A Theoretical Approach to Political Trust

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Abstract

We model political trust by adding a pollster to a political-accountability model. The pollster asks citizens about their personal trust in government at different points in time. We assume that citizens respond by reporting their Bayesian beliefs about whether the government acts well. Politicians and experts are involved in the making of policy. We distinguish three dimensions of trust: intention, competence, and incentives. Our model shows how and why political trust depends on the freedom of the press and why in countries with higher levels of trust, bad outcomes lead to less political turnover. Our model generates testable predictions of how in low-trust and high-trust countries, political trust evolves over the electoral cycle.

Keywords: Trust in Government, Political Accountability, Experts, Freedom of the Press.

JEL Classification: D72, D83

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"Confucius once remarked that rulers need three resources: weapons, food and trust. The ruler who cannot have all three should give up weapons first, then food, but should hold on to trust at all costs: 'without trust we cannot stand'". (Geoffrey Hosking, 2002, Why We Need a History of Trust, *Reviews in History*, IHS).

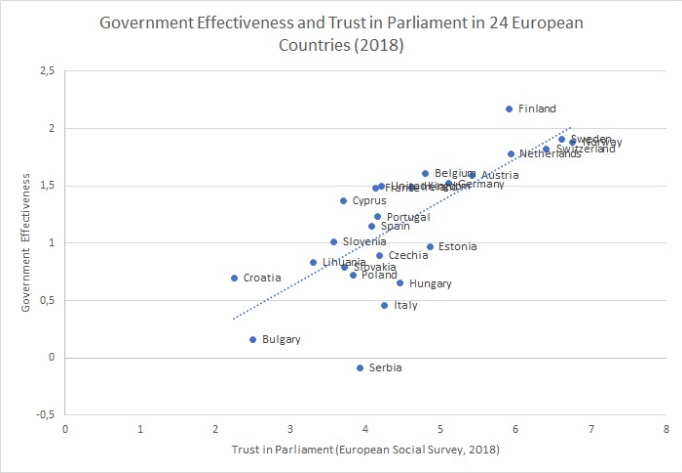
1 Introduction

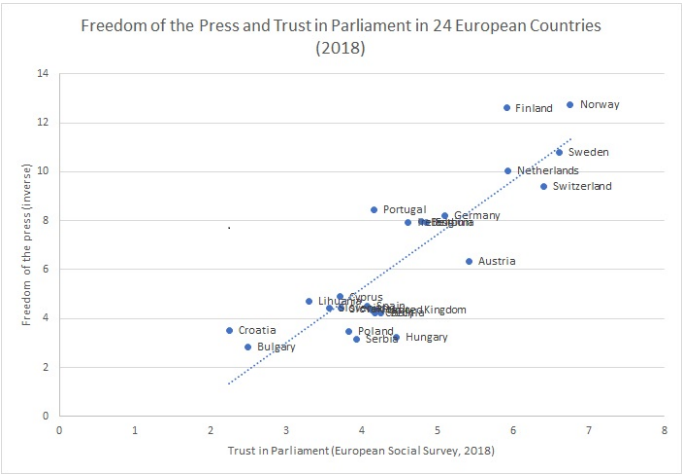
More than 2,500 years ago, Confucius already emphasized the importance of political trust. In his view, citizens' trust in rulers is a more effective way of securing compliance than food or weapons.

In the last decades, social surveys have made data on political trust, in short, "trust" available. The availability of these data has encouraged social scientists from different disciplines to empirically investigate the drivers of trust. There are two strands in this literature. In the first, the focus is on *individual* trust levels. For many countries, studies report that citizens with higher incomes, higher social status, and better education tend to trust the government *more* (see, for example, Zmerli and Newton, 2011). There are some interesting exceptions, however. In some authoritarian regimes, citizens with higher incomes, higher social status, and better education tend to trust the government *less* (Guriev and Treiman, 2019).

Studies in the second strand explain *aggregated* trust levels by various measures of institutions (Inglehart, 2003, Knack and Keefer, 1995, Putnam, 1993, Zmerli, Newton and Montero, 2007). The correlations presented in Figure 1 and 2 are exemplary for this approach. Figure 1 shows that across the countries included in the European Social Survey 2018, there is a positive correlation between trust in national parliaments (x-axis: $[0, 10]$ scale) and Government Effectiveness (y-axis: $[-2.5, 2.5]$ scale, Worldwide Governance Indicators, 2018). This correlation is reasonable and provides some credibility to the aggreated trust data for these countries.[1] Figure 2 shows across the same countries a negative correlation between the same trust measure and an indicator of the freedom of the press (y-axis: a higher value denotes less freedom of the press).

