The Effect of Fake News On Elections: A Model With Inattentive Voters

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Abstract

This thesis analyses how political leadership can use fake news to shroud its incompetence from the public. Fake news are distractive because voters find it costly to follow multiple media channels and often satisfied with the information provided by the government. I find that when having an incompetent governance decreases voters' utility substantially they pay attention to the media and fake news cannot distract them. However, when incompetence have a moderate social cost the government effectively shrouds its incapabilities. My model also predicts that when attention is to various media channels is too costly citizens will settle with the governmental media and are subject to distractive fake news. Additionally, prior uncertainty about the competence of political parties has a positive impact on news consumption which discourages the government from publishing hoaxes.

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1. Introduction

Modern information technology offers various ways to follow news about social, political and economic questions. Political parties all established media channels to accommodate to the new trends: websites, social media accounts, blogs and multiple additional ways to communicate with voters. This provides citizens the opportunity to get information on topics in many different angles and from numerous sources. However, Prior (2005) finds that regardless the large number of news providers, people search their preferred content in the media and do not pay attention to other channels. By following only their favorite sources, voters become exposed to potential biases and misleading information. For example, the Hungarian government is often accused by the opposition that it uses the migration crisis to distract public attention from domestic problems. People who only follow governmental media channels might not hear about these issues and develop a false belief about the current economic environment. In my thesis I analyze how governments can use fake news as a distraction to maintain and increase their political support.

I construct a game theoretical model with two kinds of players, a government and a continuum of Bayesian citizens[1]. The government's objective is to stay in office while citizens are motivated to elect a competent political party. There are two possible states of the world, the government is either competent or not. People make their voting decision using information on the government's quality which is acquired from the media. Electing an incompetent party has a social cost, it decreases citizens' utility. By default, voters

[1]My framework is built on Gehlbach and Sonin (2014) who analyze the factors leading to governmental media control

follow the news provided by the government. It is possible to gain additional information via other media channels for an extra cost. Voters who are willing to pay this cost and search for additional news content are called attentive and those who are not are named inattentive.

The government uses news to influence public belief. Media conveys a binary message about the government's competence. I assume that this message sends the truth unless the government decides to release fake news. Fake news distract inattentive voters, they do not learn about the incompetence of the government. At the beginning of the game the government commits to a media policy, it chooses a probability with which it releases fake news. Voters learn about this commitment and decide whether they will follow additional media channels for an extra cost. When these actions are made, the media sends the message about the government's quality. When the government is competent, every citizen learns about it. When it is incompetent, inattentive citizens only realize this if there are no fake news released which would distract them from learning the true state of the world.

The novelty of my approach is the inclusion of attention into media bias models. Up to my knowledge no theoretical papers have investigated political information distortion that is only effective on inattentive people[2].

My first main result is that voters are attentive towards the news when the social cost of incompetence is large. For example, during a financial crisis an incompetent government is more likely to make legislations that push the country even deeper into the crisis. To avoid this scenario, voters rather pay close attention to the media and learn about quality of the governance. As a consequence, releasing fake news becomes ineffective, it cannot distract voters' attention and only incurs a cost.

The prediction that voters increase attention when competence has a larger impact on

[2]Gehlbach and Sonin (2014) also include news consumption in their model, but their citizens choose between not following the media at all (then prior and posterior beliefs are the same) or following it and learning a potentially distorted message

utility is in line with the findings of Althaus (2002) who shows that during national crises the news consumption in the U.S. increases. Gadarian and Albertson (2014) conduct a lab experiment which suggests that when people are anxious about a certain topic they tend to gather information on that particular issue. This fits into my model with the assumption that large cost of incompetence induces anxiety in people.

An intuitive result would be that when incompetence matters only a little, the government does not bother releasing fake news because it is relatively expensive.My model predicts an opposite behavior, as the social cost of incompetence gets smaller the government distracts voters more often[3]. This phenomenon emerges because citizens are not attentive when the stakes are small and the government can effectively distract public focus from its incapabilities.

I also find that voters do not follow additional channels when the cost of attention is sufficiently large. The government capitalizes on this and spreads fake news to shroud its incompetence. Large attention cost has many possible interpretations. It can be that watching the news has a large opportunity cost and citizens rather do something else or that other media channels are difficult to follow due to censorship. If large attention cost arises due to censorship, my result is in line with the findings of Besley and Prat (2006) who derive that when the number of media outlets in an economy is sufficiently small, the government captures the media. For further evidence, Djankov et al. (2003) show that a government's tenure and state ownership of the media are positively correlated.

My third result is that prior uncertainty regarding the competence of the government decreases the probability of spreading fake news. My model predicts that the attention of citizens increases when people are indecisive about the quality of the government[4]. It is not straightforward how to test this result empirically. Jones (2004) finds that Americans with lower level of governmental trust are also more skeptical about the media. However,

[3]This is only true for a positive social cost, when it is zero the government does not release fake news

[4]Quantitatively this means that prior probability of competence is close to 0.5

the author does not specify whether this mistrust induces larger news consumption or not, this provides opportunities for further research.

The rest of the thesis is organized in the following way: Chapter 2 describes the players in the model, their motives and actions. Chapter 3 states the equilibrium of the model and draws consequences about its predictions. Chapter 4 concludes.

