \( \gamma^* = F(w^*) \) and the uniqueness of equilibrium directly follows. Otherwise, there is a unique \( \hat{\gamma} \in [\lim_{w \to w^*} F(w), \lim_{w \to w^*} F(w)] \) such that \( q \cdot \Delta p(\hat{\gamma}) \cdot H = v(w^* + r) - v(w^*) \). It must be that \( \gamma^* = \hat{\gamma} \) in equilibrium:

- If \( \gamma^* < \hat{\gamma} \), \( q \cdot \Delta p(\gamma^*) \cdot H < v(w^* + r) - v(w^*) \). By continuity of \( v(\cdot, \cdot) \), there exists some \( w_i > w^* \) such that \( a_i = n \), which contradicts \( w^* \) being the threshold wealth.

- If \( \gamma^* > \hat{\gamma} \), \( q \cdot \Delta p(\gamma^*) \cdot H > v(w^* + r) - v(w^*) \). By continuity of \( v(\cdot, \cdot) \), there exists some \( w_i < w^* \) such that \( a_i = c \), which contradicts \( w^* \) being the threshold wealth.

Therefore, given \( q \), the appropriate share of agents with threshold wealth comply, so that the share of non-compliers is \( \gamma^* \).

(i) To prove (i), take \( q_1, q_2 \) with \( q_1 < q_2 \) and assume, towards a contradiction, that \( \gamma_1^* < \gamma_2^* \). By (A5), the following equalities must hold:

\[
\begin{align*}
    w_1^* &= \omega(q_1, \gamma_1^*) \\
    w_2^* &= \omega(q_2, \gamma_2^*)
\end{align*}
\]

Because \( q_2 > q_1 \) and \( \gamma_2^* > \gamma_1^* \), and because \( \omega(\cdot, \cdot) \) is strictly decreasing in its arguments, \( \omega(q_2, \gamma_2^*) < \omega(q_1, \gamma_1^*) \). Then \( w_2^* < w_1^* \). By (A4), this implies \( \gamma_2^* \leq \gamma_1^* \), a contradiction.

(ii) To prove (ii), take \( r_1, r_2 \) with \( r_1 < r_2 \) and assume, towards a contradiction, that \( \gamma_1^* > \gamma_2^* \). By (A3):

\[
\begin{align*}
    q \cdot \Delta p(\gamma_1^*) \cdot H &= v(w_1^* + r_1) - v(w_1^*) \\
    q \cdot \Delta p(\gamma_2^*) \cdot H &= v(w_2^* + r_2) - v(w_2^*)
\end{align*}
\]

Since \( \gamma_1^* > \gamma_2^* \), \( \Delta p(\gamma_1^*) \geq \Delta p(\gamma_2^*) \). Because \( v(\cdot) \) is strictly concave, \( w_1^* < w_2^* \). By (A4), this implies \( \gamma_1^* \leq \gamma_2^* \), a contradiction.

(iii) To prove (iii), take \( H_1, H_2 \) with \( H_1 < H_2 \) and assume, towards a contradiction, that \( \gamma_1^* < \gamma_2^* \). By (A3):

\[
\begin{align*}
    q \cdot \Delta p(\gamma_1^*) \cdot H_1 &= v(w_1^* + r) - v(w_1^*) \\
    q \cdot \Delta p(\gamma_2^*) \cdot H_2 &= v(w_2^* + r) - v(w_2^*)
\end{align*}
\]

\( \gamma_1^* < \gamma_2^* \) and \( H_1 < H_2 \) implies \( q \cdot \Delta p(\gamma_1^*) \cdot H_1 < q \cdot \Delta p(\gamma_2^*) \cdot H_2 \). Because \( v(\cdot) \) is strictly concave, \( w_1^* > w_2^* \). By (A4), this implies \( \gamma_1^* \geq \gamma_2^* \), a contradiction.

\[\Box\]

Proof of Proposition 2. Take \( F_1(\cdot) \) and \( F_2(\cdot) \) such that \( F_1(x) \leq F_2(x) \) for all \( x \geq 0 \). Suppose, towards a contradiction, that \( \gamma_1^* > \gamma_2^* \). By (A5):

\[
\begin{align*}
    w_1^* &= \omega(q, \gamma_1^*) \\
    w_2^* &= \omega(q, \gamma_2^*)
\end{align*}
\]