[1] This credibility cannot be taken for granted. It is not clear how respondents interpret trust questions, as pointed out by Glaeser et al. (2000) [see also Alesina and Ferrara (2002) on this issue].





While some studies try to identify the drivers of trust, other studies investigate the consequences of trust. We mention a few examples. At the individual level, Marien and Hooghe (2011) find that citizens with lower levels of political trust are more permissive toward law-breaking behavior. At the country level, studies find that high trust is correlated with low levels of tax evasion [see Kogler et al. (2013) and references therein]. Algan et al. (2017) and Dustmann et al. (2017) show that the decline in trust in the EU was accompanied by a rise in populism in many European countries. These studies on the consequences of trust provide preliminary support for Confucius' hunch that trust helps to secure compliance.

This paper tries to explain recent empirical findings of aggregated trust. Specifically, our model explains the negative correlation between trust and the freedom of

the press. Furthermore, it explains why in countries with higher trust levels, bad outcomes lead to less political turnover (Nunn et al., 2017). Our model generates new testable predictions of how trust evolves over a government's term. Finally, our model can be used to investigate how citizens answer questions of trust in government. Survey questions about trust are vague. It is not clear how citizens interpret them. A formal model shows how alternative interpretations affect citizens' answers.

As the point of departure of our model of trust we take the definition of trust of the OECD (2017): a person's trust in an institution is "a person's belief that an institution will act consistently with his expectation of positive behavior" We model trust by adding a pollster to a political-economic model who asks citizens about their personal trust in government at different points in time.[2] We assume that citizens interpret this trust question in line with the definition of the OECD. More specifically, we assume that each citizen responds by reporting his Bayesian belief about whether the government acts well. The Bayesian approach assumes that citizens optimally form beliefs, given an underlying model of the world. By having surveys in our model at different points in time, we can investigate how new information affects trust and generate testable predictions.

In our model, there are three dimensions of trust: intention, competence and incentives. We model the *intention* dimension through the politicians' types. Following Maskin and Tirole (2004), we assume that some politicians are good, they want to serve the people, while others are bad, they want to leave a legacy. We model the *competence* dimension through the bureaucrats' types. Bureaucrats are experts who advise the politicians. Expert differ in their abilities. Some experts are better than others in observing the state of the world. The intention and competence dimensions are well-known in the political science literature on trust (see, for example, Nooteboom, 2007, and Bouckaert, 2012). We add a third dimension to our model: *incentives*.[3] Following Maskin and Tirole (2004), we assume that politicians receive rents from office. Electoral concerns can induce bad politicians to serve the people or good politicians to act against the interests of the people.

[2]Measures of trust in institutions are usually obtained through survey questions. For example, the European Social Survey contains questions, like "Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I readout. 0 means you do not trust an institution at all, and 10 means you have complete trust".

[3]In our model, "intention" is a characteristic of an individual. The environment, for example the presence of elections, determines "incentives".

Following Alesina and Tabellini (2006), we assume that experts are concerned with their reputation for being able. Experts can work in the private or public sector. A high-ability expert is willing to work as a bureaucrat if this yields a sufficient good reputation. For incentives to work, information about policy outcomes is important. Following Gehlbach and Sonin (2014), in our model the media tries to show that policies have been bad or good. We use the word "scoop" for a news story that policy has been bad.

Our model has three types of equilibria. First, high-trust equilibria, in which both bad and good politicians serve the people. In this equilibrium, politicians follow advice. This gives scope for able bureaucrats. In high-trust equilibria, scoops are rare and exclusively about bureaucrats. Second, moderate-trust equilibria, in which good politicians serve the people, and bad politicians ignore advice and leave legacies. Bureaucrats are less willing to work for the government. Trust is relatively volatile. Scoops are about both politicians and bureaucrats. Finally, low-trust equilibria, in which neither good nor bad politicians serve the people. In these equilibria, able bureaucrats are not willing to work for the government. Scoops are common, and about both politicians and bureaucrats.

Freedom of the press, as captured by the probability that citizens are informed about bad policies, gives incentives to bad politicians to act well, but affects trust solely through the competence dimension. Freedom of the press is important for the quality of the bureaucracy, because able experts are more willing to work as a bureaucrat when mediocre bureaucrats are more likely unmasked. Our model predicts a positive correlation between trust and the freedom of the press as depicted in Figure 2. The predictions of our model are also consistent with Nunn et al. (2017), who find that in countries where trust is high citizens attribute economic downturns less to the mistakes of politicians. As a result, bad news is less likely to cause political turnover.