1.1 Literature Review

It it important from a social welfare point of view to understand the factors that affect political information distortion. Numerous papers point out that an unbiased media is in the best interest of citizens. Besley and Burgess (2002) use panel data from India to show that the government is more responsive to the needs of citizens when newspaper circulation is large. Evaluating a newspaper campaign to improve schooling in Uganda, Reinikka and Svensson (2005) present that providing agents with information helps in the reduction of corruption and inefficient policies. Using different data sets, both Treisman (2007) and Brunetti and Weder (2003) find evidence about a significant negative relationship between the level of corruption and media freedom. These papers all support the intuitively clear idea that citizens benefit from a media that is unaffected by interest groups.

Recent theoretical literature develops a framework to analyze the circumstances under which a government captures the media. Besley and Prat (2006) builds a model which predicts that when the number of media outlets in an economy are sufficiently small, the government captures the media and information flow is in direct control of politics. In the model of Gehlbach and Sonin (2014) the government is more likely to capture the media when it is interested in mobilizing the population, but less likely to do so when it also cares about the size of the advertising market. Roy (2015) shows that direct control of the media leads to smaller media bias and larger social welfare than indirect control.

There are a number of more distant fields that are connected to my thesis both within

and outside of political economy. In my paper media is treated exogenously: news provided by the government reaches everybody while other sources of information are also available but are costly to look up. It is possible to endogenize media and it has been done by numerous authors. The previously mentioned papers[5] all treat media as an active player in their models. In his article Corneo (2006) examines a monopolist media who can cooperate with various interest groups. He finds that the media is corrupted more often when there are fewer interest groups in the economy. A thorough summary of the political media bias literature can be found in Prat and Stromberg (2011).

Inattention is in the focus of scholars in contemporary theoretical work across many segments of economics. Papers about attention usually analyze the advantage of an informed party over a mass of inattentive individuals. Within industrial organization, Gabaix and Laibson (2006) model how a firm shrouds pricing information from consumers to increase profits. From the field of finance, DellaVigna and Pollet (2009) studies the effect of inattention on stock returns using responses to earnings announcements on distractive days versus non-distractive days. They find a statistically significant drop in response rates on distractive days. Hirshleifer et al. (2004) build a model where an informed player decides whether to disclose information to a partly inattentive public, and claims that in equilibrium disclosure is incomplete. Matejka and Tabellini (2015) examine how voters choose costly attention level to different political dimensions. Their multiple findings include that extremists are more likely to pay attention to and influence policies and that socially sensitive topics receive larger attention than the equilibrium level would be.

[5]Besley and Prat (2006), Gehlbach and Sonin (2014) and Roy (2015)

2. Model overview

2.1 Environment

There are two kind of players in the model, a government G and a continuum of voters $i \in [0,1]$ distributed uniformly on the unit interval. The performance of the government is represented in a binary variable $s \in \{0,1\}$ which will be referred to as G's *competence*, G's *quality* or the *state of the world*. Nature decides whether G is competent ($s = 0$) or incompetent ($s = 1$). It is assumed that G does not know his competence at the beginning of the game, instead, both G and the voters share a common prior about the state of the world, $Pr(s = 1) = \theta$.

Citizens acquire information about the state of the world from the news. Every voter is exposed to the governmental media channel which provides a signal $\hat{s} \in \{0,1\}$ regarding G's quality, where $\hat{s} = 1$ corresponds to incompetence. However, this signal is subject to fake content based on G's actions. It is possible for voters to avoid hoaxes by being attentive to other media sources for a cost $c_i > 0$. The government makes the decision to release fake news at the beginning of the game and it incurs a cost $c_G > 0$. G's decision affects voters differently based on their attention towards the media. Those who decided not to follow multiple channels are exposed to fake content and cannot infer more information than the signal from G's channel. The attentive voters who follow various sources of information can "see through" fake content and learn the state of the world.

Formally, acquiring information is a process with two stages. First, G commits to

a strategy, a *media policy* to release fake news. Citizens learn about G's media policy, therefore biasing the news is not a deterministic decision, instead G keeps voters uncertain by choosing probabilities with which he releases fake news. This strategy, $\omega(s) \in [0,1] \times [0,1]$ is a mapping from the state of the world to the unit square.

After G chooses a media policy voters observe this and decide to follow the news closely or loosely. This is a costly commitment that has to be made before they watch the news. Those who follow multiple media channels are called *committed* or *attentive*, and those who only watch news provided by the government are named *inattentive*. After the commitment decision is made, the state of the world is realized and voters get a message about it from the media. Committed voters learn the state of the world from the news regardless of G's prior shrouding activities. Inattentive voters receive the potentially biased signal of G but they calculate with the possibility that the message they see might only be a distraction.

To sum it up, attentive citizens do not receive a message, instead they learn G's quality precisely from the followed information channels. Inattentive voters get a message $\hat{s}$ from the news which tells them that G is competent when $s = 0$ or when G shrouds his incompetence and channels that G is incompetent in every other case.

At the end of the game voters elect a new government using all attended news to predict the quality of the government. Voting is a binary action $a_i \in \{0,1\}$, where $a_i = 1$ means electing G. Their outside option in the election is a candidate C, whose competence is not directly observed. Voters and G form the common prior belief that C is competent with probability $1 - \theta$. The timing of the game is the following:

1. G commits to a media policy to release fake news $\omega(s)$. It is observable for all agents.

2. Every voter individually commits to follow multiple media channels or not.

3. G realizes the state of the world and releases fake news probabilistically according to $\omega(s)$. Attentive voters also learn the state of the world and inattentive citizens

learn $\hat{s}$, the message from G.