Since \( \omega(\cdot, \cdot) \) is strictly decreasing in its second argument, \( w_1^* < w_2^* \). But then, \( F_1(w_1^*) \leq F_2(w_1^*) \) and assume, towards a contradiction, that \( F_1(w_1^*) < F_2(w_1^*) \). By (A4), this implies \( \gamma_1^* \leq \gamma_2^* \), a contradiction.

\[\Box\]
Proof of Proposition 3. To highlight the dependence of equilibrium on $q$, we will use the notation $w^*(q)$ and $\gamma^*(q)$. Given any $q \in (0, 1)$, the equilibrium under distribution $F_1(\cdot)$ is characterized by $(w_1^*(q), \gamma_1^*(q))$. By (A3) and (A4),
\[ q \cdot \Delta p(\gamma_1^*(q)) \cdot H = v(w_1^*(q) + r) - v(w_1^*(q)) \]
\[ \gamma_1^*(q) \in \lim_{x \to w_1^*(q)-} F_1(x), \lim_{x \to w_1^*(q)+} F_1(x) \]
(\text{A6})

Similarly, the equilibrium under distribution $F_2(\cdot)$ is characterized by $(w_2^*(q), \gamma_2^*(q))$, which satisfy:
\[ q \cdot \Delta p(\gamma_2^*(q)) \cdot H = v(w_2^*(q) + r) - v(w_2^*(q)) \]
\[ \gamma_2^*(q) \in \lim_{x \to w_2^*(q)-} F_2(x), \lim_{x \to w_2^*(q)+} F_2(x) \]
(\text{A8})

Define $\hat{\gamma} \in (0, 1)$ such that
\[ \hat{\gamma} \equiv \lim_{x \to z-} F_2(x) \]
(\text{A10})

By part (i) of Proposition 1, $\gamma_1^*(q)$ and $\gamma_2^*(q)$ are decreasing in $q$, with $\lim_{q \to 0} \gamma_1^*(q) = \lim_{q \to 0} \gamma_2^*(q) = 1$. Consider four exhaustive cases:

1. Suppose $\lim_{q \to 1} \gamma_1^*(q) < \hat{\gamma}$ and $\lim_{q \to 1} \gamma_2^*(q) < \hat{\gamma}$. Then, there exists some $q_1^* \in (0, 1)$ such that
\[ \gamma_1^*(q_1^*) = \hat{\gamma} \]

Since $\lim_{x \to z-} F_2(x) \geq \lim_{x \to z-} F_1(x)$, $\hat{\gamma} \in [\lim_{x \to z-} F_1(x), \lim_{x \to z+} F_1(x)]$. By (A6), then, $q_1^*$ satisfies:
\[ q_1^* \cdot \Delta p(\hat{\gamma}) \cdot H = v(z + r) - v(z) \]
(\text{A11})

Similarly, there exists some $q_2^* \in (0, 1)$ such that
\[ \gamma_2^*(q_2^*) = \hat{\gamma} \]

By construction, $\hat{\gamma} \in [\lim_{x \to z-} F_2(x), \lim_{x \to z+} F_2(x)]$. By (A8), $q_2^*$ satisfies:
\[ q_2^* \cdot \Delta p(\hat{\gamma}) \cdot H = v(z + r) - v(z) \]
(\text{A12})

By (A11) and (A12), $q_1^* = q_2^*$. Let
\[ q^* \equiv q_1^* = q_2^* \in (0, 1) \]

- Take any $q \leq q^*$. Note that, since $\gamma_1^*(q)$ is decreasing in $q$, $\gamma_1^*(q) \geq \gamma_1^*(q^*) = \hat{\gamma}$. Then, (A7) and (A10) imply: $w_1^*(q) \geq z$. By the same argument, (A9) and (A10) imply: $w_2^*(q) \geq z$.