Though the empirical literature on political trust flourishes (see various chapters in the Oxford Handbook of Social and Political Trust, 2018, for a survey), the theoretical literature is very limited. Agranov et al. (2020) investigate the willingness of the majority of voters to follow the elite's advice. The elite has superior information about the qualities of the candidates running for office. Trust kicks in because the elite's preferences may differ from the voters' preferences. Agranov et al. (2020)

explain the negative correlation between trust and inequality. Trust concerns statements of the elite. Their analysis builds on the literature that studies endorsements (Grossman and Helpman, 1999). In our paper, trust concerns citizens' beliefs about whether the government behaves well.

Our analysis of political trust builds on the theory of political accountability (Barro, 1973, Ferejohn, 1986, Persson and Tabellini, 2000, and Maskin and Tirole, 2004). In this literature, elections serve as a disciplining device. We add to a model of political accountability a market for experts à la Besley and Ghatak (2005). Following Delfgaauw and Dur (2010), experts differ in their public sector motivation and ability. Like Alesina and Tabellini (2006), we assume that experts are concerned with their reputations for being able. As in Valasek (2018), high-ability experts want to work in well-functioning governments. Through the media, information plays an important role in government accountability. In Besley and Prat (2006), the emphasis is on disciplining politicians. In our model, freedom of the press is also important for attracting high-ability experts to the public sector.

2 Modeling Trust

We start with modeling trust in a standard model of political accountability. We refer to this model as the "basic model". In Section 3, we analyze trust in a more general setting.

The electorate is represented by a continuum of citizens with mass 1. There are two periods, $t = 1$ and $t = 2$. We denote by $\delta < 1$ the discount factor, which is assumed to be equal for all players in the model. In each period, a politician (the incumbent) makes a decision about a project, $x_t \in \{-1, 1\}$. We denote by $x_t = 1$ implementation of the project, and by $x_t = -1$ maintenance of the status quo.

The utility function

$$u_i = w_1 x_1 + \delta w_2 x_2 \tag{1}$$

describes citizen i's preferences, where $w_t \in \{-1, 1\}$ is the state of the world. We assume that $\Pr(w_t = 1) = \Pr(w_t = -1) = \frac{1}{2}$. The state in period 1 does not contain any information about the state in period 2. Equation (1) means that citizens want the politician to choose $x_t = 1$ if and only if $w_t = 1$. The incumbent observes w_t.

Citizens do not.

Following Maskin and Tirole (2004) and Smart and Sturm (2016), we distinguish between two types of politicians, $t_p \in \{b, g\}$, bad politicians who want to leave a legacy, $t_p = b$, and good politicians who receive utility from doing good for the people, $t_p = g$. The probability that $t_p = g$ equals θ_p, and the probability that $t_p = b$ equals $1 - \theta_p$. Both types of politicians receive rents from office, R. The payoff to a good politician equals

$$u_g = I_1^p R + w_1 x_1 + \delta \left(I_2^p R + w_2 x_2 \right), \tag{2}$$

where $I_t^p = 1$ if politician p is in office in period t, and $I_t^p = 0$ if he is not. The payoff to a bad politician equals

$$u_b = I_1^p \left(R + x_1 \right) + \delta I_2^p \left(R + x_2 \right). \tag{3}$$

Equation (3) captures that leaving a legacy in period t requires $x_t = 1$, irrespective of the states. Note that a good politician is concerned about the citizens' interests both when he is in office and when he is not in office. The benefit of leaving a legacy, by contrast, only accrues to a bad politician if he is in office. By distinguishing bad and good politicians, we model the intention dimension of trust.

After the politician has decided on x_1, the media reports about its consequences, $m_1 \in \{\varnothing, scoop\}$. If $x_1 \neq w_1$, with probability q the media discovers that $x_1 \neq w_1$. It reports a scoop, $m_1 = scoop$. With probability $1 - q$, the media does not discover that $x_1 \neq w_1$ and reports $m_1 = \varnothing$. If $x_1 = w_1$, the media reports $m_1 = \varnothing$. These assumptions describe a world in which (1) media outlets want to report "scoops" ($x_1 \neq w_1$); (2) conditional on $x_1 \neq w_1$, media outlets discover that $x_1 \neq w_1$ with probability q; and (3) media outlets cannot fabricate information. We interpret q as a measure of the freedom of the press.

At the end of the first period, each citizen i votes for the incumbent or for the a challenger. We denote by $v_i \in \left\{ v^I, v^C \right\}$, citizen i's vote decision, where v^I (v^C) is a vote for the incumbent (the challenger). The challenger is a new politician who is drawn from the pool of candidates.