4. Voters choose action a_i to support G in the election or not based on their available information.

2.2 Utilities and actions

Incompetent governance has a social cost, it incurs a disutility $\delta > 0$ for citizens. The value of a competent government is normalized to zero. Voters derive their expected utility from their voting decision $a_i \in \{0, 1\}$. They want to vote "correctly", which means electing the party which has a higher likelihood of competence. If a voter supports a competent G her utility is zero, if supports an incompetent one her utility is $-\delta$. Expected utility derived from the candidate C (when $a_i = 0$) is $-\theta\delta$. Formally:

$$u_i = E\big[sa_i(-\delta) + (1 - a_i)(-\theta\delta)\big]$$

Before voters watch the news, they can commit to follow a variety of channels for a cost c_i. This decision, $b_i \in \{0, 1\}$ changes the uncertainty about the state of the world and concludes voters utility:

$$u_i = E\big[sa_i(-\delta) + (1 - a_i)(-\theta\delta)\big] - b_i c_i$$

Every voter makes a rational decision based on all attended information.

Government G maximizes the number of voters by choosing a media policy to release fake news $\omega(s) \in [0, 1] \times [0, 1]$ for a cost c_G. $\omega(1)$ is the probability that G releases fake news when he is incompetent ($s = 1$) and $\omega(0)$ is the probability of fake news when G is competent. The utility of G is

$$U_G = \int_0^1 a_i \mathrm{d}_i - \big(\theta\omega(1) + (1 - \theta)\omega(0)\big)c_G$$

In the above formula $\theta\omega(1) + (1 - \theta)\omega(0)$ is the probability of releasing fake news.

2.3 Discussion on the modeling assumptions

I assume that every citizen has an exposure toward the media and receives a signal on the government's competence. It seems intuitively plausible that in the era of social media it is more difficult to stay away from news than to receive messages to some extent. Prior (2005) finds that people usually follow their preferred news content, however, to be able to highlight the role of fake news I assume that by default voters are exposed to the government's channel and listening to other sources is costly. This assumption can be relaxed by introducing more media channels into the model or it is possible to endow voters with a preference shock towards media content.

It is an important feature in my model that citizens learn about the government's media policy and take it into consideration. With this approach I follow Gehlbach and Sonin (2014) who assume that voters can detect biases and expect to be misled by the government. This assumption is based on the results of Mickiewicz (2006) who analyzed the news consumption habit of Russian citizens and found that voters are not surprised by the possibility of biased news, they even expect to witness such distractive content.

A third crucial assumption is that the incompetence of the government is an available information regardless of the presence of fake news. This is a realistic assumption in democracies and some empirical results suggests that it is plausible in autocracies too. McMillan and Zoido (2004) analyze the bribing activities of Montesinos from Peru and show that even though every media outlet was bribed in Peru, some channels refused to "stand in line" and provided truthful information about the economic and social environment. Based on this I form the assumption that the news is always available, though it can happen that searching for it is too costly.

3. Results

Let the cost of attention $c_i = \bar{c}$ be the same for all voters, and let us also assume that $\theta \in (0,1)$. The two special cases when $\theta \in \{0,1\}$ are discussed in A.6. The solution concept is Perfect Bayesian Equilibrium (PBE) and I arrive to the equilibrium using backward induction.

Proposition 3.1. *The government never releases fake news when he is competent, formally* $\omega^*(0) = 0$. *The government never shrouds his incompetence when it is too expensive:* $\omega^*(1) = 0$ *when* $c_G \geq 1$.
(The proofs can be found in A.1)

Proposition 3.1 states two straightforward consequences of the model setup. Since the media carries a binary information - whether G is competent or not - it is pointless to engage into a costly shrouding activity just to send the same message what voters would see anyways, therefore $\omega(0) = 0$. The second statement follows from the fact that the population amounts to a mass of 1, therefore if the cost of shrouding outweighs the utility from the votes it is ineffective to release fake news. From now on I assume that $c_G < 1$.

Proposition 3.2. *Let us assume that commitment is not too costly, formally* $\bar{c} < \delta\theta(1-\theta)$. *In this case the Perfect Bayesian Equilibrium of the game is that attentive voters vote for* G *if and only if* $s = 0$, *inattentive voters vote for* G *if and only if* $\hat{s} = 0$, $(1 - c_G)$ *share of voters are committed and the government chooses the shrouding strategy*

$$\omega^*(1) = \frac{\bar{c}}{\delta\theta(1-\theta)} \tag{3.1}$$

Let us discuss the main findings of Proposition 3.2. The voting decision of attentive and inattentive voters are dependent on the information they acquire from the news. Committed citizens vote according to the state of the world, they elect the government when $s = 1$ and elect the candidate when G is incompetent. Inattentive voters behave the same way but they base their decision on a possibly imprecise message. When they get the signal of competence, they elect G, otherwise they elect the candidate C. This is because the posterior probability of incompetence having received the message $\hat{s} = 0$ is smaller than the prior probability of incompetence θ. Intuitively, when they see from the news that G is competent they realize that this is either because they see a fake news and G is in fact incompetent, or simply they see the truth. As long as the probability of competence is larger than zero the message that G is competent has some chance to be true, therefore inattentive voters have the incentive to elect G.