Our claim is that $\gamma_1^*(q) \geq \gamma_2^*(q)$. Suppose, towards a contradiction, that $\gamma_1^*(q) < \gamma_2^*(q)$. By (A6) and (A8), $w_1^*(q) > w_2^*(q)$. Because $w_1^*(q) \geq z$ and $w_2^*(q) \geq z$, then, $F_1(w_1^*(q)) \geq F_2(w_2^*(q))$. By (A7) and (A9), $\gamma_1^*(q) \geq \gamma_2^*(q)$, a contradiction.
• Take any $q \geq q^*$. Note that, since $\gamma_1^*(q)$ is decreasing in $q$, $\gamma_1^*(q) \leq \gamma_1^*(q^*) = \hat{\gamma}$. Then, (A7) and (A10) imply: $w_1^*(q) \leq z$. By the same argument, (A9) and (A10) imply: $w_2^*(q) \leq z$.

Our claim is that $\gamma_1^*(q) \leq \gamma_2^*(q)$. Suppose, towards a contradiction, that $\gamma_1^*(q) > \gamma_2^*(q)$. By (A6) and (A8), $w_1^*(q) < w_2^*(q)$. Because $w_1^*(q) \leq z$ and $w_2^*(q) \leq z$, then, $F_1(w_1^*(q)) \leq F_2(w_2^*(q))$. By (A7) and (A9), $\gamma_1^*(q) \leq \gamma_2^*(q)$, a contradiction.

2. Suppose $\lim_{q \to 1} \gamma_1^*(q) \geq \hat{\gamma}$ and $\lim_{q \to 1} \gamma_2^*(q) \geq \hat{\gamma}$. Then, for all $q \in (0, 1)$, $\gamma_1^*(q) \geq \hat{\gamma}$.

By (A7) and (A10), $F_1(w_1^*(q)) \geq F_1(z)$, which implies: $w_1^*(q) \geq z$. Similarly, by (A9) and (A10), $w_2^*(q) \geq z$ for all $q$.

Our claim is that $\gamma_1^*(q) \geq \gamma_2^*(q)$ for all $q \in (0, 1)$. Suppose, towards a contradiction, that $\gamma_1^*(q) < \gamma_2^*(q)$ for some $q$. By (A6) and (A8), $w_1^*(q) > w_2^*(q)$. Because $w_1^*(q) \geq z$ and $w_2^*(q) \geq z$, then, $F_1(w_1^*(q)) \geq F_2(w_2^*(q))$. By (A7) and (A9), $\gamma_1^*(q) \geq \gamma_2^*(q)$, a contradiction. In this case, setting $q^* = 1$ yields the result.

3. Suppose $\lim_{q \to 1} \gamma_1^*(q) \geq \hat{\gamma}$ and $\lim_{q \to 1} \gamma_2^*(q) < \hat{\gamma}$. Then, for all $q \in (0, 1)$, $\gamma_1^*(q) \geq \hat{\gamma}$.

By (A7) and (A10), $F_1(w_1^*(q)) \geq F_1(z)$. Thus, $w_1^*(q) \geq z$. Also, there exists some $q_2^* \in (0, 1)$ such that

$$\gamma_2^*(q_2^*) = \hat{\gamma}$$

• Take any $q \leq q_2^*$. Since $\gamma_2^*(q)$ is decreasing in $q$, $\gamma_2^*(q) \geq \hat{\gamma}$. (A9) and (A10) imply: $w_2^*(q) \geq z$.

Our claim is that $\gamma_1^*(q) \geq \gamma_2^*(q)$. Suppose, towards a contradiction, that $\gamma_1^*(q) < \gamma_2^*(q)$. By (A6) and (A8), $w_1^*(q) > w_2^*(q)$. Because $w_1^*(q) \geq z$ and $w_2^*(q) \geq z$, then, $F_1(w_1^*(q)) \geq F_2(w_2^*(q))$. By (A7) and (A9), $\gamma_1^*(q) \geq \gamma_2^*(q)$, a contradiction.

• Take any $q \geq q_2^*$. Since $\gamma_2^*(q)$ is decreasing in $q$, $\gamma_2^*(q) \leq \hat{\gamma}$. Therefore, $\gamma_1^*(q) \geq \hat{\gamma} \geq \gamma_2^*(q)$.

Since $\gamma_1^*(q) \geq \gamma_2^*(q)$ for all $q \in (0, 1)$, setting $q^* = 1$ yields the result.

