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Abstract

We suggest a particular notion of populism. A populist is a politician who engages in so-called "politsplaining": He explains complex developments and assigns weights to potential causes and potential remedies as it best suits his objectives. We present a simple model of politsplaining in which two candidates compete for office. The income of citizens is affected by two shocks (say automation and globalization), but citizens only observe the joint shock impact and cannot identify which shocks occur. By using politsplaining, a candidate turns into a populist and he can reallocate beliefs about the causes of income shocks in the society. This results in two types of consequences. First, a populist may be able to form a majority for measures that are not only inefficient, but are applied in areas in which the underlying cause is not present. Second, a populist forces the other candidate to become populist, but the two populists are not offsetting each other.

JEL Classification: D72, D78, D83, H11

Keywords: Politsplaining - Populism - Elections

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Politsplaining: Populism Breeds Populism*

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Abstract

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1 Introduction

While populism was a recurrent phenomenon of the 19^{th} century, the past few years it has become a problem in some of the most advanced democracies. The central issues in this regard are: What exactly is populism? How to address it?

There are many definitions of populism. We will review them in the next section. In this paper, we use a particular definition of populism: A populist is a politician who engages in so-called "politsplaining": He explains the causes for complex economic or political developments and assigns weights to these causes. The weights are chosen such that it best helps him to be elected. Moreover, he might also sell his own policies as the optimal remedies against the identified causes.

This definition of populism is illustrated by the following example, which will serve throughout the paper. Imagine voters feeling that jobs are endangered in a particular country— as in the rustbelt in the US. This could be due to a combination of causes, such as automation and globalization. A populist could oversimplify such threats to jobs by defining "globalization" as its cause, for instance, and promise protective measures to shield the workers from it. He could present his intended policy as the simple solution to a menacing, but simple problem. Of course, citizens will evaluate the populist's oversimplifying and exaggerating— a behavior we call "politsplaining". Even if they recognize this oversimplification, the citizens might not be immune against it, as they do not know the causes of their economic hardship. Thus they may partially believe politsplaining and embrace it for want of a better explanation. Our main assumption is that a populist engaging in politsplaining cannot affect the average beliefs about the causes of such problems as job threats in the electorate— otherwise he could manipulate the entire electorate. Yet, he can reallocate the beliefs in the electorate by politsplaining. In particular, he may persuade some citizens that globalization is indeed likely to destroy their jobs, while other citizens may believe that automation is likely the root cause of job destruction.

We present a simple model of politsplaining in which two candidates compete for office. The income of citizens is affected by two shocks, but citizens only observe the joint shock impact and cannot identify *which* shocks occur. Against one shock, say automation, no protective measures are available. Against the other shock, say globalization, protective measures, i.e. protections, are available in principal. Such anti-globalization measures benefit the group of citizens whose income is put at risk by globalization. However, at the aggregate level, the harm caused by such measures for the group threatened by automation outweighs the benefits for the group threatened by globalization, so that the anti-globalization measures are socially inefficient from a utilitarian perspective.

By using politsplaining, a candidate turns into a populist and he can reallocate beliefs about the causes of income shocks in the society, benefiting from the fact that individuals experiencing the shocks do not know their causes. The more he reallocates, however, the less credibility is attached to his politsplaining.

We obtain the following results: if only one candidate turns into a populist, he can cause two types of inefficiencies. First, he may be able to form a majority for protectionist measures by politsplaining. In our globalization example, a minority will oppose him strongly, and aggregate welfare will decline. Second, the protectionist measures are also applied in areas in which the claimed cause "globalization" has no impact. Thus, these income shocks will not be corrected.

If the other candidate also considers becoming populist, he may be forced to do it to *ascertain* his chances of winning the election. Hence, as soon as one candidate starts oversimplifying and exaggerating— i.e. politsplaining— his opponents face a hard choice: they can remain matter-of-fact, but then, they must invest a lot of effort into accurate information and the complex explanations of the problems at hand and the solutions they suggest— this is not attractive to voters, as they also have to invest effort in understanding both the problems and the solutions suggested: one complex solution per complex problem and per candidate, in the worst of cases. Thus, even "honest" candidates can be forced to adapt their campaign to the populist's discourse, to oversimplify their own arguments and to exaggerate the benefits of their solutions: populism breeds populism.

Finally, we show that politsplaining by both politicians is not offsetting: one politician may have won the election without politsplaining, while the other politician wins under competing politsplaining. Hence, two populists may not neutralize each other in terms of election outcomes.

This paper is organized as follows: In the next section, we relate our paper to the literature. In Section 3, we present our model of populism. In Section 4, we describe the outcomes when one candidate becomes a populist. In Section 5, we investigate the equilibria when both candidates are open to becoming a populist to maximize their vote share. In Section 6, we summarize and discuss our findings. Section 7 concludes.

2 Relation to the Literature

There is a substantial strand of literature on historical waves of populism, e.g. Ionescu and Gellner (1969), Di Tella (1965), and Müller (2017). In the context of populism in Latin America, economists have stressed that the populists undertake policies that are detrimental for the economy in the long run, as well as for the country as a whole. This may even trigger crises (Houle and Kenny (2018), Dornbusch and Edwards (1991)).

The causes of populism in Europe and the US in recent years are complex (see Mudde and Kaltwasser (2017)). Two main explanations have been put forward. First, economic insecurity might be a major source of populism. According to this view, deep structural transformations, as the financial crisis of 2008/2009 and the subsequent Euro crisis, have increased uncertainty about future material standards, which fueled populism (Algan et al. (2017), Dustmann et al. (2017), Funke et al. (2016), Andersen et al. (2017)). Boeri et al. (2018) also find that crises increase support for populists, but it is weakened by civil society associations. Rodrik (2018) shows that populism is a rational response to transformations triggered by globalization.

Second, the cultural backlash hypothesis states that social transformations and shifting of societal values might endanger the identity of some parts of a society, which makes them support politicians who promise to protect this same cultural identity. Inglehart and Norris (2016) found supporting evidence for this hypothesis. They indicate that strong conflicts have emerged between traditional and progressive cultural values, a divide that also affected political competition.

Our approach to populism starts from the economic insecurity hypothesis. We will complement this hypothesis with the argument that the power of politsplaining might be closely connected to the populists' ability to bridge the cultural gap to those who feel threatened by job or income losses.

Finally, our approach to politsplaining takes a middle ground between two perspectives—rational voters and voters with rational or behavioral ignorance. In particular, we allow a populist to reallocate beliefs by narratives[1] that seem plausible for voters who lack information about the causes of current economic developments. However, a populist cannot affect average assessments in the society.

[1] Shiller (2017) emphasized the importance of narratives in economics. Populists use narratives to engage in politsplaining.

3 The Model

We present a simple model that captures the difficulty to assign causes to economic developments and includes the possibility of politsplaining.

3.1 The Economic Environment

The polity consists of a continuum of voters $V = [0,1]$, indexed by $i \in [0,1]$. In the first period, each voter i receives a random income $\tilde{x}_i$ given as follows:

$$\tilde{x}_i = x_i + \tilde{z}_i^1 + \tilde{z}_i^2, \tag{1}$$

in which x_i ($x_i > 0$) is the part that is certain, while $\tilde{z}_i^1 \in \{-Z, 0\}$ and $\tilde{z}_i^2 \in \{-Z, 0\}$ are two random variables representing two types of negative economic shocks ($Z > 0$). The shocks are denoted by $k \in \{1,2\}$ and they are stochastically independent. As explained in the introduction, the shocks may represent globalization or automation, respectively. Independently of all other voters, voter i is hit by shock k with probability $p_k \in (0,1)$, i.e. $\tilde{z}_i^k$ is distributed as follows:

$$\mathbb{P}[\tilde{z}_i^k = -Z] = 1 - \mathbb{P}[\tilde{z}_i^k = 0] = p_k. \tag{2}$$

Consequently, voter i's income $\tilde{x}_i$ can take three different values:

$$\tilde{x}_i = \begin{cases} x_i & \text{with probability } (1-p_1)(1-p_2), \\ x_i - Z & \text{with probability } p_1(1-p_2) + (1-p_1)p_2, \\ x_i - 2Z & \text{with probability } p_1 p_2. \end{cases} \tag{3}$$

Realizing $\tilde{x}_i = x_i$, voter i knows with certainty that he has not been hit by any of the shocks. Similarly, if $\tilde{x}_i = x_i - 2Z$, voter i has certainly been hit by both shocks. But if $\tilde{x}_i = x_i - Z$, voter i does not know which shock has occurred and his ex post beliefs are as follows:

$$\mathbb{P}[\tilde{z}_i^1 = -Z | \tilde{x}_i = x_i - Z] = \frac{\mathbb{P}[\{\tilde{z}_i^1 = -Z\} \cap \{\tilde{z}_i^2 = 0\}]}{\mathbb{P}[\tilde{x}_i = x_i - Z]} \tag{4}$$

$$= \frac{p_1(1-p_2)}{p_1(1-p_2) + (1-p_1)p_2} \tag{5}$$

$$\mathbb{P}[\tilde{z}_i^2 = -Z | \tilde{x}_i = x_i - Z] = \frac{(1-p_1)p_2}{p_1(1-p_2) + (1-p_1)p_2}. \tag{6}$$

Since the probability of being hit by shock $k \in \{1, 2\}$ is the same for all voters, the ex post beliefs among voters with $\tilde{x}_i = x_i - Z$ are homogeneous.

Clearly, the sets $V_0 := \{i|\tilde{x}_i = x_i\}$, $V_1 := \{i|\tilde{x}_i = x_i - Z\}$, and $V_2 := \{i|\tilde{x}_i = x_i - 2Z\}$ partition $V = [0, 1]$ according to the realized number of shocks. Applying the law of large numbers to a continuum of random variables[2], the subsets V_0, V_1, and V_2 have measures given by the corresponding probabilities in Equation (3). By reordering the polity, we can assume that $V_0 = \big[0, (1 - p_1)(1 - p_2)\big)$, $V_1 = \big[(1 - p_1)(1 - p_2), 1 - p_1 p_2\big]$, and $V_2 = \big(1 - p_1 p_2, 1\big]$.

3.2 Policies

In the second period, the economic environment remains unchanged. If no policy measures are taken, voter i's income, denoted by $\tilde{y}_i$, is the same as in the first period, i.e. $\tilde{y}_i = \tilde{x}_i$.

We assume there are policies providing protection for voters who have been hit by the first shock, say globalization, at the cost of hurting the remaining voters. One could imagine that such a policy represents measures to protect a set of domestic industries from foreign competition. Workers (and shareholders) in these industries benefit from this measure, while the other individuals are hurt (as workers or consumers), since prices of these goods rise and there is misallocation of labor across industries. Specifically, the protection policy β, raises the income of voter i by βZ if i has been hit by shock 1 with β being a given positive number ($\beta > 0$). Total gains from the protection policy amount to $p_1 \beta Z$. However, the policy generates total losses of $\lambda p_1 \beta Z$, for some $\lambda > 1$, which are distributed uniformly among all voters. Hence, the policy is socially undesirable from a utilitarian perspective. Moreover, we assume $\lambda p_1 < 1$. Hence, citizens who are indeed hit by shock 1 benefit from the protective policy since their individual gain βZ is larger than the per-capita losses $\lambda p_1 \beta Z$. Hence, the implementation of protection policy changes voter i's income in the second period to

$$\tilde{y}_i = \begin{cases} \tilde{x}_i + \beta Z - \lambda p_1 \beta Z & \text{if } \tilde{z}_i^1 = -Z, \\ \tilde{x}_i - \lambda p_1 \beta Z & \text{if } \tilde{z}_i^1 = 0. \end{cases} \tag{7}$$

Note that $\beta = 1$ corresponds to a complete protection against shock 1.