In this setup voters are identical, hence either everybody is committed or nobody is. The only exception from this happens when the expected utility derived from attention and inattention are equal, so voters are indifferent. When this occurs voters make a randomized decision to commit or not. In equilibrium, the share of inattentive voters is equal to the cost of shrouding information. The interpretation of this is that voters gain comfort when shrouding is relatively expensive and have less incentives to make a costly commitment to follow multiple media channels.

When G is incompetent, the probability to publish fake news is a function of the commitment cost of voters $\bar{c}$, the disutility derived from incompetence δ and the prior uncertainty which is measured as $\theta(1-\theta)$. The closer θ to 0.5, the larger the prior uncertainty about G's competence which increases the likelihood of voter attention. When every voter is attentive, G has the incentive to reduce $\omega(1)$ to encourage inattention. When nobody is committed, G has the incentive to increase $\omega(1)$ so it is more likely for him to gain votes when $s = 1$. In these two regimes there can never be an equilibrium, so G chooses $\omega(1)$ in a way that voters are indifferent between attention and inattention.

This intuition is explained formally in the proof of Proposition 3.2.

Proof of Proposition 3.2:

Voting decision

When the voting decision has to be made a citizen is either already committed, so she knows the state of the world or only receives a signal $\hat{s}$ about G's competence. An attentive voter derives a utility of 0 when she votes for a competent G and a utility of $-\delta$ from electing an incompetent G. The outside option, the candidate provides an expected utility of $-\theta\delta$. Based on this, an attentive voter elects

- G if the state of the world is zero since her utility is 0 as opposed to $-\theta\delta$.
- a candidate when $s = 1$ since her utility is $-\theta\delta$ as opposed to $-\delta$.

An inattentive voter first updates her belief about the state of the world given the received signal $\hat{s}$. Posterior beliefs are updated using Bayes' rule. When $\hat{s} = 1$ voters know for sure that $s = 1$ since G is always worse off by spreading the news that he is incompetent. The posterior beliefs when $\hat{s} = 0$ are

$$\begin{aligned} Pr(s = 0|\hat{s} = 0) &= \frac{Pr(\hat{s} = 0|s = 0)Pr(s = 0)}{Pr(\hat{s} = 0|s = 0)Pr(s = 0) + Pr(\hat{s} = 0|s = 1)Pr(s = 1)} \\ &= \frac{1 - \theta}{1 - \theta + \theta\omega(1)} \\ Pr(s = 1|\hat{s} = 0) &= \frac{Pr(\hat{s} = 0|s = 1)Pr(s = 1)}{Pr(\hat{s} = 0|s = 1)Pr(s = 1) + Pr(\hat{s} = 0|s = 0)Pr(s = 0)} \\ &= \frac{\theta\omega(1)}{1 - \theta + \theta\omega(1)} \end{aligned}$$

The posterior probability that G is incompetent having received the message $\hat{s} = 0$ is smaller than the prior unless $\omega(1) = 1$, in that case the two are equal [1].

When $\omega(1) < 1$, an inattentive voter elects

[1] This statement is formally derived in A.2

- G if $\hat{s} = 0$ since her expected utility $-\delta\frac{\theta\omega(1)}{1-\theta+\theta\omega(1)}$ is larger than the utility derived from electing C, $-\theta\delta$
- a candidate when $\hat{s} = 1$ since her utility is $-\theta\delta$ as opposed to $-\delta$

When $\omega(1) = 1$ the message is uninformative, it always signals that G is competent regardless of the state of the world. In this case inattentive voters are indifferent between the two parties and make a randomized decision.

Commitment decision

When voters decide whether to commit to follow multiple media channels for a cost $\bar{c}$, they maximize their expected utility by choosing b_i. The expected utility of a voter when she commits:

$$u_i = \theta(-\theta\delta) + (1-\theta)0 - \bar{c} = -\theta^2\delta - \bar{c}$$

The first term is the utility from the candidate when G is incompetent (which is the optimal voting decision based on the above derivation) weighted by the probability of incompetence. The second term is the utility derived from having a competent government weighted by its probability.

Expected utility when voters do not commit is

$$u_i = \Big(\omega(1)\theta + 1 - \theta\Big)\Big[-\delta\frac{\theta\omega(1)}{1-\theta+\theta\omega(1)}\Big] + \Big(\theta(1-\omega(1)\Big)\Big(-\delta\theta\Big)$$

This equation should be interpreted as follows: The first parenthesis contains the probability that $\hat{s} = 0$ multiplied by the expected payoff from electing G (which is the optimal choice in this case based on previous calculations). The second part of the expression is the probability that $\hat{s} = 1$ multiplied by the expected payoff from voting for the candidate.

After simplification, voters commit if [2]

$$\bar{c} < \delta\omega(1)\theta(1-\theta) \quad \rightarrow \quad \omega(1) > \frac{\bar{c}}{\delta\theta(1-\theta)} \tag{3.2}$$

[2] A detailed derivation can be found in A.3

We can see from Equation 3.2 that the larger the prior uncertainty about the state of the world $\theta(1-\theta)$ is, the more often voters commit to be attentive. Commitment is also more likely if the cost of incompetence δ is larger or when G releases fake news more often, so when $\omega(1)$ is larger.