4. Suppose $\lim_{q \to 1} \gamma_1^*(q) < \hat{\gamma}$ and $\lim_{q \to 1} \gamma_2^*(q) \geq \hat{\gamma}$. There exists some $q^* \in (0, 1)$ such that

$$\gamma_1^*(q^*) = \hat{\gamma}$$

Also, for all $q \in (0, 1)$, $\gamma_2^*(q) \geq \hat{\gamma}$. By (A9) and (A10), $F_2(w_2^*(q)) \geq F_2(z)$. Thus, $w_2^*(q) \geq z$.

• Take any $q \leq q^*$. Since $\gamma_1^*(q)$ is decreasing in $q$, $\gamma_1^*(q) \geq \hat{\gamma}$. (A7) and (A10) imply: $w_1^*(q) \geq z$.

Our claim is that $\gamma_1^*(q) \geq \gamma_2^*(q)$. Suppose, towards a contradiction, that $\gamma_1^*(q) < \gamma_2^*(q)$. By (A6) and (A8), $w_1^*(q) > w_2^*(q)$. Because $w_1^*(q) \geq z$ and $w_2^*(q) \geq z$, then, $F_1(w_1^*(q)) \geq F_2(w_2^*(q))$. By (A7) and (A9), $\gamma_1^*(q) \geq \gamma_2^*(q)$, a contradiction.

• Take any $q \geq q^*$. Since $\gamma_1^*(q)$ is decreasing in $q$, $\gamma_1^*(q) \leq \hat{\gamma}$. Therefore, $\gamma_2^*(q) \geq \hat{\gamma} \geq \gamma_1^*(q)$.
Since the four cases are exhaustive, the proof of the first part follows. For the second part, note that by (A10), a lower value of \( z \) corresponds to a lower value of \( \hat{\gamma} \). In cases 1 and 4, this results in a higher value of \( q^* \). In cases 2 and 3, \( q^* = 1 \) does not change.

Finally, set \( \tilde{z} \) such that
\[
v(\tilde{z} + r) - v(\tilde{z}) = \Delta p(1) \cdot H
\]
Since \( v(r) > H \) by (1), this equality is satisfied for some \( \tilde{z} > 0 \).

Take any \( z < \tilde{z} \). For any agent with \( w_i \leq z \),
\[
v(w_i + r) - v(w_i) > q \cdot \Delta p(\gamma_1^*(q)) \cdot H
\]
for any \( q \in (0, 1) \). By (A2), \( a_i^* = n \) in any equilibrium. Therefore, \( \lim_{q \to 1} \gamma_1^*(q) > F_1(z) \).

By the same argument, \( \lim_{q \to 1} \gamma_2^*(q) > F_2(z) \). This corresponds to case 2 above, where \( q^* = 1 \).

**Proof of Proposition 4.** As discussed in the main text, we begin by showing that the preferences over \( r \) are single-dipped. Fix \( q \in (0, 1) \). For any \( r \), by Proposition 1, there is a threshold income that distinguishes compliers and non-compliers in equilibrium. To emphasize its dependence on \( r \), denote this threshold by \( w^*(r) \). It is given by the indifference condition:
\[
v(w^*(r) + r) - v(w^*(r)) = q \cdot \Delta p (F(w^*(r))) \cdot H
\]
(A13)

By part (ii) of Proposition 1, \( w^*(r) \) is strictly increasing in \( r \) with \( w^*(0) = 0 \). Therefore, it has an inverse function \( \rho(w) \), which is strictly increasing in \( w \) with \( \rho(0) = 0 \). \( \rho(w) \) is the value of \( r \) that leaves an agent with income \( w \) indifferent between complying and non-complying.

If \( r > \rho(w) \) the agent does not comply in equilibrium, if \( r < \rho(w) \) she complies.

The expected utility of an agent \( i \) in equilibrium is
\[
\mathbb{E}[u_i] = \begin{cases} 
v(w_i) - q \cdot p(C, c, F(w^*(r))) \cdot H, & \text{if } r < \rho(w_i) \\
v(w_i + r) - q \cdot p(C, n, F(w^*(r))) \cdot H, & \text{if } r > \rho(w_i) 
\end{cases}
\]
(A14)

Now,

- If \( r < \rho(w_i) \),
\[
\frac{\partial \mathbb{E}[u_i]}{\partial r} = -q \cdot p_3(C, c, F(w^*(r))) \cdot H \cdot f(w^*(r)) \cdot \frac{\partial w^*(r)}{\partial r} < 0
\]
by Assumption 1