To measure trust, we assume that surveys are conducted in which each citizen i is asked to report the probability with which he assesses that the decisions x_1 and

x_2 are in his interest. Denote by $z_{t,i}(\Omega)$ the probability that citizen i assesses that x_t is in his interest, given information Ω. We assume that each citizen i reports

$$z_i(\Omega) = \frac{z_{1,i}(\Omega) + \delta z_{2,i}(\Omega)}{1+\delta}.$$

when asked about his trust in the government. Surveys are held at three points in time:

1. At the beginning of the game: Ω only contains information about the game and equilibrium strategies.

2. Just after the politician has made a decision on x_1: Ω also contains information about x_1, $\Omega = \{x_1\}$;

3. After the media outlets have reported about the state: Ω also contains information about m_1, $\Omega = \{x_1, m_1\}$.

We define aggregated trust in the government, in short trust in the government, $z(\Omega)$, as the mean of individual trust levels: $z(\Omega) = \int_0^1 z_i(\Omega_i)\, di$. Our approach enables us to investigate how trust in the government responds to new information. The present paper focuses on aggregated trust. As in our model, all citizens possess the same signal, the difference between aggregated trust and individual trust is not relevant. Note, however that our approach to modeling trust can be applied to individual trust. In the proceeding, we only report aggregated trust. We use subscript 0 for trust at the beginning of the game, *ex ante* trust, z_0, subscript x for trust after the politician has made a decision on x_1, $z_x(x_1)$, and subscript xm for trust after the media outlets have reported on the consequences of x_1, *ex post* trust, $z_{xm}(x_1, m_1)$.

Our measure of trust implies that at the beginning of the game, citizens are forward-looking. Trust concerns future decisions. z_0 is close to citizens' perceptions of welfare. Once the decision on x_1 has been made, trust concerns the past decision and the future decision. In practice, it is not clear whether citizens think of past decisions, an upcoming decision, or both past and future decisions when answering survey questions about political trust. Ultimately, this is an empirical question. Our model can be used to predict how citizens' answers to trust questions depend on

how citizens interpret questions about trust. Also note that our measure of trust in government concerns "the system", the combination of intentions and incentives. Citizens might however report trust in politicians (prior, interim and posterior probabilities of θ_p). Our theoretical model can also be used to predict citizens' political trust when they report trust in politicians.

To solve our game, we identify Perfect Baysian Equilibria, in which politicians' strategies are sequentially rational and beliefs are updated according to Bayes' rule, whenever possible. In our model, the interesting actions take place in period 1. In period 2, the politician does not face a re-election constraint. As a result, the elected politician honors his type in period 2: a bad politician chooses $x_2 = 1$ irrespective of w_2, and a good politician chooses $x_2 = 1$ if and only if $w_2 = 1$. Clearly, all citizens want a good politician to win the election. A weakly dominant strategy for citizen i is to vote for the incumbent if $\hat{\theta}_p(x_1, m_1) = \Pr(t_1 = g|x_1, m_1) > \theta_p$, and to vote for the challenger otherwise. We assume that all citizens follow this voting strategy. In period 1, both types of politicians anticipate citizens' voting strategies and the period 2 strategies of both types of politicians. The analyis focuses on period 1.

3 Equilibria

This section describes the equilibria of the basic model. We first identify the conditions under which a pooling equilibrium exists, in which in period 1, both good and bad politicians serve the people, and citizen re-elect the incumbent unless the media reports a scoop that the decision on x_1 was incorrect. In this equilibrium, trust is high and stable over time. We next establish the conditions under which a partially separating equilibrium exists, in which in period 1, only good politicians serve the people, and citizens re-elect the incumbent only if $x_1 = -1$. In this equilibrium, trust is low and responds to new information. The conditions for these two equilibria do not cover the entire parameter space. We show that for moderate rents from office, a pooling equilibrium like the one above exists, in which citizens re-elect the incumbent if $x_1 = 1$ with a probability lower than one. This vote strategy weakens the incentives of a bad politician to choose $x_1 = 1$ when $w_1 = -1$. Finally, we briefly discuss two other possible pooling equilibria, in which policy decisions do not depend on w_1. We argue that those equilibria rely on implausible out-of-equilibrium

beliefs.

3.1 High-Trust Equilibrium I

We first identify the conditions under which a pooling (high-trust) equilibrium exists, in which both types of politicians choose $x_1 = 1$ if and only if $w_1 = 1$, and citizens re-elect the incumbent unless $m_1 = scoop$. In this equilibrium, neither x_1 nor m_1 contains information about the incumbent's type, meaning that $\hat{\theta}_p(x_1, \varnothing) = \theta_p$. Furthermore, citizens never observe $m_1 = scoop$ in equilibrium. In accordance with the Intuitive Criterion, we assume that if nevertheless $m_1 = scoop$, citizens believe that the incumbent is bad, $\hat{\theta}_p(x_1, scoop) = 0$. Hence, they vote for the challenger if $m_1 = scoop$.