Fake news decision

Let us continue with the derivation of the equilibrium level of shrouding, $\omega(1)$. First let us show that it can never be an equilibrium to choose $\omega(1) \in \left(\frac{\bar{c}}{\delta\theta(1-\theta)}, 1\right]$. This is the scenario when voters are committed to multiple media sources since $\bar{c} < \delta\omega(1)\theta(1-\theta)$. Attentive voters cannot be manipulated by fake news, therefore choosing a positive $\omega(1)$ only incurs a cost c_G. The expected utility is

$$U_G = \theta\big[\omega(1)\big(-c_G\big)\big] + (1-\theta)$$

The first part of the expression summarizes the case when G is incompetent which happens with probability θ. Committed voters realize the state of the world and vote against G, so releasing fake news only incurs a cost without any additional votes. Hence the utility is decreasing in $\omega(1)$, so G chooses the smallest possible fraction of shrouding, which means $\omega(1)$ approaches the threshold value $\frac{\bar{c}}{\delta\theta(1-\theta)}$. Therefore there is no optimal choice in this regime because reaching the threshold would change the behavior of voters.

Now let us examine the case when $\omega(1) \in \left[0, \frac{\bar{c}}{\delta\theta(1-\theta)}\right)$. This corresponds to the scenario when it is too expensive to commit, so every citizen in the society is inattentive. The expected utility in this case is

$$U_G = \theta\big[\omega(1)\big(1-c_G\big)\big] + (1-\theta) = 1 + \theta\Big(\omega(1)(1-c_G) - 1\Big)$$

Every citizen is inattentive, so upon receiving the message $\hat{s} = 0$ they vote for G since the posterior probability of incompetence is smaller than θ. As a consequence, the above expression is increasing in $\omega(1)$. G maximizes his expected utility when there is no commitment if he chooses the maximal possible value of $\omega(1)$ so again $\omega(1)$ approaches

the threshold value and there is no optimal choice within this regime.

Based on the above calculations, it must be that in equilibrium $\omega(1) = \frac{\bar{c}}{\delta\theta(1-\theta)}$. In equilibrium, nobody wants to deviate from her strategy. The voting decision of citizens is unaffected by the choice of $\omega(1)$ as long as it is smaller than one. In Proposition 3.2 it was assumed that $\bar{c} < \delta\theta(1-\theta)$ which guarantees that in this regime $\omega(1) < 1$. In the commitment stage, the expected payoff from attention and inattention are equal, so voters randomize their choice of commitment. Let α be the share of committed voters in the society when $\omega(1) = \frac{\bar{c}}{\delta\theta(1-\theta)}$. In this case the expected utility of the government is

$$U_G = \theta\big[\omega(1)\big(1-\alpha-c_G\big)\big] + (1-\theta)$$

When $s = 1$, only inattentive voters vote for G and only when they receive the message $\hat{s} = 0$ which happens with probability $\theta\omega(1)$. When $s = 0$ everybody votes for G. The government does not want to deviate from $\omega(1) = \frac{\bar{c}}{\delta\theta(1-\theta)}$ if he is unable to increase his expected utility by doing so. The sensitivity of the expected utility to $\omega(1)$ is given as

$$\frac{\partial U_G}{\partial \omega(1)} = \theta(1-\alpha-c_G)$$

When $1-\alpha-c_G > 0$ G would be better off by increasing the probability of shrouding and when $1-\alpha-c_G < 0$ G would like to decrease $\omega(1)$. Therefore in equilibrium it must be that $1-\alpha-c_G = 0$ so the fraction of committed voters is $\alpha = 1-c_G$.

The equilibrium described in Proposition 3.2 relies on the assumption that commitment is a viable option for voters. However, it is also possible that citizens are not able to observe the state of the world because it is too costly. In Proposition 3.3, I characterize the equilibrium of the game when being attentive is never an optimal strategy for voters due to the large cost.

Proposition 3.3. *Let us assume that commitment is too costly, formally* $\bar{c} \geq \delta\theta(1-\theta)$. *In the Perfect Bayesian Equilibrium of this game* G *chooses* $\omega^*(1) = 1$ *as long as the number of voters outweigh the cost of shrouding.*

(The proof can be found in A.4)

Proposition 3.3 predicts that G abuses the inattention of citizens and always shrouds his incompetence. The message $\hat{s} = 0$ what citizens see is uninformative since $\omega(1) = 1$, therefore inattentive voters are indifferent between voting for G or the candidate. The government does not want to deviate from $\omega^*(1) = 1$ if the randomized voting decision of citizens is such that G gets more votes than the cost he pays for shrouding.

Large cost of attention can be interpreted in many ways. It can be that all conveniently available media channels are censored. In that environment searching for different sources of information can be expensive, it maybe requires the knowledge of a foreign language or other investments. There are a number of papers that make similar predictions regarding the level of media bias in a state with censorship. Besley and Prat (2006) find that when the number of media outlets is sufficiently small, the media is captured and it reports according to what the government prefers. In my model the cost of attention plays a similar role as the number of media outlets in the paper of Besley and Prat (2006). Sufficiently large attention cost is analogous to few media outlets and results in a fully captured media. Djankov et al. (2003) show that there is a positive correlation between state ownership of the media and time spend in office by a government which further strengthens my prediction.

3.1 Comparative statics

Let us analyze the equilibrium stated in Proposition 3.2 more thoroughly as this is the scenario which provides an interior solution and may give insight to the motives of fake news distribution.