- If \( r > \rho(w_i) \),
\[
\frac{\partial \mathbb{E}[u_i]}{\partial r} = v'(w_i + r) - q \cdot p_3(C, n, F(w^*(r))) \cdot H \cdot f(w^*(r)) \cdot \frac{\partial w^*(r)}{\partial r}
\]
(A15)

Taking the derivative of (A13) with respect to \( r \):
\[
v'(w^*(r) + r) \left( \frac{\partial w^*(r)}{\partial r} + 1 \right) - v'(w^*(r)) \frac{\partial w^*(r)}{\partial r} = q \cdot \Delta p'(F(w^*(r))) \cdot H \cdot f(w^*(r)) \cdot \frac{\partial w^*(r)}{\partial r}
\]
(A16)
Recall that \( p(C, n, \gamma) = p(C, c, \gamma) + \Delta p(\gamma) \), and therefore
\[
p_3(C, n, \gamma) = p_3(C, c, \gamma) + \Delta p(\gamma) \geq \Delta p'(\gamma) \geq 0 \text{ by Assumption 1}
\]

(A15) then implies:
\[
\frac{\partial E[u_i]}{\partial r} \geq v'(w_i + r) - q \cdot \Delta p'(F(w^*(r))) \cdot H \cdot f(w^*(r)) \cdot \frac{\partial w^*(r)}{\partial r}
\]
Substituting this into (A16):
\[
\frac{\partial E[u_i]}{\partial r} \geq v'(w_i + r) - \left( v'(w^*(r) + r) \cdot \left( \frac{\partial w^*(r)}{\partial r} + 1 \right) - v'(w^*(r)) \frac{\partial w^*(r)}{\partial r} \right)
\]
\[
= v'(w_i + r) - v'(w^*(r) + r) - \left( v'(w^*(r) + r) - v'(w^*(r)) \right) \frac{\partial w^*(r)}{\partial r} > 0
\]

If \( w_i \) is high enough so that \( \rho(w_i) > r \), \( E[u_i] \) is decreasing in \( \hat{r} \in [0, r] \), so the agent’s most preferred enforcement level is \( \hat{r} = 0 \). Otherwise, since the utility is decreasing in \( \hat{r} \) for \( \hat{r} < \rho(w_i) \) and increasing in \( \hat{r} \) for \( \hat{r} > \rho(w_i) \), the value of \( \hat{r} \in [0, r] \) that maximizes the utility is either \( \hat{r} = 0 \) or \( \hat{r} = r \). An agent with wealth \( w_i \) then compares:
\[
v(w_i) - q \cdot p(C, c, 0) \cdot H
\]
and
\[
v(w_i + r) - q \cdot p(C, n, F(w^*(r))) \cdot H
\]
An agent \( i \) prefers \( \hat{r} = r \) over \( \hat{r} = 0 \) if and only if:
\[
v(w_i + r) - v(w_i) > q \cdot (p(C, n, F(w^*(r))) - p(C, c, 0)) \cdot H
\]
By (1), \( v(r) > H \) so that the inequality holds for \( w_i = 0 \). Since \( v(\cdot) \) is concave, the left-hand side is decreasing in \( w_i \). Therefore, there is a threshold \( \hat{w} > 0 \) such that this inequality holds if and only if \( w_i < \hat{w} \).

**Proof of Proposition 5.** The equilibrium description follows from Proposition 1.

(i) Part (i) follows from the fact that \( q^m(\widehat{N}) \leq q^m(\widehat{C}) \), and part (i) of Proposition 1.

(ii) By (6) and (7), \( q^m(\widehat{s}) \) is strictly increasing in \( \theta \) for \( \widehat{s} \in \{\widehat{C}, \widehat{N}\} \). Thus, by part (i) of Proposition 1, \( \gamma^*(\widehat{s}) \) is decreasing in \( \theta \).