[2]Constructing a valid law of large numbers for a continuum of random variables is not without pitfalls (see, e.g. Alos-Ferrer (1999)).

3.3 Politicians

There are two politicians who compete for office. One Politician $P_\emptyset$ proposes not to implement any protection policy, while the other Politician P_β proposes to implement protection policy β for some $\beta > 0$ to be chosen and communicated before election. Both politicians are solely interested in maximizing their vote share. For ease of presentation, we just call the politician proposing no measures "Politician $P_\emptyset$", and the other politician is called "Politician P_β".

Several remarks are in order. First, we assume that Politician $P_\emptyset$ does not gain more votes by imitating Politician P_β, i.e. by also proposing the protection policy, in any of the constellations we will consider. This can be justified by arbitrarily small differences in the attractiveness of candidates, which only matter if both politicians propose the same policies. This makes copying uninteresting for the less attractive politician. For instance, when Politician $P_\emptyset$ is the incumbent and Politician P_β the challenger, a large share of the indifferent voters may support the new candidate proposing new policies, even if the incumbent also tries to propose them, since the incumbent did not implement them until now. Second, while we take β as a fixed value in the main body of the paper, we will also consider scenarios where politicians can choose different values of β.

3.4 Politsplaining

Uncertain voters have homogeneous ex post beliefs about the realized economic shock(s), which are given by Equations (4)-(6). These beliefs determine whether a voter expects profits or losses from a protective policy. Consequently, politicians might address uncertain voters and explain the shock to influence voters' beliefs. Since voters with income $x_i - Z$ do not know which shock caused their loss, a politician can explain to some of them that the cause of the problem was globalization and to others that it was automation: He will put forward plausible narratives about the forces generating the shock. However, we assume that voters as a whole cannot be fooled into believing false narratives. That is, shock explanation can assign heterogeneous beliefs to the group of uncertain voters and thereby change individual beliefs, but we assume that a politician cannot change the average belief. In other words, politsplaining can reallocate beliefs among uncertain voters, but cannot affect the average assessment of the likelihood that one of the shocks has occurred because of a particular phenomenon. Thus, politsplaining cannot change the assessment of the aggregate consequences of the shock.

Shock explanations are modeled as functions from the set of uncertain voters V_1 into $[0, 1]$ representing the assigned belief of being hit by shock 1. A shock explanation

$q : V_1 \to [0, 1]$ is a function that satisfies the following average belief condition:

$$\frac{1}{|V_1|} \int_{V_1} q(i)di = \mathbb{P}[\tilde{z}_i^1 = -Z | \tilde{x}_i = x_i - Z]. \tag{8}$$

Note that the right-hand side does not depend on i.

Hence, $q(i)$ is the assigned assessment of an uncertain voter i that the first shock, say globalization, has occurred. Without loss of generality, we assume that q is non-decreasing if only one politician engages in politsplaining.[3]

Until Section 4, we consider politsplaining by one politician. For this case, we assume that all uncertain voters $i \in V_1$ trust this explanation, i.e. they take their voting decisions according to the assigned belief $q(i)$.

3.5 Sequence of Events

We summarize the sequence of events:

1. Shocks realize.
2. Realization of income $\tilde{x}_i$.
3. Politicians $P_\emptyset$ and P_β propose their policies.
4. Politician P_β explains shocks (if applicable).
5. Election.
6. Elected Politician implements proposed protection policy (if applicable).
7. Realization of income $\tilde{y}_i$.

3.6 Absence of Politsplaining

We start with an analysis of voters' behavior under absence of shock explanation. First, any voter $i \in V_0$ knows that he has not been hit by shock 1 and that the implementation of a protective policy would decrease his income. Hence, he votes for Politician $P_\emptyset$. Similarly, any voter $i \in V_2$ votes for Politician P_β. Second, if Politician P_β is elected and implements the protective policy, the expected income $\tilde{y}_i$ of an uncertain voter i is given

[3] This can always be achieved by a suitable ordering of uncertain voters.

by

$$\mathbb{E}[\tilde{y}_i|\tilde{x}_i = x_i - Z] = \mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z] \cdot \big(x_i + (\beta - 1)Z - \lambda p_1 \beta Z\big) \tag{9}$$

$$+ \big(1 - \mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z]\big) \cdot \big(x_i - Z - \lambda p_1 \beta Z\big) \tag{10}$$

$$= \tilde{x}_i - Z + \big(\mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z] - \lambda p_1\big) \cdot \beta Z. \tag{11}$$

Consequently, an uncertain voter expects an income increase from protection policy P_β if and only if

$$\mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z] \geq \lambda p_1. \tag{12}$$

This condition does not depend on β. Nonetheless, the expected income change becomes larger as β increases. From Equation (12), we obtain

Proposition 1

Under absence of politsplaining, an uncertain voter chooses Politician P_β if and only if his ex post belief about shock 1 is at least λp_1. The voting decision is uniform among all uncertain voters and does not depend on $\beta > 0$.

Figure 1 shows the election result under absence of shock explanation for different values of $\lambda > 1$, $p_1 \in (0, \frac{1}{\lambda})$, and $p_2 \in (0, 1)$. This will allow us to display how politsplaining can affect election results.

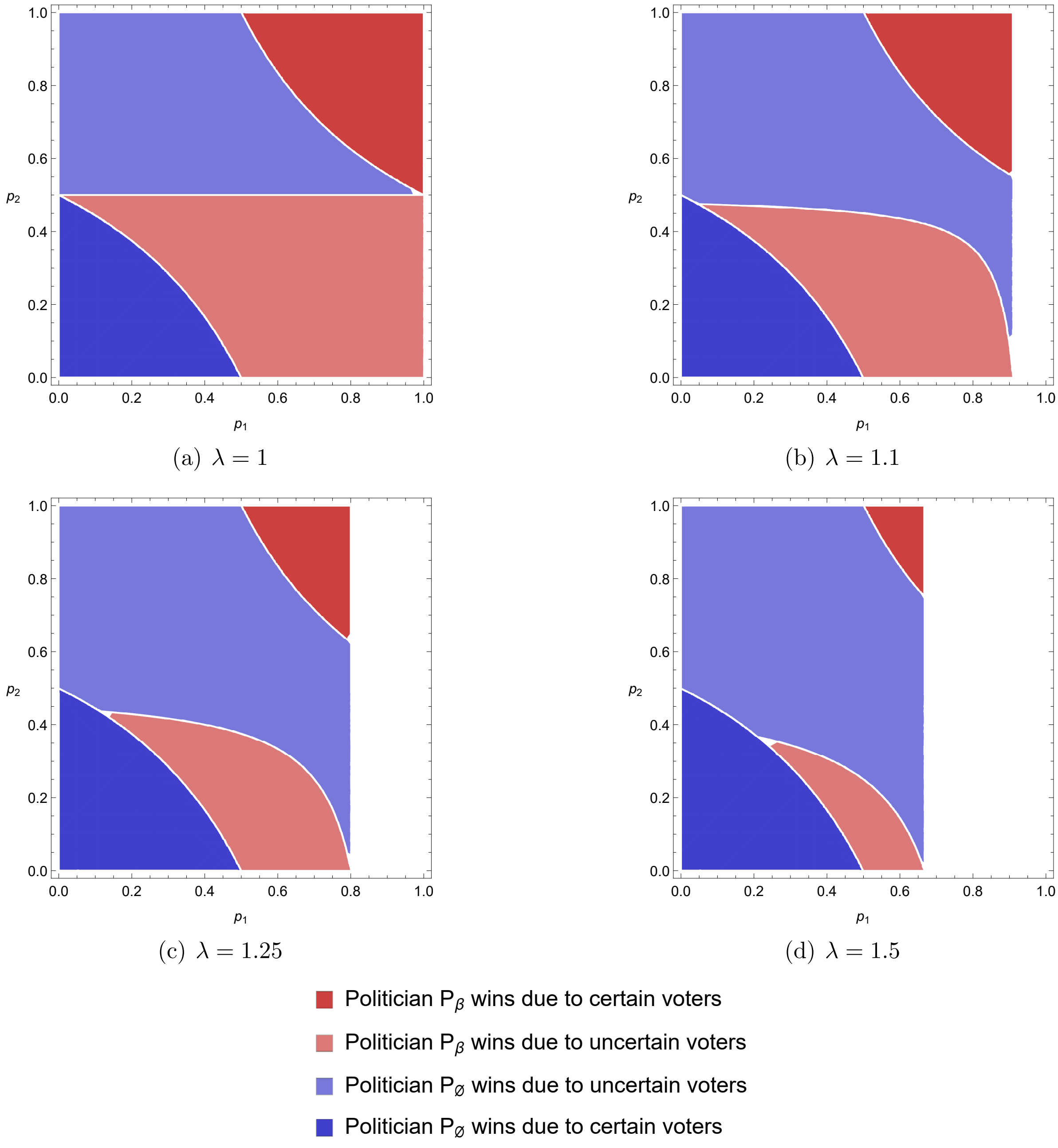
The figure shows how the shock parameters impact the election outcome. It also shows that a large degree of inefficiency— a higher value of λ— of the protectionist policy reduces the parameter space in which Politician P_β can win the election.

3.7 Optimal Politsplaining by Politician P_β

We next examine how a shock explanation by Politician P_β impacts the decision of uncertain voters. Let Politician P_β provide a shock explanation $q : V_1 \to [0, 1]$.

If Equation (12) is satisfied, all uncertain voters are in favor of P_β. Thus, Politician P_β cannot increase his share of votes by giving a shock explanation that deviates from the default explanation $q \equiv \mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z]$. Consequently, we will focus on the case $\mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z] < \lambda p_1$. Since an uncertain voter $i \in V_1$ votes for P_β if and only if $q(i) \geq \lambda p_1$, Politician P_β's optimal shock explanation q maximizes the share $\alpha \in [0, 1]$ of uncertain voters with $q(i) \geq \lambda p_1$ under the average belief constraint (8).

Therefore, it is optimal to assign belief $q(i) = \lambda p_1$ to a share of $\alpha = \frac{\mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z]}{\lambda p_1} \in (0, 1)$ uncertain voters while assigning belief $q(i) = 0$ to the remaining share of $1 - \alpha$ uncertain voters. Based on this optimal shock explanation, through belief reallocation,



(a) $\lambda = 1$

(b) $\lambda = 1.1$

(c) $\lambda = 1.25$

(d) $\lambda = 1.5$

Figure 1: Election outcome under absence of politsplaining for different values of $\lambda \geq 1$, $p_1 \in (0, \frac{1}{\lambda})$, and $p_2 \in (0, 1)$.

the percentage of votes received by P_β is

$$|V_2| + \alpha \cdot |V_1| = \mathbb{P}[\tilde{x}_i = x_i - 2Z] + \alpha \cdot \mathbb{P}[\tilde{x}_i = x_i - Z] \tag{13}$$

$$= \mathbb{P}[\tilde{x}_i = x_i - 2Z] + \frac{\mathbb{P}[\tilde{z}_i^1 = -Z, \tilde{x}_i = x_i - Z]}{\lambda \cdot \mathbb{P}[\tilde{z}_i^1 = -Z]} \tag{14}$$

$$= \mathbb{P}[\tilde{x}_i = x_i - 2Z] + \frac{\mathbb{P}[\tilde{z}_i^2 = 0]}{\lambda} \tag{15}$$

We summarize these observations in the following proposition.