Proposition 3.4. *The equilibrium level of governmental shrouding* $\omega(1) = \frac{\bar{c}}{\delta\theta(1-\theta)}$ *derived in Proposition 3.2 is increasing in voters' commitment cost* $\bar{c}$*, decreasing in cost of incompetence* δ *and also decreasing in prior uncertainty* $\theta(1-\theta)$*.*

(The proofs can be found in A.5)

The first result of the model is that releasing fake news can be an efficient tool to increase governmental support. This phenomenon arises when voters are not motivated to pay close attention to multiple media channels. In equilibrium, voters commit to follow the media if $\bar{c} < \delta\omega(1)\theta(1-\theta)$. Since the decision to release fake news depends on the commitment of voters, it is important to understand why and when voters are attentive.

In equilibrium, voters pay more attention to the media when "stakes are high", that is, when the cost of incompetence δ is large. It is not straightforward to measure the cost of having an incompetent government to a society. However, it seems intuitive to assume that in critical international situations such as wars or financial crises these kind of costs are larger. Althaus (2002) finds that news consumption among American adults were significantly larger during and after the 9/11 attacks and the Iraqi war. In a lab experiment, Gadarian and Albertson (2014) show that when individuals are anxious about a topic - in their example immigration- they are more likely to follow news about this particular issue. This result fits well into my model under the assumption that during international crises people are potentially anxious about it and try to follow the events as precisely as possible. These incentives of voters to follow the news lead to the prediction of the model that the government is less likely to shroud information from the public when stakes are high since voters would pay the cost to look up the relevant news anyways.

The government is more likely to release fake news to cover smaller incompetencies, when voters do not bother to follow the media. As long as δ is positive the government distracts attention with larger and larger probability, however, when $\delta = 0$ this behavior changes. In an environment where incompetence is not costly voters are indifferent between electing G or the candidate, they make a randomized decision. G has no incentives to pay the cost of fake news, when he is unable to influence the voting decision.

There is a positive relationship between the cost of attention $\bar{c}$ and the probability to release fake news $\omega(1)$. When $\bar{c}$ is large, the equilibrium level of shrouding increases. It is a consequence of the model setup that inattentive voters are in favor of the government

when they get the signal competence, therefore when inattention is more likely, G shrouds with a larger probability. Gentzkow and Shapiro (2006) present similar results in their article. The authors find that firms are less likely to distort news when consumers have the possibility to access independent sources of information that reveals the state of the world with certainty. This happens because firms do not want to damage their own reputation when the truth is more likely to reach consumers. In my model reputation can be thought of as the type of G, when enough people learns about the incompetence of G it becomes pointless to release fake news.

The third determinant of the equilibrium level of $\omega(1)$ is the prior probability of incompetence, θ. It appears in the formula as $\theta(1-\theta)$ which can be interpreted as the prior uncertainty about the state of the world since the closer θ is to 0.5, the larger $\theta(1-\theta)$ becomes. The model predicts that G is more likely to release fake news in the extreme prior scenarios, when at the beginning of the game he is rather likely or rather unlikely to be competent. This are the cases when replacing the government with the candidate is less likely to make an improvement, therefore voters are not willing to follow multiple media channels. It is not straightforward how to test this prediction empirically. Jones (2004) finds that political mistrust also induces skepticism towards the media. However, this result does not suggest that as a response voters follow more media channels. It is also not evident whether mistrust in politics corresponds to a small θ or to a θ close to 0.5. The former means that people who are dubious towards politics expect parties to be incompetent and the latter says that mistrust corresponds to uncertainty about the quality politicians. Both are intuitively viable scenarios which provides grounds for empirical research.

4. Conclusion

The aim of my thesis was to incorporate attention into the theoretical political media bias literature. I built a stylized model using the framework of Gehlbach and Sonin (2014). In my model voters are motivated to elect a competent party. There is a government whose competence is decided during the game by Nature. Citizens learn about the competence of the government from the news which potentially channels a distorted message. Voters have the option to be attentive to multiple media sources which guarantees that they learn the quality of the government, but incurs an additional cost. Those who choose not to be attentive are subject to fake news spread by the government. Electing an incompetent party generates a cost for the citizens which motivates them to be attentive.

My model results in three main observations about the interaction between attention and fake news distribution. First, I found that a large social cost induced by an incompetent government increases voters' attention. As a result, the government is less likely to release fake news. The second prediction was that when the cost of being attentive is above a threshold value voters do not follow the news and the government shrouds its incompetence with certainty. I also found that prior uncertainty about the competence of the political parties gives motivation for voters to consume news from multiple media channels which discourages the government to release fake news since it has no distractive power anymore.

There are some empirical results that provide evidence for my predictions. Althaus (2002) shows that during national crises the news consumption in the U.S. increases. It

seems plausible that having an incompetent government during national crises is very costly for the society, therefore this result agrees with my prediction that people are more attentive when the stakes are large. Djankov et al. (2003) analyze the relationship between state-owned media and political tenure and finds a positive correlation. The connection of this result to my thesis is that state-ownership of the media increases the cost of attention (e.g. in the form of censorship). Large attention cost discourages voters to consume multiple news channels which gives the government the opportunity to influence citizens with fake news. Verifying the prediction that uncertainty about the competence of the government induces larger news consumption is a potential area for further research.