(iii) We first show that \( q^m(\widehat{s}) \) is increasing in \( m \) for \( \widehat{s} \in \{\widehat{C}, \widehat{N}\} \). By (6),
\[
\frac{\partial q^m(\widehat{C})}{\partial m} = \frac{\theta(1 - \theta)}{(\theta(1 - G_c(m)) + (1 - \theta)(1 - G_N(m)))^2} (g_N(m)(1 - G_C(m)) - g_C(m)(1 - G_N(m))) > 0
\]
Since $g_C(\cdot)$ and $g_N(\cdot)$ satisfy the monotone likelihood ratio property, for any $m' \geq m$,

\[
\frac{g_C(m')}{g_N(m')} \geq \frac{g_C(m)}{g_N(m)} \implies g_C(m')g_N(m) \geq g_C(m)g_N(m')
\]

\[
\implies \int_m^1 g_C(m')g_N(m)dm' \geq \int_m^1 g_C(m)g_N(m')dm'
\]

\[
\implies g_N(m)(1 - G_C(m)) \geq g_C(m)(1 - G_N(m))
\]

\[
\implies g_N(m)(1 - G_C(m)) - g_C(m)(1 - G_N(m)) \geq 0
\]

Substituting, we conclude that $\frac{\partial q^m(\hat{C})}{\partial m} \geq 0$. Similarly, by (7),

\[
\frac{\partial q^m(\hat{N})}{\partial m} = \frac{\theta(1 - \theta)}{(\theta G_C(m) + (1 - \theta)G_N(m))^2} (g_C(m)G_N(m) - g_N(m)G_C(m)) > 0
\]

By the monotone likelihood ratio property, for any $m \geq m'$,

\[
\frac{g_C(m)}{g_N(m)} \geq \frac{g_C(m')}{g_N(m')} \implies g_C(m)g_N(m') \geq g_C(m')g_N(m)
\]

\[
\implies \int_0^m g_C(m)g_N(m')dm' \geq \int_0^m g_C(m')g_N(m)dm'
\]

\[
\implies g_C(m)G_N(m) \geq g_N(m)G_C(m)
\]

\[
\implies g_C(m)G_N(m) - g_N(m)G_C(m) \geq 0
\]

Substituting, we conclude that $\frac{\partial q^m(\hat{N})}{\partial m} \geq 0$.

Since $q^m(\hat{s})$ is increasing in $m$ for $\hat{s} \in \{\hat{C}, \hat{N}\}$, by part (i) of Proposition 1, $\gamma^*(\hat{s})$ is decreasing in $m$.

\[ \Box \]

**Proof of Proposition 6.** We start with the most-preferred cutoff of agents with $w_i = \bar{w}$. Define $\bar{m} \in (0, 1)$ such that $q^m(\hat{N}) = \bar{q}$, i.e.

\[
\frac{\theta G_C(\bar{m})}{\theta G_C(\bar{m}) + (1 - \theta)G_N(\bar{m})} = \frac{v(\bar{w} + r) - v(\bar{w})}{\Delta p(\alpha) \cdot H}
\]

Take any $m \geq \bar{m}$. By monotonicity of $q^m(\hat{N})$ in $m$, for all such $m$, $q^m(\hat{N}) \geq \bar{q}$. Since $q^m(\hat{C}) \geq q^m(\hat{N})$, we also have $q^m(\hat{C}) \geq \bar{q}$ for all such $m$. By (12),

\[
U(w, q) = v(w + r) - q \cdot p(C, c, \alpha) \cdot H, \quad \text{for } q \in \{q^m(\hat{N}), q^m(\hat{C})\} \text{ with } m \geq \bar{m}
\]

Then, for any $m \geq \bar{m}$,

\[
\mathbb{E}_{q \sim H^m}[U(w, q)] = \mathbb{E}_{q \sim H^m}[v(w + r) - q \cdot p(C, c, \alpha) \cdot H]
\]

\[
= v(w + r) - \mathbb{E}_{q \sim H^m}[q] \cdot p(C, c, \alpha) \cdot H
\]

\[
= v(w + r) - \theta \cdot p(C, c, \alpha) \cdot H
\]
which is independent of \( m \). Now, take any \( m < \overline{m} \). Once again, by monotonicity of \( q^m(\hat{N}) \), \( q^m(\hat{N}) < \overline{q} \) for all such \( m \). Since \( q^m(\hat{C}) > \theta > \overline{q} \), we have \( q^m(\hat{C}) \geq \overline{q} \) for all such \( m \). By (12),

\[
U(w, q) = \begin{cases} 
v(w + r) - q_0^m \cdot p(C, c, \gamma) \cdot H, & \text{for } q = q^m(\hat{N}), \\
v(w + r) - q_1^m \cdot p(C, c, \alpha) \cdot H, & \text{for } q = q^m(\hat{C}).
\end{cases}
\]