Does one of the politician's types have an incentive to deviate? A good politician has not. Doing well for the people ensures office. A bad politician faces a dilemma in case $w_1 = -1$: $x_1 = 1$ yields a higher payoff in period 1, while $x_1 = -1$ yields a higher payoff in period 2. $x_1 = -1$ yields a higher payoff than $x_1 = 1$ if

$$\begin{aligned} R + 1 + \delta(1-q)(R+1) &\leq R - 1 + \delta(R+1) \\ R &\geq \bar{R}^P = \frac{2-\delta q}{\delta q}. \end{aligned} \tag{4}$$

Equation (4) shows that the pooling equilibrium exists if rents from office are sufficiently high. Rents from office give bad politicians an incentive to promote the electorate's interests. More freedom of the press and a higher discount rate widen the range of R for which a pooling equilibrium exists. In the pooling equilibrium, trust in government does not change when information becomes available. It equals

$$\begin{aligned} z_0 &= z_x(x_1) = z_{xm}(x_1, m_1) = \frac{1 + \delta\left(\theta_p + \frac{1}{2}(1-\theta_p)\right)}{1+\delta} \\ &= \frac{1 + \delta\frac{1}{2}(1+\theta_p)}{1+\delta}. \end{aligned}$$

3.2 The Low-Trust Equilibrium

We now consider the partially separating (low-trust) equilibrium, in which a bad politician chooses $x_1 = 1$ and a good politician chooses $x_1 = w_1$. The posterior

beliefs that the incumbent is good, $\hat{\theta}_p(x_1, m_1)$, are

$$\begin{aligned}
\hat{\theta}_p(1, \varnothing) &= \Pr(t_1 = g|1,1) = \frac{\theta_p \frac{1}{2}}{\theta_p \frac{1}{2} + (1-\theta_p)\frac{1}{2} + (1-\theta_p)\frac{1}{2}(1-q)} \\
&= \frac{\theta_p}{1 + (1-\theta_p)(1-q)} < \theta_p \\
\hat{\theta}_p(1, scoop) &= 0 \\
\hat{\theta}_p(-1, \varnothing) &= 1.
\end{aligned}$$

Given these posteriors, citizens send home politicians who have chosen $x_1 = 1$. As a result, rents from office give incentives to choose $x_1 = -1$. Consider a good politician who has learned that $w_1 = 1$. $x_1 = 1$ yields a payoff $R + 1 + \delta\theta_p$, while $x_1 = -1$ yields a payoff $R - 1 + \delta(1-q)(R+1) + \delta q\theta_p$. Hence, deviating does not pay if

$$R \leq \bar{R}^{PS,g} = \frac{2 - \delta(1-q)(1-\theta_p)}{\delta(1-q)}. \tag{5}$$

Inequality (5) shows that for a good politician to choose $x_1 = 1$ if $w_1 = 1$, the rents from office must be sufficiently low. A good politician values office for rents but also values office because a bad politician may succeed him. Therefore, a higher value of θ_p weakens a good politician's incentive to choose $x_1 = -1$ if $w_1 = 1$. A higher q reduces the chances of re-election when $x_1 = -1$ and $w_1 = 1$. As a result, a higher value of q also weakens a good politician's incentive to deviate.

A bad politician has the strongest incentive to deviate if $w_1 = -1$. Then, $x_1 = -1$ ensures winning the election. A bad politician does not benefit from deviating if $R - 1 + \delta(R+1) < R + 1$, implying

$$R \leq \bar{R}^{PS,b} = \frac{2 - \delta}{\delta} \tag{6}$$

It is easy to verify that $\bar{R}^{PS,g} > \bar{R}^{PS,b}$.[4] To understand why a bad politician is more inclined to deviate, first note that by deviating a bad politician is sure to keep office. By deviating, a good politician runs the risk of a scoop, which prevents re-election. In addition, the benefits from deviating are smaller for a good politician because he benefits from a good successor, while a defeated bad politician does not receive any

[4] To see this note that $\frac{2-\delta(1-\theta)(1-q)}{\delta(1-q)} - \frac{2-\delta}{\delta} = \frac{2q+\theta\delta-q\theta\delta}{\delta(1-q)} > 0$.