There are numerous possible ways to refine my analysis. In the model voters are ex ante homogeneous. Ex post heterogeneity only arises when voters are indifferent between two actions and make a randomized decision. It would make sense to introduce heterogeneity in attention cost. For example those who speak foreign languages are able to acquire news from abroad on certain topics, or the opportunity cost of watching the news is smaller for people with a general interest in politics. These effects are currently ignored in the model but the inclusion of it would be straightforward. Prior calculations suggest that the equilibrium does not change qualitatively.

A. Appendix

A.1 Proof of Proposition 3.1

- $\omega^*(0) = 0$:

  Let $s = 0$, so G is competent and let $\alpha \in (0, 1)$ be the share of voters who vote for G given that $\hat{s} = 0$. The expected utility of G in this state of the world is

  $$\omega(0)\Big(\alpha - c_G\Big) + (1 - \omega(0))\alpha$$

  The expected utility is decreasing in $\omega(0)$ since

  $$\frac{\partial}{\partial \omega(0)} = -c_G < 0$$

  Releasing the news that G is competent when he is in fact competent is an unnecessary cost, therefore in equilibrium $\omega^*(0) = 0$.

- $\omega^*(1) = 0$ when $c_G \geq 1$:

  Let $\alpha \in (0, 1)$ be the share of committed voters. A committed voter is perfectly informed and always votes according to the state of the world, so elect G when $= 0$ and elects the candidate when G is incompetent. As a result of this, fake news only affect the decision of inattentive voters who have a mass of $1 - \alpha$. As a "worst case scenario", let us assume that every inattentive voter votes for the candidate when they see the message $\hat{s} = 1$ and votes for G when $\hat{s} = 0$. This corresponds to the

case when shrouding is the most effective, so every voter can be "turned around" by fake news. Then the expected utility of G is

$$\theta\Big[\omega(1)\Big(1-\alpha-c_G\Big)+(1-\omega(1))\times 0\Big]+1-\theta$$

The first part of the expression is the utility in case $s=1$ weighted by its probability θ. In this case when G releases fake news ($\omega(1)$ fraction of the times) he draws every inattentive voter to vote for him for a cost c_G. When G is competent everybody votes for him. The expected utility of G is decreasing in $\omega(1)$ since

$$\frac{\partial}{\partial\omega(1)}=\theta\Big(1-\alpha-c_G\Big)<0$$

This means in case $c_G >\geq 1$ the optimal strategy of G is to choose $\omega^*(1)=0$, so never release fake news.

A.2 Relationship between prior and posterior probabilities

Let us compare the prior probability of incompetence with the posterior when $\hat{s}=0$:

$$\begin{aligned}\frac{\theta\omega(1)}{\theta\omega(1)+1-\theta} &\lesseqgtr \theta\\ \omega(1) &\lesseqgtr \theta\omega(1)+1-\theta\\ (1-\theta)\omega(1) &\lesseqgtr 1-\theta\end{aligned}$$

It is easy to see that the left hand side (the posterior probability) is smaller unless $\omega(1)=1$.

A.3 Commitment decision

The expected utility from attention is $-\theta^2\delta - \bar{c}$. The expected utility from inattention simplifies to

$$u_i = \Big(\omega(1)\theta + 1 - \theta\Big)\Big[-\delta\frac{\theta\omega(1)}{1-\theta+\theta\omega(1)}\Big] + \Big(\theta(1-\omega(1)\Big)\Big(-\delta\theta\Big)$$
$$= \omega(1)\theta(-\delta) + \theta^2\Big(1-\omega(1)\Big)(-\delta) = -\theta^2\delta - \theta\delta\omega(1) + \theta^2\delta\omega(1)$$

Voters commit if the expected utility from commitment is larger than the expected utility from being inattentive. Formally

$$-\theta^2\delta - \bar{c} > -\theta^2\delta - \theta\delta\omega(1) + \theta^2\delta\omega(1)$$
$$\theta\delta\omega(1) - \theta^2\delta\omega(1) > \bar{c}$$
$$\theta\delta\omega(1)(1-\theta) > \bar{c}$$

A.4 Proof of Proposition 3.3

The voting decision of the two kind of voters (attentive and inattentive) are unaffected by the change, so it is sufficient to discuss the optimal commitment and the optimal shrouding decision.

- $\bar{c} > \delta\theta(1-\theta)$:

  Attention is too costly, so every voter is inattentive. Therefore the expected utility of G can be written as

  $$U_G = \theta\Big[\omega(1)\big(1-c_G\big)\Big] + (1-\theta)$$

  This expression is increasing in $\omega(1)$ hence the optimal shrouding decision is to choose $\omega^*(1) = 1$. However, this choice changes the optimal voting behavior of inattentive citizens since the message becomes uninformative, therefore the posterior

and the prior probabilities of incompetence are equal. Formally, when $\omega(1) = 1$ the expected utility from voting to G is when the message is $\hat{s} = 0$ (which happens with probability 1)

$$u_i = -\delta \frac{\theta\omega(1)}{1 - \theta + \theta\omega(1)} = -\delta\theta$$

which is equal to the expected utility derived from voting to the candidate. Voters are indifferent, so they randomize at the election. Let α be the share of voters who vote for G. Then G's expected utility from choosing $\omega(1) = 1$

$$U_G = \theta\Big[\omega(1)\big(\alpha - c_G\big)\Big] + (1 - \theta)\alpha$$

G has no incentives to deviate from $\omega(1) = 1$ as long as his utility is non-decreasing in $\omega(1)$. This happens exactly when $\alpha \geq c_G$.