Proposition 2

Under politsplaining solely performed by Politician P_β, there exists a unique optimal shock explanation, which is characterized by $\alpha = \min\{\frac{\mathbb{P}[\tilde{z}_i^1 = -Z|\tilde{x}_i = x_i - Z]}{\lambda p_1}, 1\}$. Politician P_β receives a share of $\min\{\frac{\mathbb{P}[\tilde{z}_i^2=0]}{\lambda}, |V_1|\} + |V_2|$ votes.

Figure 2 shows the election result under shock explanation solely by Politician P_β for different values of $\lambda \geq 1$, $p_1 \in (0, \frac{1}{\lambda})$, and $p_2 \in (0, 1)$.

We observe how politsplaining generates a new space for Politician P_β to win the election. In situations where uncertain voters would support Candidate $P_\emptyset$, Politician P_β can obtain the support of a subgroup by explaining that the likelihood that they were hit by a globalization shock is high. He maximizes his share of supporters by making them just indifferent between voting for him and voting for Politician $P_\emptyset$. Accordingly, the other group of uncertain voters believes that its income prospects are harmed by automation and thus supports Politician $P_\emptyset$.

4 Two-sided Politsplaining

In this section, we introduce politsplaining by both politicians and characterize the resulting equilibria. Of course, this raises new issues: since shock explanations are competing, they might contradict each other.

4.1 Setup

As shock explanations only affect the decision of uncertain voters, we restrict our attention to the subset V_1 and, without loss of generality, rescale to obtain $V_1 = [0, 1]$. To further

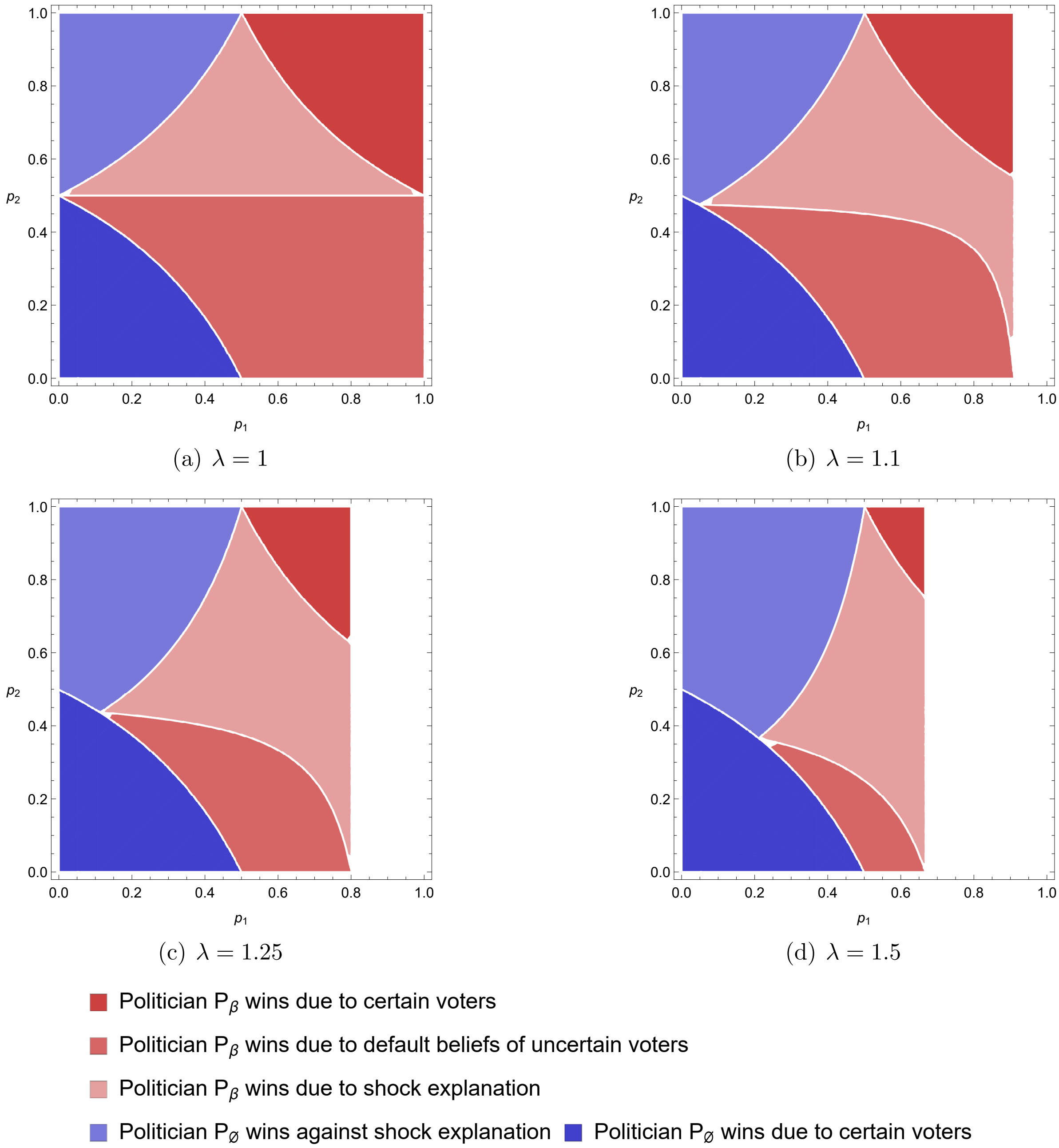


Figure 2: Election outcome under politsplaining solely by Politician P_β for different values of $\lambda \geq 1$, $p_1 \in (0, \frac{1}{\lambda})$, and $p_2 \in (0, 1)$.

simplify our notation, we express all quantities in terms of the following parameters:

$$p_1 = \mathbb{P}[\tilde{z}_i^1 = -Z] \in (0,1), \tag{16}$$
$$\bar{p}_1 := \mathbb{P}[\tilde{z}_i^1 = -Z | \tilde{x}_i = x_i - Z] \in (0,1), \tag{17}$$
$$\lambda \in [1, \frac{1}{p_1}). \tag{18}$$

Motivated by the optimal shock explanation in Section 3, we restrict our attention to the following shock explanations given by $P_\emptyset$ and P_β: On the one hand, Politician P_β can choose the share of uncertain voters he addresses to increase their belief of being hit by shock 1— this corresponds to the share α in Subsection 3.7. We observe again that any optimal politsplaining of Politician P_β assigns belief 0 that shock 1 has occurred to the remaining share of uncertain voters who will not support him. We denote Politician P_β's choice variable by π in this section and use Condition (8) to obtain the following shock explanation:

$$q_\pi(i) := \begin{cases} 0, & \text{if } 0 \leq i \leq \pi, \\ \frac{\bar{p}_1}{1-\pi} =: p_\pi, & \text{if } \pi < i \leq 1. \end{cases} \tag{19}$$

Note that Politician P_β is restricted to $\pi \in [0, 1 - \bar{p}_1]$, so that the explanation q_π takes values in $[0,1]$.

One the other hand, Politician $P_\emptyset$ can choose the share of uncertain voters he addresses to decrease their belief of being hit by shock 1. Optimally, he will thereby assign belief 1 to the remaining share of uncertain voters. We denote Politician $P_\emptyset$'s choice variable by ϱ and obtain the following shock explanation:

$$q_\varrho(i) := \begin{cases} 1 - \frac{1-\bar{p}_1}{\varrho} =: p_\varrho, & \text{if } 0 \leq i < \varrho, \\ 1, & \text{if } \varrho \leq i \leq 1. \end{cases} \tag{20}$$

Note that the choice of Politician $P_\emptyset$ is restricted to $\varrho \in [1-\bar{p}_1, 1]$, so that the explanation q_ϱ takes values in $[0,1]$.[4]

Having introduced the possible shock explanations of the two politicians, we now want to define the resulting belief of an uncertain voter, based on the competing shock explanations. To this end, we denote Politician P_β's credibility in politsplaining by c_π and Politician $P_\emptyset$'s credibility by c_ϱ. Before giving a precise definition of credibility, we

[4] We assume that voters in V_1 can be ordered such that the shock explanations by both candidates monotonically increase.

define the resulting belief $\bar{q}$ as a weighted average of both explanations:

$$\bar{q}(i) := \frac{c_\pi q_\pi(i) + c_\varrho q_\varrho(i)}{c_\pi + c_\varrho}, \tag{21}$$

$$= \begin{cases} \frac{c_\varrho p_\varrho}{c_\pi + c_\varrho}, & \text{if } i \in [0, \pi], \\ \frac{c_\pi p_\pi + c_\varrho p_\varrho}{c_\pi + c_\varrho}, & \text{if } i \in (\pi, \varrho), \\ \frac{c_\pi p_\pi + c_\varrho}{c_\pi + c_\varrho}, & \text{if } i \in [\varrho, 1]. \end{cases} \tag{22}$$

In the degenerate case $\pi = \varrho = 1 - \bar{p}_1$, we set $\bar{q} \equiv \bar{p}_1$. Clearly, $\bar{q}$ is non-decreasing in i.

4.2 Credibility of Politsplaining

A politician's credibility regarding politsplaining depends on his personal reputation, the lack of alternative credible explanations and the plausibility of his narrative, which itself depends on how much his shock explanation deviates from the default belief $\bar{p}_1$. Clearly, the credibility c_π, respectively c_ϱ, should be maximal if the politician does not deviate from the default belief, i.e. if $\pi = 0$ respectively $\varrho = 1$.

Note that integrating the absolute distance between default and assigned belief over all uncertain voters yields $2\pi\bar{p}_1$ in the case of Politician P_β and $2(1-\varrho)(1-\bar{p}_1)$ in the case of Politician $P_\emptyset$. This yields a natural way to measure the deviation of politician's shock explanation from the default belief. In both cases, the maximal deviation is $2\bar{p}_1(1 - \bar{p}_1)$ and we define credibility as maximal minus actual deviation. After rescaling by a factor $\frac{1}{2}$, which has no impact on the resulting belief, we obtain the following definitions of credibility:

$$c_\pi := \bar{p}_1(1 - \bar{p}_1) - \pi\bar{p}_1 = \bar{p}_1((1 - \bar{p}_1) - \pi) \tag{23}$$

$$c_\varrho := (1 - \bar{p}_1)(\varrho - (1 - \bar{p}_1)) \tag{24}$$

In Figure 3, the shock explanations as well as the resulting beliefs are visualized for a specific example.

4.3 Equilibrium Concept and Tie-breaking Rule

We are looking for Nash equilibria[5] (π, ϱ) in the space of possible shock explanations $[0, 1 - \bar{p}_1] \times [1 - \bar{p}_1, 1]$. More precisely, the pair (π, ϱ) is an equilibrium of our game if π maximizes the share of received votes by Politician P_β for given ϱ, and ϱ maximizes

[5]Strictly speaking, we are looking for subgame perfect equilibria involving shock explanation in the first stage and voting by citizens in the second stage.