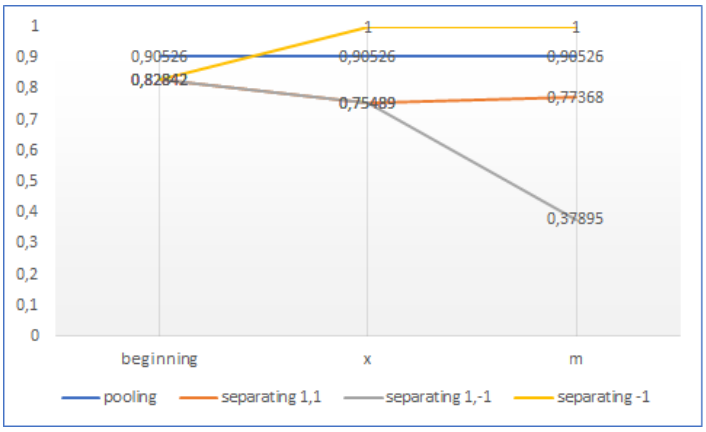


Figure 1: Trust in the equilibria of the basic game ($\theta_p = 0.6$, $\delta = 0.9$, and $q = 0.5$).

utility from period 2.

In a partially separating equilibrium, trust evolves over the electoral cycle. Figure 1 illustrates. At the beginning of the game, trust equals

$$\begin{aligned} z_0 &= \frac{\theta_p + (1-\theta_p)\frac{1}{2} + \delta\left\{\frac{1}{2}\theta_p + \left(1-\frac{1}{2}\theta_p\right)\left[\theta_p + (1-\theta_p)\frac{1}{2}\right]\right\}}{1+\delta} \\ &= \frac{\frac{1}{2}(1+\theta_p) + \delta\left[\frac{1}{2}\theta_p + \left(1-\frac{1}{2}\theta_p\right)\frac{1}{2}(1+\theta_p)\right]}{1+\delta}, \end{aligned}$$

which is lower than trust at the beginning of the game in the pooling equilibrium. For this reason, we refer to the pooling equilibrium of the previous subsection as the high-trust equilibrium, and to the partially separating equilibrium as the low-trust equilibrium.

In a partially separating equilibrium, x_1 contains information about the politician's type. From $x_1 = -1$, citizens infer that the politician is good. $x_1 = 1$, by contrast, increases the probability that the politician is bad. Hence,

$$\begin{aligned} z_x(1) &= \frac{\frac{\frac{1}{2}\theta_p}{\frac{1}{2}\theta_p+(1-\theta_p)} + \left(1-\frac{\frac{1}{2}\theta_p}{\frac{1}{2}\theta_p+(1-\theta_p)}\right)\frac{1}{2} + \delta\left(\theta_p + (1-\theta_p)\frac{1}{2}\right)}{1+\delta} \\ &= \frac{\frac{1}{2-\theta_p} + \delta\frac{1}{2}(1+\theta_p)}{1+\delta} < z_0 \\ z_x(-1) &= 1. \end{aligned}$$

Now consider how news affects trust, $z_{xm}(x_1, m_1)$, if $x_1 = 1$ (in equilibrium, no

scoops occur if $x_1 = -1$). Supportive news ($m_1 = \varnothing$) boosts trust

$$\begin{aligned} z_{xm}(1,\varnothing) &= \frac{\frac{\frac{1}{2}\theta_p}{\frac{1}{2}\theta_p+\frac{1}{2}(1-\theta_p)+\frac{1}{2}(1-\theta_p)(1-q)} + \left(1 - \frac{\frac{1}{2}\theta_p}{\frac{1}{2}\theta_p+\frac{1}{2}(1-\theta_p)+\frac{1}{2}(1-\theta_p)(1-q)}\right)\frac{1}{2} + \delta\left(\theta_p + (1-\theta_p)\frac{1}{2}\right)}{1+\delta} \\ &= \frac{\frac{1}{2}\frac{2-q(1-\theta_p)}{2-\theta_p-q(1-\theta_p)} + \delta\frac{1}{2}(1+\theta_p)}{1+\delta} > z_x(1). \end{aligned}$$

A scoop (severly) damages trust, as it excludes the possibility that a good decision has been made in period 1:

$$z_{xm}(1,-1) = \frac{\delta\frac{1}{2}(1+\theta_p)}{1+\delta}.$$

3.3 High-Trust Equilibrium II

We have shown that a pooling equilibrium exists if $R \geq \bar{R}^P$, and a partially separating equilibrium exists if $R \leq \bar{R}^{PS,b}$. As $\bar{R}^{PS,b} < \bar{R}^P$, we still have to identify an equilibrium for $\bar{R}^{PS,b} < R < \bar{R}^P$. Under this condition, a pooling equilibrium exists in which both types of politicians choose $x_1 = w_1$, and the electorate re-elects the incumbent with probability 1 if $x_1 = -1$, and re-elects the incumbent with probability $\rho(R) = \frac{\delta(1+R)-2}{\delta(1-q)(1+R)}$ if $x_1 = 1$ and $m_1 = \varnothing$. $\rho(R)$ ensures that a bad politician is indifferent between $x_1 = -1$ and $x_1 = 1$ if $w_1 = -1$. One can verify that $\rho\left(\bar{R}^P\right) = 0$ and $\rho\left(\bar{R}^{PS,b}\right) = 1$. Thus, for the complete parameter space, we have identified equilibria. In the equilibrium where the electorate randomizes, trust equals $z_0 = z_x(x_1) = z_{xm}(x_1, m_1) = \frac{1+\delta\frac{1}{2}(1+\theta_p)}{1+\delta}$ as in the pooling equilibrium in pure strategies.