- $\bar{c} = \delta\theta(1 - \theta)$:

  In this scenario the expected utility from attention is equal to the expected utility in case of inattention, so voters randomize their commitment decision. Let $\alpha.$ be the share of committed voters. The expected utility of G is

$$U_G = \theta\Big[\omega(1)\big(1 - \alpha - c_G\big)\Big] + (1 - \theta)$$

  This expression is increasing in $\omega(1)$ so the optimal choice is to always shroud incompetence ($\omega(1) = 1$). As before, when $\omega(1) = 1$ inattentive voters are indifferent between electing the candidate or G, therefore they randomize voting decision. Let β be the share of voters who elect G having received the message $\hat{s} = 0$. The expected utility of G is

$$U_G = \theta\big[\omega(1)\big(\beta(1 - \alpha) - c_G\big)\big] + (1 - \theta)\big(\beta(1 - \alpha) + \alpha\big)\big)$$

  G has no incentive to deviate from $\omega(1) = 1$ when his expected utility is non-decreasing in $\omega(1)$ which happens only when $\beta(1 - \alpha) \geq c_G$.

A.5 Proof of Proposition 3.4

The sensitivity analysis of $\omega^*(1) = \frac{\bar{c}}{\delta\theta(1-\theta)}$ is straightforward:

$$\frac{\partial\omega(1)}{\partial\delta} = -\frac{\bar{c}}{\delta^2\theta(1-\theta)} < 0$$
$$\frac{\partial\omega(1)}{\partial\bar{c}} = \frac{1}{\delta\theta(1-\theta)} > 0$$
$$\frac{\partial\omega(1)}{\partial\delta} = -\frac{\bar{c}(1-2\theta)}{\delta\theta^2(1-\theta)^2}$$

The last derivative is negative when $\theta < 0.5$ and positive when $\theta > 0.5$, therefore it has a minimum in $\theta = 0.5$. If prior uncertainty is defined as $\theta(1-\theta)$ then the sensitivity analysis simplifies to:

$$\frac{\partial\omega(1)}{\partial\theta(1-\theta)} = -\frac{\bar{c}}{\delta\big[\theta(1-\theta)\big]^2} < 0$$

A.6 Special cases: $\theta \in \{0, 1\}$

The two extreme scenarios are not particularly insightful, but for the sake of completeness let us derive the equilibrium in these cases.

- $\theta = 0$:

  The common prior is that both the government and the candidate are competent with probability 1. The means when voters compare a competent G with the candidate, they are indifferent between the two since both yields the same utility. As a consequence, voters randomize their election decision. However, when G is revealed to be incompetent (which happens with zero probability) both attentive and inattentive citizens vote for the candidate. Therefore when commitment decision is

made, citizens compare the expected utilities:

$$\begin{aligned} u_i|_{attention} &= \theta(\theta(-\delta)) - \bar{c} = -\bar{c} \\ u_i|_{inattention} &= \Big(\omega(1)\theta + 1 - \theta\Big)\Big[-\delta\frac{\theta\omega(1)}{1-\theta+\theta\omega(1)}\Big] + \Big(\theta(1-\omega(1)\Big)\Big(-\delta\theta\Big) \\ &= 0 \end{aligned}$$

It is clear that voters never commit. When G decides on a strategy to release fake news, he maximizes his expected utility given the voting and commitment decision of the voters. Let α be the share of inattentive citizens who vote for G when the message is $\hat{s} = 0$. Then the expected utility of G is

$$U_G = \theta\Big[\omega(1)\big(\alpha - c_G\big)\Big] + (1-\theta)\alpha = \alpha$$

As a consequence, choosing any $\omega(1) \in (0,1)$ is optimal for G since his expected utility is independent from the level of shrouding. Intuitively, when a government is sure about his competence, it does not really matter which level of shrouding he commits to, it will not affect citizens (only affects them with zero probability).

- $\theta = 1$:

  In this scenario the political parties are believed to be incompetent with certainty. The voting behavior is the same as in the previous case, attentive citizens are indifferent between an incompetent G or an incompetent candidate (however they vote for G if the $s = 1$) and inattentive people randomize their voting decision. When an individual makes the commitment decision, she compares the expected utilities:

$$\begin{aligned} u_i|_{attention} &= \theta(\theta(-\delta)) - \bar{c} = -\delta - \bar{c} \\ u_i|_{inattention} &= \Big(\omega(1)\theta + 1 - \theta\Big)\Big[-\delta\frac{\theta\omega(1)}{1-\theta+\theta\omega(1)}\Big] + \Big(\theta(1-\omega(1)\Big)\Big(-\delta\theta\Big) \\ &= -\delta \end{aligned}$$

  Again it is optimal to not pay attention since it only incurs a cost without resulting in any benefit. Let α be the share of inattentive citizens who vote for the government0.

G maximizes his expected utility when chooses $\omega(1)$:

$$U_G = \theta\Big[\omega(1)\big(\alpha - c_G\big) + \big(1 - \omega(1)\big)\Big] + (1 - \theta) = -\omega(1)c_G$$

The expected utility of G is decreasing in $\omega(1)$, therefore he chooses it to be zero. Intuitively, when G is incompetent for sure, releasing fake news cannot help him because voters are not going to believe the news they see anyways, so it is optimal not to pay the cost for it.

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