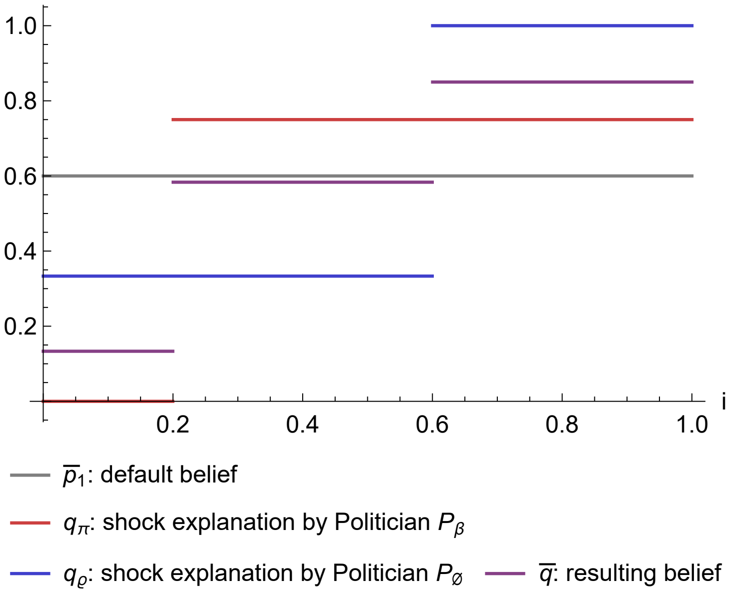


Figure 3: Example of shock explanations with choice variables $\pi = 0.2$, $\varrho = 0.6$, and parameter $\bar{p}_1 = 0.6$.

the share of received votes by Politician $P_\emptyset$ for given π. Furthermore, we introduce the following tie-breaking rule for voters who are indifferent between Politician P_β and Politician $P_\emptyset$:

Definition 1

If $\bar{q}(i) = \lambda p_1$ for a shock explanation (π, ϱ), voter i decides as follows:

(i) If $\forall \epsilon > 0\ \exists \pi' \in (\pi - \epsilon, \pi + \epsilon) : \bar{q}(i) > \lambda p_1$ for (π', ϱ), he votes for Politician P_β.

(ii) If $\forall \epsilon > 0\ \exists \varrho' \in (\varrho - \epsilon, \varrho + \epsilon) : \bar{q}(i) < \lambda p_1$ for (π, ϱ'), he votes for Politician $P_\emptyset$.

(iii) If (i) and (ii) do not uniquely determine i's decision, he is indifferent and tosses a fair coin.

The tie-breaking rule not only facilitates the description of the equilibria, it is also necessary to establish existence.

The sequence of events in the model with competition in politsplaining is shown in the following time-line:

1. Shocks realize.
2. Realization of income $\tilde{x}_i$.
3. Politicians $P_\emptyset$ and P_β propose their policies.
4. Politicians $P_\emptyset$ and P_β explain shocks.
5. Election.
6. Elected politician implements proposed protection policy (if applicable).
7. Realization of income $\tilde{y}_i$.

4.4 Analysis of the Resulting Belief $\bar{q}$

To characterize equilibria (π, ϱ) for the model with shock explanations by both politicians, we analyze the behavior of the resulting belief $\bar{q}$ as a function of π and ϱ. We refer to the technical details regarding this function to the Appendix and solely report the two most important properties in this section. In particular, in Appendix A.1 we establish that the belief function has a unique maximum with respect to π and a unique minimum with resprect to ϱ. This is summarized in the following two propositions and will allow to construct mutally best responses. We start by the choice of π by politician by P_β,

Proposition 3
With respect to $\pi \in [0, 1 - \bar{p}_1]$, $\bar{q}|_{(\pi,\varrho)} \equiv \frac{c_\pi p_\pi + c_\varrho p_\varrho}{c_\pi + c_\varrho}$ *has a unique maximum at some* π^* *and the maximal value is* $\left(p_{\pi^*}\right)^2$.

Similiarly, we can characterize the minimal value of ϱ for politician $P_\emptyset$.

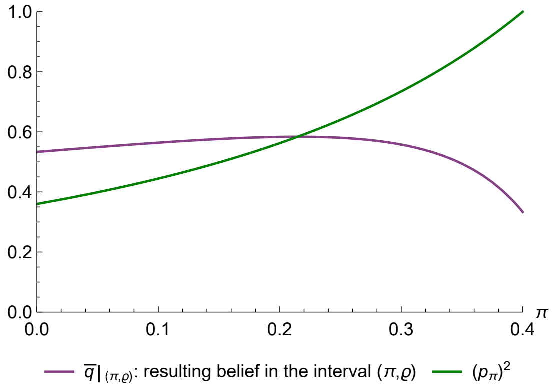
Proposition 4
With respect to $\varrho \in [1 - \bar{p}_1, 1]$, $\bar{q}|_{(\pi,\varrho)} \equiv \frac{c_\pi p_\pi + c_\varrho p_\varrho}{c_\pi + c_\varrho}$ *has a unique minimum at some* ϱ^* *and the minimal value is* $1 - \left(1 - p_{\varrho^*}\right)^2$.

To visualize the results in Propositions 3 and 4, Figure 4 shows the resulting belief $\bar{q}|_{(\pi,\varrho)}$ as a function of π, respectively ϱ.

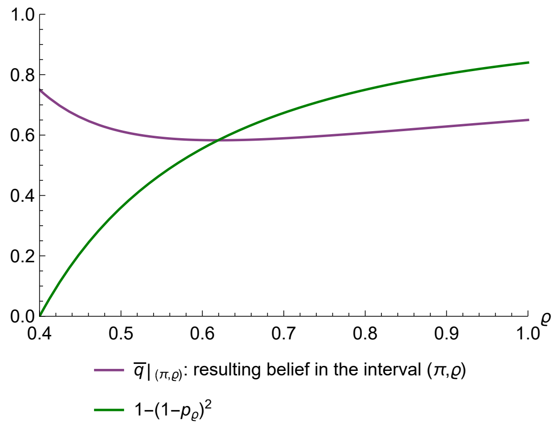
5 Equilibria and Election Outcomes

5.1 Equilibria Characterization

Based on our analysis of the resulting belief $\bar{q}$, we now describe all equilibria of our game depending on the parameters p_1, $\bar{p}_1$, and λ. As a preliminary remark, let us mention that



(a)



(b)

Figure 4: Value of the resulting belief in the interval (π, ϱ) for the parameter $\bar{p}_1 = 0.6$ and fixed choice variable $\varrho = 0.6$ respectively $\pi = 0.2$.

the degenerate case $(\pi, \varrho) = (1 - \bar{p}_1, 1 - \bar{p}_1)$ cannot be an equilibrium. The first result characterizes equilibria for low values of $\bar{p}_1$ for which $\varrho = 1$ is part of the equilibrium.

Proposition 5

Suppose $\bar{p}_1 \leq d_-(\lambda p_1)$, where $d_-(x) := x-(1-\sqrt{x})(\sqrt{1+x}-1)$ for $x \in (0,1)$. By choosing $\varrho^* = 1$, Politician $P_\emptyset$ convinces all uncertain voters (independently of π). Consequently, a pair of shock explanations $(\pi^*, \varrho^*) \in [0, 1-\bar{p}_1] \times [1-\bar{p}_1, 1]$ is an equilibrium if and only if $\varrho^* = 1$.

The proof of Proposition 5 is given in the Appendix A.2. Hence, when $\bar{p_1}$, the probability uncertain voters connect with the occurrence of the first shock, globalization, is sufficiently low, Politician $P_\emptyset$ can persuade all uncertain voters to support his default policy, i.e. keeping the status quo, independently of politsplaining by Politician P_β. Politician $P_\emptyset$ does not need to engage in politsplaining. The next result characterizes the opposite case.

Proposition 6

Suppose $\bar{p}_1 \geq d_+(\lambda p_1)$, where $d_+(x) := x + (1 - \sqrt{1-x})(\sqrt{2-x} - 1)$ for $x \in (0,1)$. By choosing $\pi^* = 0$, Politician P_β convinces all uncertain voters (independently of ϱ). Consequently, a pair of shock explanations $(\pi^*, \varrho^*) \in [0, 1-\bar{p}_1] \times [1-\bar{p}_1, 1]$ is an equilibrium if and only if $\pi^* = 0$.

The proof of Proposition 6 is given in the Appendix A.2.

Now, since $\bar{p_1}$ is sufficiently high, P_β can attract the support of all uncertain voters, which cannot be prevented by politsplaining of Politician $P_\emptyset$. We next address the most interesting case, i.e. when $\bar{p_1}$ is in the middle range and politsplaining matters. To prepare our main result, we need two auxiliary results which are proved in the Appendix A.2.

Lemma 1

The function $d_0 : (0,1) \to (0,1)$ *defined by* $d_0 := \frac{1-\sqrt{1-x}}{2-\sqrt{x}-\sqrt{1-x}}$ *is a strictly increasing bijection. Consequently, its inverse* ${d_0}^{-1}$ *exists and is strictly increasing.*

Lemma 2

For $(\pi, \varrho) \in [0, 1-\bar{p}_1] \times [1-\bar{p}_1, 1]$, *the system of equations*

$$\begin{cases} \pi^* = \operatorname{argmax}_\pi \bar{q}|_{(\pi,\varrho^*)} \\ \varrho^* = \operatorname{argmin}_\varrho \bar{q}|_{(\pi^*,\varrho)} \end{cases} \tag{25}$$

has a unique solution (π^*, ϱ^*). *Furthermore,* $\bar{q}|_{(\pi^*,\varrho^*)} = {d_0}^{-1}(\bar{p}_1)$.

Essentially, Lemma 2 states that the intersection of best responses is unique. This will allow to develop our main theorem, which we state next.

Theorem 1

Suppose $\bar{p}_1 \in \big(d_-(\lambda p_1), d_+(\lambda p_1)\big)$. *Then there exists a unique equilibrium* (π^*, ϱ^*) *of shock explanations, and the uncertain voters decide as follows:*

(i) Voters in the non-empty set $[0, \pi^*]$ *choose Politician* $P_\emptyset$.

(ii) Voters in the non-empty subset $[\varrho^*, 1]$ *choose Politician* P_β.

(iii) Voters in (π^*, ϱ^*) *are indifferent for* $\bar{p}_1 = d_0(\lambda p_1)$. *If* $\bar{p}_1 > d_0(\lambda p_1)$, *they vote in favor of Politician* P_β. *If* $\bar{p}_1 < d_0(\lambda p_1)$, *they choose Politician* $P_\emptyset$.

The proof of Theorem 1 is given in the Appendix A.2. Combining Propositions 5, 6, and Theorem 1 yields a complete equilibrium characterization depending on $\bar{p}_1$ and λp_1. The resulting election decisions of the uncertain voters are shown in Figures 5 and 6.

Theorem 1 has important consequences. If one politician engages in politsplaining, the other politician's best response is to also engage in it as well as possible. Otherwise his vote share will be lower, which can mean defeat. Hence, politsplaining breeds politsplaining.