3.4 Other Equilibria

Apart from the three equilibria discussed above, two other equilibria exist in which neither good nor bad politicians respond to w_1. First, a pooling equilibrium exists in which both types of politicians choose $x_1 = 1$. It yields worse outcomes for citizens than the pooling equilibrium discussed above. This inferior pooling equilibrium requires a specific, implausible out-of-equilibrium belief about the incumbent's type when citizens observe $x_1 = -1$. Moreover, it requires that $R \geq \frac{2-\delta}{\delta}$. If $R < \frac{2-\delta}{\delta}$, the good politician would choose $x_1 = w_1$. Second, an analogous pooling equilibrium

exists in which both types of politicians always choose $x_1 = -1$.[5] From now on, we ignore these pooling equilibria.

We have proved the next proposition.

Proposition 1 *There are two equilibria of the basic model, a high-trust equilibrium, in which bad and good politicians promote citizens' interests in period 1, and a low-trust equilibrium, in which only good politicians promote citizens' interests in period 1. The high-trust equilibrium requires that rents from office are sufficiently high,* $R > \frac{2-\delta}{\delta}$. *If* $\bar{R}^{PS,b} < R < \bar{R}$, *more freedom of the press decreases turnover. In the high-trust equilibrium, trust is stable over the electoral cycle. In the low-trust equilibrium, trust is more volatile over the electoral cycle.*

A comparison between the pooling equilibria and the partially separating equilibrium shows that the former ones yield better outcomes in period 1, while the latter yields better outcomes in period 2. In the pooling equilibria, incentives are better, while in the partially separating equilibrium, selection is better. Because of our assumption that $\delta < 1$, the pooling equilibria lead to higher trust at the beginning of the game.

In the equilibria of the basic model, our measure of freedom of the press, q, plays a limited role. In the high-trust equilibrium, politicians behave like angels, leaving no room for scoops. In the partially separating equilibrium, news may unmask bad politicians. As a scoop reveals bad policy, it damages trust in government. Of course, the flip-side of the coin is that if $x_1 = 1$, the absence of a scoop boosts trust. In expectations, due to the Martingale property, both effects cancel out. If $\bar{R}^{PS,b} < R < \bar{R}$, q affects the probability with which the electorate re-elects the incumbent when $x_1 = 1$. The implication is that a higher value of q increases the probability with which the incumbent is re-elected if $x_1 = 1$.

The basic model highlights two dimensions of trust: intentions and incentives. Generally, the higher θ_p is, the higher trust is. Incentives affect the equilibrium of the model. Strong incentives, that is, high rents from office lead to the high-trust equilibrium.

[5] A separating equilibrium, in which one type of politician chooses $x_1 = 1$ and the other type chooses $x_1 = -1$, does not exist because either a good politician or a bad politician would have an incentive to deviate. A good politician wants to deviate if $R < \frac{2-\delta(1-\theta_p)}{\delta}$, while a bad politician wants to deviate if $R > \frac{2-\delta}{\delta}$.

Data on trust in institutions are collected through surveys. As discussed before, it is hard to assess how citizens interpret survey questions about trust. So far, we have assumed that trust concerns (1) citizens' beliefs about the correctness of *both* x_1 and x_2, and (2) citizens' beliefs due to *intentions* and *incentives*. An alternative assumption for (1) is that citizens report beliefs about the correctness of the next decision to be made. That is, before the incumbent has made a decision about x_1, citizens' report $z_0 = \Pr(x_1 = w_1)$ when asked about their trust in government, while after the incumbent has made a decision about x_1, citizens report $z_x = \Pr(x_2 = w_2|x_1)$ and $z_{xm} = \Pr(x_2 = w_2|x_1, m_1)$. How would this alternative assumption affect our results? Suppose a partially separating equilibrium. Then, the alternative trust measure leads to no effect of a scoop on trust, $z_0 = z_{xm}$, as the incumbent will be replaced by a new politician. The absence of a scoop, however, would still affect trust, as no scoop increases the likelihood that in period 2, the politician is good.