Then, for any \( m < \overline{m} \),

\[
\mathbb{E}_{q \sim H^m}[U(w, q)] \\
= v(w + r) - \left( \Pr(q = q^m(\hat{N})) \cdot q^m(\hat{N}) \cdot p(C, c, \gamma) + \Pr(q = q^m(\hat{C})) \cdot q^m(\hat{C}) \cdot p(C, c, \alpha) \right) \cdot H \\
< v(w + r) - \left( \Pr(q = q^m(\hat{N})) \cdot q^m(\hat{N}) \cdot p(C, c, \gamma) + \Pr(q = q^m(\hat{C})) \cdot q^m(\hat{C}) \cdot p(C, c, \alpha) \right) \cdot H \\
= v(w + r) - \left( \Pr(q = q^m(\hat{N})) \cdot q^m(\hat{N}) + \Pr(q = q^m(\hat{C})) \cdot q^m(\hat{C}) \right) \cdot p(C, c, \alpha) \cdot H \\
= v(w + r) - \mathbb{E}_{q \sim H^m}[q] \cdot p(C, c, \alpha) \cdot H \\
= v(w + r) - \theta \cdot p(C, c, \alpha) \cdot H
\]

This argument establishes that \( \mathbb{E}_{q \sim H^m}[U(w, q)] < \mathbb{E}_{q \sim H^m}[U(w, q)] \) for any \( m' < \overline{m} \leq m'' \), and \( \mathbb{E}_{q \sim H^m}[U(w, q)] = \mathbb{E}_{q \sim H^m}[U(w, q)] \) for any \( m'' \geq \overline{m} \). We conclude that \( m^*(w) = [\overline{m}, 1) \).

Now, consider the most-preferred cutoff of agents with \( w_i = \overline{w} \). Our claim is that \( \sup m^*(\overline{w}) \leq \overline{m} \). To see this, suppose, towards a contradiction, that \( \sup m^*(\overline{w}) > \overline{m} \). Take \( m \in m^*(\overline{w}) \setminus (0, \overline{m}) \). Using the same argument as above, one can show

\[
\mathbb{E}_{q \sim H^m}[U(\overline{w}, q)] = v(\overline{w} + r) - \theta \cdot p(C, c, \alpha) \cdot H
\]

This implies that information obtained under media policy \( m \) does not have any value for an agent with \( w_i = \overline{w} \), as she receives the payoff she would receive absent any information. But the agent can receive a strictly higher payoff by choosing \( m' = \epsilon > 0 \) small enough, a contradiction. We conclude that \( \sup m^*(\overline{w}) \leq \overline{m} \).

This argument establishes that any \( m \in m^*(\overline{w}) \) satisfies:

\[
q^m(\hat{N}) < \overline{q} < q^m(\hat{C})
\]

Thus, for an agent with \( w_i = \overline{w} \), under the media policy \( m \in m^*(\overline{w}) \), \( n \in a^*_t(q^m(\hat{N})) \) and \( a^*_t(q^m(\hat{C})) = c \). The optimization problem in (13) can then be written as:

\[
\max_{m \in (0,1)} \left( \theta G_C(m) + (1 - \theta) G_N(m) \right) \cdot \left( v(w + r) - q^m(\hat{N}) \cdot p(C, n, \gamma^*(q^m(\hat{N}))) \cdot H \right) \\
+ \left( \theta(1 - G_C(m)) + (1 - \theta)(1 - G_N(m)) \right) \left( v(w) - q^m(\hat{N}) \cdot p(C, c, \alpha) \cdot H \right)
\]

Note that the objective function is submodular in \( (w, m) \):

\[
\frac{\partial^2}{\partial w \partial m} \mathbb{E}_{q \sim H^m}[U(w, q)] = \left( v'(w + r) - v'(\overline{w}) \right) \cdot \left( \theta g_C(m) + (1 - \theta) g_N(m) \right) < 0
\]

By Topkis (1998), \( m^*(\overline{w}) \) is decreasing in \( \overline{w} \) in the strong set order. \( \square \)