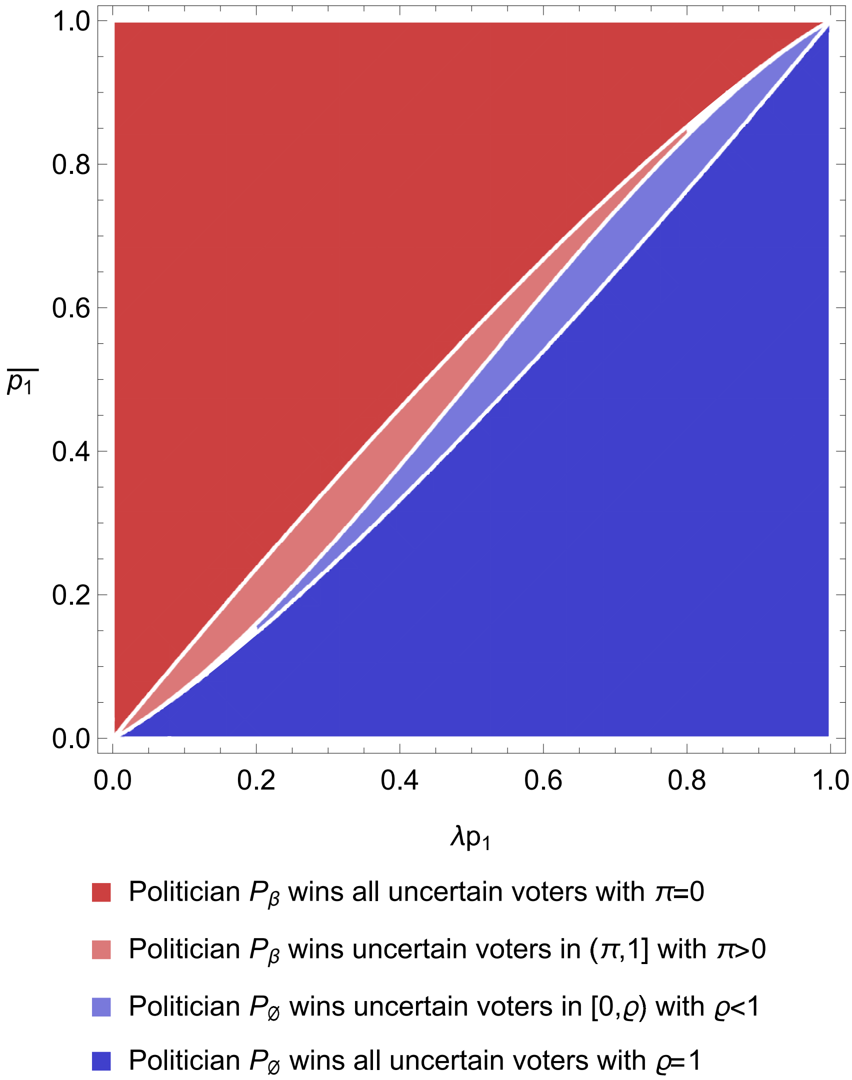
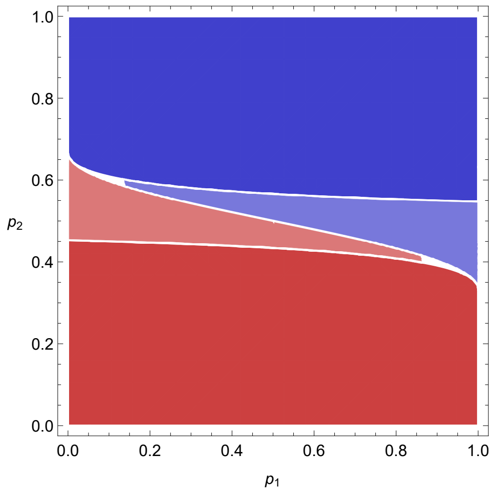
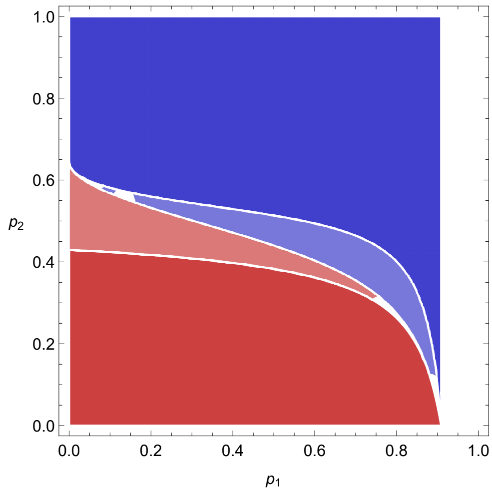


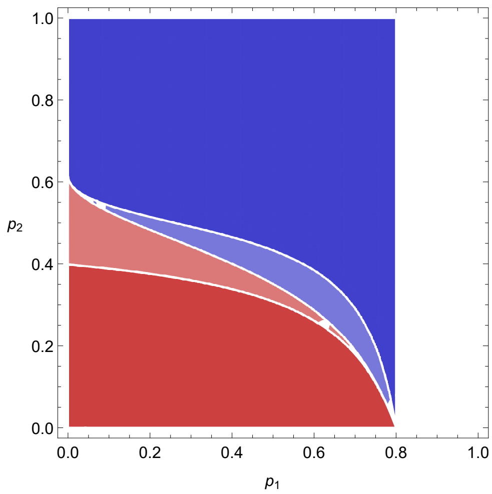
Figure 5: Decision of the uncertain voters in equilibrium, depending on λp_1 and $\bar{p}_1$, separation of regions by the functions $d_- \leq d_0 \leq d_+$.



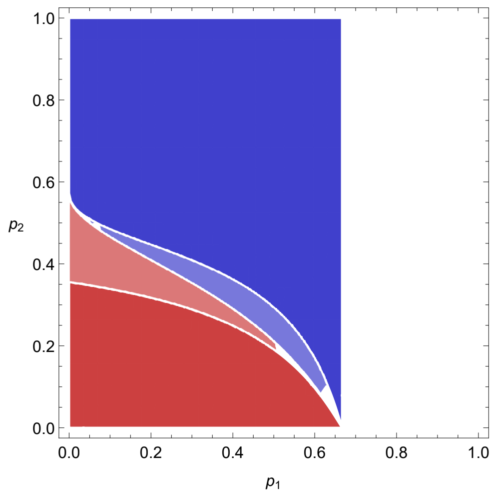
(a) $\lambda = 1$



(b) $\lambda = 1.1$



(c) $\lambda = 1.25$



(d) $\lambda = 1.5$

- Politician P_β wins all uncertain voters with π=0
- Politician P_β wins uncertain voters in (π,1] with π>0
- Politician $P_\varnothing$ wins uncertain voters in [0,ϱ) with ϱ<1
- Politician $P_\varnothing$ wins all uncertain voters with ϱ=1

Figure 6: Decision of the uncertain voters in equilibrium depending on the parameters $p_1 \in (0, \frac{1}{\lambda})$ and $p_2 \in (0, 1)$ for different values of $\lambda \geq 1$.

5.2 Calculating the Election Results

Given that Politicians $P_\emptyset$ and P_β choose equilibrium levels of politsplaining, we have shown in the previous subsection that the voting behavior of uncertain voters is uniquely determined by the parameters p_1, p_2, and λ. To determine the overall election result, we now compute the share of votes that each politician receives from the uncertain voters.

For $\bar{p}_1 \in [0, d_-(\lambda p_1)]$, all uncertain voters choose Politician $P_\emptyset$ by Proposition 5. Similarly, for $\bar{p}_1 \in [d_+(\lambda p_1), 1]$, all uncertain voters choose Politician P_β by Proposition 6.

If we have $\bar{p}_1 \in (d_-(\lambda p_1), d_0(\lambda p_1))$, the equilibrium (π^*, ϱ^*) is described by Equation (75). Using continuity of $\bar{q}_{(\pi,\varrho)}$ in π, ϱ and the argument from Equation (73), we conclude $\pi^* = 1 - \frac{\bar{p}_1}{\sqrt{\lambda p_1}}$ and ϱ^* is the maximal solution in $[1-\bar{p}_1, 1]$ to:

$$\bar{q}_{(\pi^*,\varrho^*)} = \lambda p_1 \tag{26}$$

$$\iff c_{\varrho^*}(\lambda p_1 - p_{\varrho^*}) = \big(\bar{p}_1(1-\sqrt{\lambda p_1})\big)^2 \tag{27}$$

$$\iff (\varrho^*)^2 + \varrho^*\Big[\frac{\big(\bar{p}_1(1-\sqrt{\lambda p_1})\big)^2}{(1-\bar{p}_1)(1-\lambda p_1)} - (1-\bar{p}_1)\cdot\frac{2-\lambda p_1}{1-\lambda p_1}\Big] + \frac{(1-\bar{p}_1)^2}{1-\lambda p_1} = 0. \tag{28}$$

The maximal solution is

$$\varrho^* = \frac{1}{2}\Bigg(\frac{(1-\bar{p}_1)(2-\lambda p_1)}{1-\lambda p_1} - \frac{(\bar{p}_1)^2(1-\sqrt{\lambda p_1})^2}{(1-\bar{p}_1)(1-\lambda p_1)} \tag{29}$$

$$+\sqrt{\Big(\frac{(1-\bar{p}_1)(2-\lambda p_1)}{1-\lambda p_1} - \frac{(\bar{p}_1)^2(1-\sqrt{\lambda p_1})^2}{(1-\bar{p}_1)(1-\lambda p_1)}\Big)^2 - \frac{4(1-\bar{p}_1)^2}{1-\lambda p_1}}\Bigg), \tag{30}$$

which coincides with the vote share obtained by Politician $P_\emptyset$ from uncertain voters.

For $\bar{p}_1 \in (d_0(\lambda p_1), d_+(\lambda p_1))$, we similarly get $\varrho^* = \frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}}$, and π^* is the minimal solution in $[0, 1-\bar{p}_1]$ to

$$\bar{q}_{(\pi^*,\varrho^*)} = \lambda p_1 \tag{31}$$

$$\iff c_{\pi^*}(p_{\pi^*} - \lambda p_1) = \big((1-\bar{p}_1)(1-\sqrt{1-\lambda p_1})\big)^2 \tag{32}$$

$$\iff (1-\pi^*)^2 + (1-\pi^*)\Big(\frac{\big((1-\bar{p}_1)(1-\sqrt{1-\lambda p_1})\big)^2}{\bar{p}_1\lambda p_1} - \bar{p}_1\frac{1+\lambda p_1}{\lambda p_1}\Big) + \frac{(\bar{p}_1)^2}{\lambda p_1} = 0. \tag{33}$$

The minimal solution is

$$\pi^* = 1 - \frac{1}{2}\Bigg(\frac{\bar{p}_1(1+\lambda p_1)}{\lambda p_1} - \frac{(1-\bar{p}_1)^2(1-\sqrt{1-\lambda p_1})^2}{\bar{p}_1 \lambda p_1} \tag{34}$$

$$+ \sqrt{\Big(\frac{\bar{p}_1(1+\lambda p_1)}{\lambda p_1} - \frac{(1-\bar{p}_1)^2(1-\sqrt{1-\lambda p_1})^2}{\bar{p}_1 \lambda p_1}\Big)^2 - \frac{4(\bar{p}_1)^2}{\lambda p_1}}\Bigg), \tag{35}$$

which coincides with the vote share obtained by Politician $P_\emptyset$ from uncertain voters.

Finally, for $\bar{p}_1 = d_0(\lambda p_1)$, the equilibrium is $(\pi^*, \varrho^*) = (1 - \frac{\bar{p}_1}{\sqrt{\lambda p_1}}, \frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}})$. Since voters in the interval (π^*, ϱ^*) are indifferent, Politician $P_\emptyset$ obtains a share of $\frac{\varrho^*+\pi^*}{2}$ votes.

Based on these computations, we determine the election result under shock explanation by both politicians, which is shown for different values of $\lambda \geq 1$ in Figure 7.

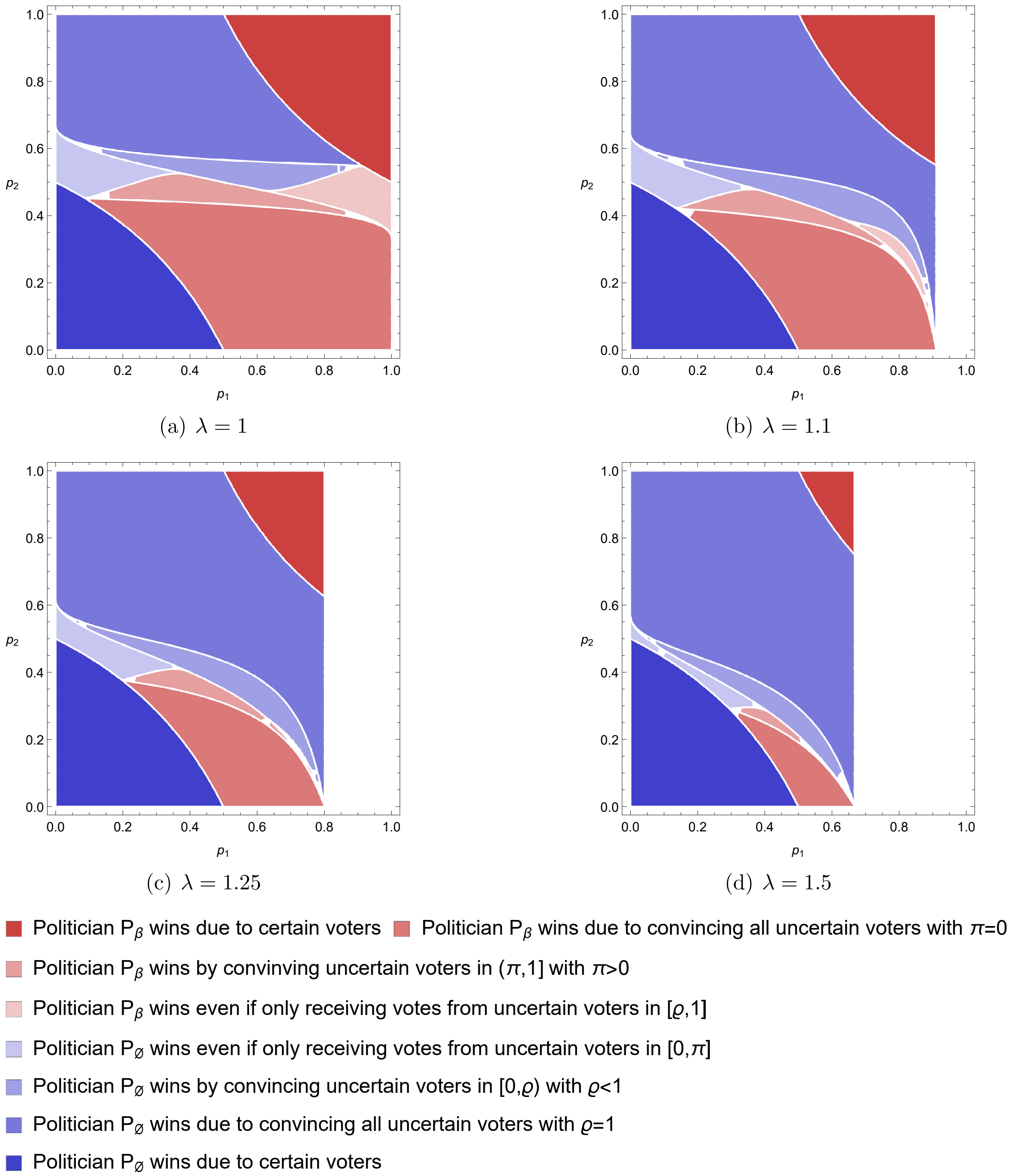
6 Comparison of Election Outcomes

The goal of this section is to compare the election outcome for the three different cases without politsplaining, under politsplaining by one politician, and under politsplaining by both politicians. The election outcome is shown in Figures 1, 2, and 7.

If the election is decided by certain voters, shock explanation obviously cannot change the result. In addition, there are further parameter constellations for which Politician $P_\emptyset$ (respectively P_β) always wins the election, independently of whether politsplaining takes place. For $\lambda = 1$, this is the case if $p_2(1-p_1) > \frac{1}{2}$ (resp. $p_1(1-p_2) > \frac{1}{2}$).

Outside these parameter regions, politsplaining matters in two aspects. First, politsplaining by only one politician is always powerful enough to change the election outcome. Second, politsplaining by both politicians is not offsetting: one politician may have won the election without politsplaining, while the other politician wins under competing shock explanations. Hence, two populists may not neutralize each other in terms of election outcome. Therefore, we differentiate between constellations where the winner is identical under no shock explanation and under shock explanations by both politicians and constellations where the winner changes.

To give a concrete example, we set $\lambda = 1$ and $p_1 = 0.35$. For $p_2 = 0.6$, Politician $P_\emptyset$ wins the election, due to the votes of all uncertain voters, both without shock explanation and under shock explanation by both politicians. For $p_2 = 0.55$, Politician $P_\emptyset$ still wins in both cases, but under shock explanations by both politicians, there is a positive share of uncertain voters that does not vote for him. In contrast, for $p_2 = 0.51$, Politician $P_\emptyset$ only wins the election without shock explanations and looses it otherwise.



(a) $\lambda = 1$ (b) $\lambda = 1.1$ (c) $\lambda = 1.25$ (d) $\lambda = 1.5$

Figure 7: Election outcome under shock explanation by both politicians for different values of $\lambda \geq 1$, $p_1 \in (0, \frac{1}{\lambda})$, and $p_2 \in (0, 1)$.

7 Ramifications

Our model introduced in this paper is quite simple, but should allow many extensions and variations. We sketch out a few in this section.

Choice of β

We have focused on a protection policy with a fixed value of β. Let us assume that β can be chosen in the interval $[\beta^-, \beta^+]$, with $0 < \beta^- < \beta^+$. From our analysis in Section 3 and Condition (12), it is clear that any voter i is either in favor of Politician $P_\emptyset$ or in favor of Politician P_β. Hence, Politician P_β is indifferent as to which value of β to choose. However, if we consider competition for becoming Politician P_β, in primaries for a presidential election in the US, for instance, it becomes relevant how much uncertain voters who are in favor of Politician P_β gain from such a policy. Since potential gains scale with β, a politician who wants to become P_β will best offer $\beta = \beta^+$ to avoid competition from politicians who might also run for office by proposing a protection policy with some $\tilde{\beta} > \beta$.

Interpretation of the Tie-breaking Rule

One might want to introduce a tie-breaking rule based on the following idea: An uncertain voter prefers the politician who gives a "stable" shock-explanation, "stable" meaning that even under a small perturbation (some ϵ-deviation towards a less polarised shock explanation), the voter would receive a higher expected income from the politician's election. Of course, the equilibrium deviation has to be adjusted accordingly, but the results would not differ significantly from the ones in the paper.

Voter Loyalty

We have abstracted from many other potential reasons why voters may support a candidate or why they may believe the narrative of one politician rather than the other. Let us first examine the impact of voter loyalty. Loyal voters support a candidate even if his current policy proposal will entail losses for them, because this politician may pursue other types of policies in the future, which are attractive to them or simply because of ideological bonds. If some of the uncertain voters are loyal voters of one politician, this will induce, ceterus paribus, more extreme forms of politsplaining, since only a smaller fraction of uncertain voters has to be attracted and unfavorable beliefs can be reallocated to loyal voters.

Multiple Causes and other Sources of Credibility

We have focussed on a simple set-up with only two possible causes when agents are hit by negative income shocks. Typically, the set of causes is larger and multiple subcauses may form a larger cause. Moreover, we have adopted a very simple credibility notion regarding shock explanation. More sophisticated variants of credibility could be considered, e.g. by adding the desire of individuals to avoid unreliable information[6]. Moreover, we could add other characteristics that influence the credibility of shock explanations. In particular, characteristics that are connected to cultural identity might be particularly important in this respect, as they play a key role in the emergence of populism, as emphasized by the proponents of the cultural backlash hypothesis, discussed in section 2.

8 Conclusion

We have prescribed a simple framework to define and analyze politsplaining. A populist is defined as a politician who engages in politsplaining. Further insights are that populism breeds populism and that two populists do not necessarily offset each other. As a populist can increase his support by politsplaining on a socially inefficient policy, this may allow him to win the election— this is the core result generated by our model.

As discussed above, there are many possible further avenues for research. Of course, populism is a complex issue and multiple complementary explanations for it have to be assessed. Yet, politsplaining should be included into any analysis of populism.

[6]There is an important literature about the desire to avoid bad information, see Golman et al. (2017).

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A Appendix

A.1 Appendix: Properties of the Belief Function

To begin with, let us calculate the derivatives of c_π, p_π, c_ϱ, and p_ϱ:

$$\frac{\partial c_\pi}{\partial \pi} = -\bar{p}_1 < 0, \tag{36}$$

$$\frac{\partial p_\pi}{\partial \pi} = \frac{\bar{p}_1}{(1-\pi)^2} > 0 \text{ (strictly increasing in } \pi), \tag{37}$$

$$\frac{\partial c_\varrho}{\partial \varrho,} = (1-\bar{p}_1) > 0, \tag{38}$$

$$\frac{\partial p_\varrho}{\partial \varrho} = \frac{1-\bar{p}_1}{\varrho^2} > 0 \text{ (strictly decreasing in } \varrho). \tag{39}$$

In the next two lemmas we summarize important properties of the resulting belief $\bar{q}$.

Lemma 3

Restricted to non-degenerate $(\pi, \varrho) \neq (1-\bar{p}_1, 1-\bar{p}_1)$, the value of the constant function $\bar{q}|_{[0,\pi]} \equiv \frac{c_\varrho p_\varrho}{c_\pi + c_\varrho}$ is strictly increasing with respect to ϱ. Depending on π, it is strictly increasing for $\varrho \in (1-\bar{p}_1, 1]$, and equal to 0 for $\varrho = 1-\bar{p}_1$.

Proof of Lemma 3.

Using product and chain rule, one concludes the first statement by computing the partial derivative with respect to ϱ:

$$\frac{\partial}{\partial \varrho}\Big(\frac{c_\varrho p_\varrho}{c_\pi + c_\varrho}\Big) = \frac{c'_\varrho p_\varrho + p'_\varrho c_\varrho}{c_\pi + c_\varrho} - \frac{c'_\varrho c_\varrho p_\varrho}{\big(c_\pi + c_\varrho\big)^2} \tag{40}$$

$$= \frac{c_\pi(c'_\varrho p_\varrho + p'_\varrho c_\varrho) + p'_\varrho (c_\varrho)^2}{\big(c_\pi + c_\varrho\big)^2}. \tag{41}$$

Similarly, we obtain:

$$\frac{\partial}{\partial \pi}\Big(\frac{c_\varrho p_\varrho}{c_\pi + c_\varrho}\Big) = -\frac{c'_\pi c_\varrho p_\varrho}{\big(c_\pi + c_\varrho\big)^2}. \tag{42}$$

■

Lemma 4

Restricted to non-degenerate $(\pi, \varrho) \neq (1-\bar{p}_1, 1-\bar{p}_1)$*, the value of the constant function* $\bar{q}|_{[\varrho,1]} \equiv \frac{c_\pi p_\pi + c_\varrho}{c_\pi + c_\varrho}$ *is strictly increasing with respect to* π*. Depending on* ϱ*, it is strictly increasing for* $\pi \in [0, 1-\bar{p}_1)$*, and equal to* 1 *for* $\pi = 1-\bar{p}_1$*.*

Proof of Lemma 4.

Using product and chain rule, we compute the partial derivative with respect to π:

$$\frac{\partial}{\partial \pi}\Big(\frac{c_\pi p_\pi + c_\varrho}{c_\pi + c_\varrho}\Big) = \frac{c_\pi' p_\pi + c_\pi p_\pi'}{c_\pi + c_\varrho} - \frac{c_\pi'(c_\pi p_\pi + c_\varrho)}{\big(c_\pi + c_\varrho\big)^2} \tag{43}$$

$$= \frac{c_\pi p_\pi'(c_\pi + c_\varrho) - c_\pi' c_\varrho (1-p_\pi)}{\big(c_\pi + c_\varrho\big)^2}. \tag{44}$$

The first statement follows directly from $c_\pi' < 0$. For the second statement, observe that one can equivalently write

$$\bar{q}|_{[\varrho,1]} \equiv 1 - \frac{c_\pi(1-p_\pi)}{c_\pi + c_\varrho}, \tag{45}$$

and that c_ϱ is strictly increasing in ϱ. ■

Proof of Propostion 3.

Observing $p_\pi' c_\pi = \bar{p}_1 p_\pi (1-p_\pi)$, we can rewrite the partial derivative with respect to π as follows:

$$\frac{\partial \bar{q}|_{(\pi,\varrho)}}{\partial \pi} = \frac{1}{\big(c_\pi + c_\varrho\big)^2}\big[c_\pi'(c_\varrho p_\pi - c_\varrho p_\varrho) + p_\pi' c_\pi (c_\pi + c_\varrho)\big] \tag{46}$$

$$= \frac{\bar{p}_1}{\big(c_\pi + c_\varrho\big)^2}\big[p_\pi(1-p_\pi)(c_\pi + c_\varrho) - c_\varrho p_\pi + c_\varrho p_\varrho\big] \tag{47}$$

$$= \frac{\bar{p}_1}{c_\pi + c_\varrho}\big[\bar{q}|_{(\pi,\varrho)} - (p_\pi)^2\big]. \tag{48}$$

For $\pi = 1-\bar{p}_1$, we have $\bar{q}|_{(\pi,\varrho)} = p_\varrho \leq \bar{p}_1 < 1 = (p_\pi)^2$. For $\pi = 0$, we need to show that $\bar{q}|_{(\pi,\varrho)} = \frac{(\bar{p}_1)^2(1-\bar{p}_1) + c_\varrho p_\varrho}{\bar{p}_1(1-\bar{p}_1) + c_\varrho} > (\bar{p}_1)^2 = (p_\pi)^2$, or equivalently

$$(1+\bar{p}_1)\varrho + \frac{1-\bar{p}_1}{\varrho} > 2(1-\bar{p}_1)(1+\bar{p}_1). \tag{49}$$

After multiplying by ϱ, we note that the corresponding quadratic equation in ϱ has no real solution, and conclude that the above inequality is satisfied for all $\varrho \in [1 - \bar{p}_1, 1]$.

Continuity of $\bar{q}|_{(\pi,\varrho)}$ and $(p_\pi)^2$ with respect to $\pi \in [0, 1 - \bar{p}_1]$ implies the existence of some $\pi^* \in (0, 1 - \bar{p}_1)$ satisfying $\bar{q}|_{(\pi^*,\varrho)} = (p^*_\pi)^2$. Uniqueness follows from Equations (37) and (48). ■

Proof of Propostion 4.

Observing $p'_\varrho c_\varrho = (1-\overline{p}_1)p_\varrho(1-p_\varrho)$, we can rewrite the partial derivative with respect to ϱ as follows:

$$\frac{\partial \overline{q}|_{(\pi,\varrho)}}{\partial \varrho} = \frac{1}{\left(c_\pi + c_\varrho\right)^2}\left[c'_\varrho(c_\pi p_\varrho - c_\pi p_\pi) + p'_\varrho c_\varrho(c_\pi + c_\varrho)\right] \tag{50}$$

$$= \frac{1 - \overline{p}_1}{\left(c_\pi + c_\varrho\right)^2}\left[c_\pi p_\varrho - c_\pi p_\pi + p_\varrho(1 - p_\varrho)(c_\pi + c_\varrho)\right] \tag{51}$$

$$= \frac{1 - \overline{p}_1}{c_\pi + c_\varrho}\left[p_\varrho(2 - p_\varrho) - \overline{q}|_{(\pi,\varrho)}\right]. \tag{52}$$

For $\varrho = 1 - \overline{p}_1$, we have $\overline{q}|_{(\pi,\varrho)} = p_\pi \geq \overline{p}_1 > 0 = p_\varrho(2 - p_\varrho)$. For $\varrho = 1$, we need to show that $\overline{q}|_{(\pi,\varrho)} = \frac{c_\pi p_\pi + (\overline{p}_1)^2(1-\overline{p}_1)}{c_\pi + \overline{p}_1(1-\overline{p}_1)} < \overline{p}_1(2 - \overline{p}_1) = p_\varrho(2 - p_\varrho)$, or equivalently

$$\frac{\overline{p}_1}{1 - \pi} + (2 - \overline{p}_1)(1 - \pi) > 2\overline{p}_1(2 - \overline{p}_1). \tag{53}$$

After multiplying by $(1 - \pi)$, we note that the corresponding quadratic equation in the variable $(1 - \pi)$ has no real solution, and conclude that the above inequality is satisfied for all $\pi \in [0, 1 - \overline{p}_1]$.

Continuity of $\overline{q}|_{(\pi,\varrho)}$ and $p_\varrho(2-p_\varrho)$ with respect to $\varrho \in [1-\overline{p}_1, 1]$ implies the existence of some $\varrho^* \in (1-\overline{p}_1, 1)$ satisfying $\overline{q}|_{(\pi,\varrho^*)} = p_{\varrho^*}(2-p_{\varrho^*})$. Uniqueness follows from Equations (39) and (52). ■

A.2 Appendix: Further Proofs

Proof of Proposition 5. For the choice $\varrho^* = 1$, the resulting belief $\overline{q}$ simplifies to

$$\overline{q}(i) = \begin{cases} \frac{(\overline{p}_1)^2(1-\overline{p}_1)}{c_\pi + \overline{p}_1(1-\overline{p}_1)}, & \text{if } i \in [0, \pi], \\ \frac{c_\pi p_\pi + (\overline{p}_1)^2(1-\overline{p}_1)}{c_\pi + \overline{p}_1(1-\overline{p}_1)}, & \text{if } i \in [\pi, 1]. \end{cases} \tag{54}$$

Based on Condition 12, it is optimal for Politician $P_\emptyset$ to choose $\varrho^* = 1$ if the resulting belief satisfies $\max_\pi \overline{q}|_{[\pi,1]} \leq \lambda p_1$.

Step 1: $\max_\pi \overline{q}|_{[\pi,1]} = \lambda p_1 \iff \overline{p}_1 = d_-(\lambda p_1)$

By Proposition 3, $\overline{q}$ is maximized on $[\pi, 1]$ by choosing π as the unique solution of $\overline{q}|_{[\pi,1]} = (p_\pi)^2$. Therefore, we obtain

$$\max_\pi \overline{q}|_{[\pi,1]} = \lambda p_1 \iff \begin{cases} \overline{q}|_{[\pi,1]} = \lambda p_1 \\ \overline{q}|_{[\pi,1]} = (p_\pi)^2 \end{cases} \iff \begin{cases} \overline{q}|_{[\pi,1]} = \lambda p_1 & \text{(I)} \\ \pi = 1 - \frac{\overline{p}_1}{\sqrt{\lambda p_1}} & \text{(II)}. \end{cases} \tag{55}$$

Note that $\pi = 1 - \frac{\overline{p}_1}{\sqrt{\lambda p_1}} \geq 0$ since $\overline{p}_1 \leq d_-(\lambda p_1) \leq \lambda p_1 \leq \sqrt{\lambda p_1}$. Plugging (II) into (I) yields

$$\frac{\overline{p}_1\big((1-\overline{p}_1) - (1 - \frac{\overline{p}_1}{\sqrt{\lambda p_1}})\big) \cdot \sqrt{\lambda p_1} + (\overline{p}_1)^2(1-\overline{p}_1)}{\overline{p}_1\big((1-\overline{p}_1) - (1 - \frac{\overline{p}_1}{\sqrt{\lambda p_1}})\big) + \overline{p}_1(1-\overline{p}_1)} = \lambda p_1 \tag{56}$$

$$\iff (\overline{p}_1)^2 - 2\overline{p}_1(1 - \sqrt{\lambda p_1} + \lambda p_1) + \lambda p_1 = 0. \tag{57}$$

Solving for $\overline{p}_1$ yields two solutions,

$$(\overline{p}_1)_\pm = \lambda p_1 + (1 - \sqrt{\lambda p_1})(1 \pm \sqrt{1 + \lambda p_1}), \tag{58}$$

but only $(\overline{p}_1)_- = d_-(\lambda p_1)$ takes values in $(0, 1)$.

Step 2: For $\varrho^* = 1$ and all $\pi \in [0, 1 - \overline{p}_1)$, $\overline{q}|_{[\pi,1]}$ is strictly increasing in $\overline{p}_1$.

Plugging-in c_π and p_π yields

$$\overline{q}|_{[\pi,1]} = \frac{\overline{p}_1\big(2 - \overline{p}_1 \cdot \frac{2-\pi}{1-\pi}\big)}{2(1-\overline{p}_1) - \pi}, \tag{59}$$

and we obtain

$$\frac{\partial}{\partial \overline{p}_1} \overline{q}|_{[\pi,1]} = \frac{2(2-\pi)(1-\overline{p}_1)(1-\frac{\overline{p}_1}{1-\pi})}{\big(2(1-\overline{p}_1)-\pi\big)^2}. \tag{60}$$

Since $\frac{\overline{p}_1}{1-\pi} < 1$ for $\pi \in [0, 1-\overline{p}_1)$, the partial derivative with respect to $\overline{p}_1$ is strictly positive.

Conclusion: Step 2 implies that $\max_\pi \overline{q}|_{[\pi,1]}$ is strictly increasing in $\overline{p}_1$, where we use the fact that the maximum is attained in the interior of $[0, 1-\overline{p}_1]$. Hence, $\max_\pi \overline{q}|_{[\pi,1]} \leq \lambda p_1$ if and only if $\overline{p}_1 \leq d_-(\lambda p_1)$. ■

Proof of Proposition 6. For the choice $\pi^* = 0$, the resulting belief $\bar{q}$ simplifies to

$$\bar{q}(i) = \begin{cases} \frac{(\bar{p}_1)^2(1-\bar{p}_1)+c_\varrho p_\varrho}{\bar{p}_1(1-\bar{p}_1)+c_\varrho}, & \text{if } i \in [0,\varrho], \\ \frac{(\bar{p}_1)^2(1-\bar{p}_1)+c_\varrho}{\bar{p}_1(1-\bar{p}_1)+c_\varrho}, & \text{if } i \in [\varrho, 1]. \end{cases} \tag{61}$$

Based on Condition (12), it is optimal for Politician P_β to choose $\pi^* = 0$ if the resulting belief satisfies $\min_\varrho \bar{q}|_{[0,\varrho]} \geq \lambda p_1$.

Step 1: $\min_\varrho \bar{q}|_{[0,\varrho]} = \lambda p_1 \iff \bar{p}_1 = d_+(\lambda p_1)$

By Proposition 4, $\bar{q}$ is minimized on $[0,\varrho]$ by choosing ϱ as the unique solution of $\bar{q}|_{[0,\varrho]} = 1-(1-p_\varrho)^2$. Therefore, we obtain

$$\min_\varrho \bar{q}|_{[0,\varrho]} = \lambda p_1 \iff \begin{cases} \bar{q}|_{[0,\varrho]} = \lambda p_1 \\ \bar{q}|_{[0,\varrho]} = 1-(1-p_\varrho)^2 \end{cases} \iff \begin{cases} \bar{q}|_{[0,\varrho]} = \lambda p_1 & \text{(I)} \\ \varrho = \frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}} & \text{(II).} \end{cases} \tag{62}$$

Note that $\varrho = \frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}} \leq 1$ since $\bar{p}_1 \geq d_+(\lambda p_1) \geq 1-\sqrt{1-\lambda p_1}$. Plugging (II) into (I) yields

$$\frac{(\bar{p}_1)^2(1-\bar{p}_1)+(1-\bar{p}_1)\big(\frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}}-(1-\bar{p}_1)\big)(1-\sqrt{1-\lambda p_1})}{\bar{p}_1(1-\bar{p}_1)+(1-\bar{p}_1)\big(\frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}}-(1-\bar{p}_1)\big)} = \lambda p_1 \tag{63}$$

$$\iff (\bar{p}_1)^2 - \bar{p}_1\big(\lambda p_1 - (1-\sqrt{1-\lambda p_1})^2\big) - (1-\sqrt{1-\lambda p_1})^2 = 0. \tag{64}$$

Solving for $\bar{p}_1$ yields two solutions:

$$(\bar{p}_1)_\pm = \frac{\lambda p_1 - (1-\sqrt{1-\lambda p_1})^2}{2} \tag{65}$$
$$\pm \frac{1}{2}\sqrt{\big(\lambda p_1 - (1-\sqrt{1-\lambda p_1})^2\big)^2 + 4(1-\sqrt{1-\lambda p_1})^2} \tag{66}$$
$$= \sqrt{1-\lambda p_1} - (1-\lambda p_1) \pm (1-\sqrt{1-\lambda p_1})\sqrt{2-\lambda p_1} \tag{67}$$
$$= \lambda p_1 + (1-\sqrt{1-\lambda p_1})(\pm\sqrt{2-\lambda p_1} - 1), \tag{68}$$

but only $(\bar{p}_1)_+ = d_+(\lambda p_1)$ takes values in $(0,1)$.

Step 2: For $\pi^* = 0$ and all $\varrho \in (1-\bar{p}_1, 1]$, $\bar{q}|_{[0,\varrho]}$ is strictly increasing in $\bar{p}_1$.

Plugging-in c_ϱ and p_ϱ yields

$$\bar{q}|_{[0,\varrho]} = \frac{(\bar{p}_1)^2 + 2\bar{p}_1 - 2 + \varrho + \frac{(1-\bar{p}_1)^2}{\varrho}}{2\bar{p}_1 - (1-\varrho)}, \tag{69}$$

and we obtain

$$\frac{\partial}{\partial \bar{p}_1}\bar{q}|_{[0,\varrho]} = \frac{2\bar{p}_1(\varrho+1)(1-\frac{1-\bar{p}_1}{\varrho})}{\big(2\bar{p}_1 - (1-\varrho)\big)^2}. \tag{70}$$

Since $1 - \frac{1-\bar{p}_1}{\varrho} > 0$ for $\varrho \in (1-\bar{p}_1, 1]$, the partial derivative with respect to $\bar{p}_1$ is strictly positive.

Conclusion: Step 2 implies that $\min_\varrho \bar{q}|_{[0,\varrho]}$ is strictly increasing in $\bar{p}_1$, where we use that the minimum is attained in the interior of $[1-\bar{p}_1, 1]$. Hence, $\min_\varrho \bar{q}|_{[0,\varrho]} \geq \lambda p_1$ if and only if $\bar{p}_1 \geq d_+(\lambda p_1)$. ■

Proof of Lemma 1. Computing the first derivative yields

$$d_0'(x) = \frac{1}{2\big(2-\sqrt{x}-\sqrt{1-x}\big)^2} \cdot \left[\frac{1-\sqrt{x}}{\sqrt{1-x}} + \frac{1-\sqrt{1-x}}{\sqrt{x}}\right] > 0, \tag{71}$$

which shows that d_0 is strictly increasing and thereby injective. The extension of d_0 to $[0,1]$ is continuous and one has $d_0(0) = 0$ and $d_0(1) = 1$. Hence, d_0 is also surjective. ■

Proof of Lemma 2. Using Propositions 3 and 4, we can equivalently write the system of equations as

$$\begin{cases} \bar{q}|_{(\pi^*,\varrho^*)} = (p_{\pi^*})^2, \\ \bar{q}|_{(\pi^*,\varrho^*)} = 1-(1-p_{\varrho^*})^2. \end{cases} \tag{72}$$

If there is a solution (π^*, ϱ^*), we have $\bar{q}|_{(\pi^*,\varrho^*)} = (p_{\pi^*})^2 \geq (\bar{p}_1)^2$ and $\bar{q}|_{(\pi^*,\varrho^*)} = 1-(1-p_{\varrho^*})^2 \leq 1-(1-\bar{p}_1)^2$. Therefore, it is sufficient to analyze the system of equations:

$$\begin{cases} \bar{q}|_{(\pi^*,\varrho^*)} = x \\ \bar{q}|_{(\pi^*,\varrho^*)} = (p_{\pi^*})^2 \\ \bar{q}|_{(\pi^*,\varrho^*)} = 1-(1-p_{\varrho^*})^2 \end{cases} \iff \begin{cases} \bar{q}|_{(\pi^*,\varrho^*)} = x & \text{(I)}, \\ \pi^* = 1-\frac{\bar{p}_1}{\sqrt{x}} & \text{(II)}, \\ \varrho^* = \frac{1-\bar{p}_1}{\sqrt{1-x}} & \text{(III)}, \end{cases} \tag{73}$$

for $x \in [(\bar{p}_1)^2, 1-(1-\bar{p}_1)^2]$, and to show that is has a unique solution for exactly one value of x and no solution otherwise.

Note that π^*, ϱ^* in (II) and (III) are well-defined choice variables, since $x \in [(\bar{p}_1)^2, 1-(1-\bar{p}_1)^2$. Plugging (II) and (III) into (I) yields

$$\Big(\frac{\bar{p}_1}{1-\bar{p}_1}\Big)^2 = \Big(\frac{1-\sqrt{1-x}}{1-\sqrt{x}}\Big)^2 \iff \frac{\bar{p}_1}{1-\bar{p}_1} = \frac{1-\sqrt{1-x}}{1-\sqrt{x}}, \tag{74}$$

where we use $\bar{p}_1, x \in (0,1)$. Rearranging terms shows that the right-hand side is uniquely solved by $\bar{p}_1 = d_0(x)$. Hence, there is a unique solution for $x = {d_0}^{-1}(\bar{p}_1)$ and no solution otherwise. ■

Proof of Theorem 1. Case 1: $\bar{p}_1 = d_0(\lambda p_1)$

Suppose that both politicians choose their shock explanation in order to maximize, respectively minimize, the resulting belief $\bar{q}|_{(\pi^*,\varrho^*)}$. By Lemma 2, this corresponds to $(\pi^*, \varrho^*) = (1-\frac{\bar{p}_1}{\sqrt{\lambda p_1}}, \frac{1-\bar{p}_1}{\sqrt{1-\lambda p_1}})$. For this pair of shock explanations, due to $\bar{q}|_{[0,\pi^*]} < \bar{q}|_{(\pi^*,\varrho^*)} = \lambda p_1 < \bar{q}|_{[\varrho^*,1]}$, voters in (π^*, ϱ^*) are indifferent, voters in $[0, \pi^*]$ are in favor of Politician $P_\emptyset$, and voters in $[\varrho^*, 1]$ are in favor of Politician P_β. Clearly, (π^*, ϱ^*) is an equilibrium: Any deviation $\varrho \neq \varrho^*$ leads to Politician P_β winning the uncertain voters in (π^*, ϱ), while leaving the share of voters in favor of Politician $P_\emptyset$ unchanged. Similarly, any deviation $\pi \neq \pi^*$ is suboptimal.

It follows from Lemma 2 that in any equilibrium candidate (π, ϱ) with $(\pi, \varrho) \neq (\pi^*, \varrho^*)$, all voters in (π, ϱ) vote for Politician $P_\emptyset$ or Politician P_β. Without loss of generality, let us assume that they vote for Politician P_β. But then, choosing ϱ cannot be optimal for Politician $P_\emptyset$ since ϱ^* would make the voters in (π, ϱ^*) indifferent at least. Hence, there cannot exist another equilibrium.

Case 2: $\bar{p}_1 < d_0(\lambda p_1)$

Let us denote by $(\tilde{\pi}, \tilde{\varrho})$ the unique solution to Equations (25). Since $\bar{q}|_{[\tilde{\pi},\tilde{\varrho}]} = {d_0}^{-1}(\bar{p}_1)$ is strictly increasing in $\bar{p}_1$, we conclude that Politician $P_\emptyset$ wins the voters in $[0, \tilde{\varrho}]$ for the choice $\tilde{\varrho}$. Here we use that $\lambda p_1 > \bar{q}|_{[\tilde{\pi},\tilde{\varrho}]} > \bar{q}|_{(\pi,\tilde{\varrho})}$ for any $\pi \in [0, 1 - \bar{p}_1]$.

Recall that $\bar{q}|_{(\pi,\varrho)}$ and thereby also $\max_\pi \bar{q}|_{(\pi,\varrho)}$ increases as ϱ goes from $\tilde{\varrho}$ to 1. Therefore, Politician $P_\emptyset$ will increase his choice ϱ as long as $\max_\pi \bar{q}|_{(\pi,\varrho)} \leq \lambda p_1$. Define

$$\varrho^* := \max\{\varrho \in [\tilde{\varrho}, 1] : \max_\pi \bar{q}|_{(\pi,\varrho)} \leq \lambda p_1\}. \tag{75}$$

This choice is optimal for Politician $P_\emptyset$ if Politician P_β chooses $\pi^* := \operatorname{argmax}_\pi \bar{q}|_{(\pi,\varrho^*)}$. Hence, (π^*, ϱ^*) is an equilibrium.

Suppose that there is another equilibrium $(\pi, \varrho) \neq (\pi^*, \varrho^*)$. Clearly, $\varrho > \varrho^*$, because otherwise, the choice of π is not optimal. But then Politician P_β can choose π' such that $\bar{q}|_{(\pi',\varrho)} > \lambda p_1$, and thereby win all voters in $[\pi', 1]$, contradicting the optimality of ϱ. Hence, no other equilibrium can exist.

Step 3: $\bar{p}_1 > d_0(\lambda p_1)$

Similarly to the previous case, one proves that there is a unique equilibrium (π^*, ϱ^*) given by

$$\pi^* := \min\{\pi \in [0, \tilde{\pi}] : \min_\varrho \bar{q}|_{(\pi,\varrho)} \geq \lambda p_1\} \tag{76}$$

and $\varrho^* := \operatorname{argmin}_\varrho \bar{q}|_{(\pi^*,\varrho)}$. ■