An alternative assumption for (2) is that citizens only report their beliefs about intentions, that is about the incumbent's type, $z_0 = \Pr(t_p = g)$, $z_x = \Pr(t_p = g|x_1)$ and $z_{xm} = \Pr(t_p = g|x_1, m_1)$. Under this assumption, the pooling and partially separating equilibrium yield the same ex ante level of trust, $z_0 = \theta_p$, as incentives do not affect θ_p in our model. The patterns of trust over time are similar to the ones generated in the basic model. In the pooling equilibrium, trust is stable over time, $z_0 = z_x = z_{xm} = \theta_p$. In the partially separating equilibrium, x_1 and m_1 contain information about the politician's type.

In the end, how citizens interpret survey questions is an empirical question. Models like ours can help to formulate hypotheses and to interpret empirical results.

4 Trust in a More General Model

In the basic model, the incumbent observes the state. In this section, we assume that a bureaucrat provides information about the state to the incumbent. We extend the basic model with a market for experts. Experts differ in their ability and motivation to work for the government. The politician observes neither trait. Our model is a self-selection model. We investigate which experts, in terms of ability and public sector motivation, are willing to work as a bureaucrat. At the beginning of the game,

the politician randomly picks experts until one accepts the job. All other experts work in the private sector. At the end of this section, we investigate politicians' incentives to screen experts. Through the bureaucrat's expected ability, we model the competence dimension of trust.

The bureaucrat is hired for both periods 1 and 2. Once hired, she cannot be fired. On the basis of ability, we distinguish two types of experts: high-ability experts, $t_e = h$, and low-ability experts, $t_e = l$. The share of high-ability experts in the total pool of experts equals θ_e. To make our main points most simply, we assume that if hired as a bureaucrat, a high-ability expert receives a correct signal of the state, s_t, with $\Pr(s_t = w_t | t_e = h) = 1$, while a low-ability expert receives a correct signal with probability $\Pr(s_t = w_t | t_e = l) = \pi > \frac{1}{2}$. In our model, experts do not have any incentive to manipulate information. For this reason, we assume that the bureaucrat honestly reveals her signal to the incumbent. Citizens do not observe the bureaucrat's signal, however. They only observe decisions, x_t, and news, m_t.

Following Alesina and Tabellini (2007), we posit that experts are concerned with their reputations for being able.[6] Let $\hat{\theta}_j^{po}(\Omega)$ denote citizens' beliefs that expert j in position po is of high ability, conditional on information, Ω, where $po = pr$ denotes that j works in the private sector and $po = bu$ denotes that she works as a bureaucrat. We assume that in case expert j works in the private sector, citizens learn j's type with certainty, $\hat{\theta}_j^{pr}(h|\Omega) = 1$ and $\hat{\theta}_j^{pr}(l|\Omega) = 0$.[7] We assume that experts are concerned with their reputations just after media outlets have reported m_1, $\hat{\theta}_j^{po}(x_1, m_1)$.

In line with several studies on public-sector motivation, we assume that experts differ in their motivation to work in the private or public sector. Following Delfgaauw and Dur (2010), we model experts' public sector motivation relative to their motivation to work in the private sector by a stochastic term, γ. We assume that irrespective of the expert's ability, γ is uniformly distributed on the interval $[0, 1]$. The upper bound of γ, $\gamma = 1$, makes expressions easier. It implies that for high-ability experts, reputations always play a role in their decisions to apply for the

[6] An expert's reputation for being able may affect her utility directly or through its effect on her future wage.

[7] Important for our results is that, in expected terms, the market learns more about an expert's type in the private sector than in the public sector.

job of a bureaucrat. The lower bound of γ, $\gamma = 0$, means that all low-ability experts prefer to work as a bureaucrat. As discussed at the end of this section, by screening, politicians can lower the probability that a low-ability expert gets the job. Each expert has private information about her ability and about her public sector motivation.

High-ability expert j prefers the job of a bureaucrat to a job in the private sector if

$$\gamma + E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right] > 1 \rightarrow \gamma > 1 - E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right] \tag{7}$$

where $E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right]$ denotes expert j 's expectation about his reputation for being able, formed at the beginning of the game. As under our assumptions, all low-ability experts are willing to accept the job of a bureaucrat, the share of high-ability experts in the pool of applicants for the job of a bureaucrat equals

$$\hat{\theta}_e = \frac{E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right]\theta_e}{E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right]\theta_e + (1 - \theta_e)} \tag{8}$$

One could interpret $\hat{\theta}_e$ as a measure of the expected quality of the bureaucrat. It captures the competence diminsion of trust. Its value depends on $E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right]$, which is determined in equilibrium. Clearly, the higher is $E_h\left[\hat{\theta}_j^{bu}(x_1, m_1)\right]$, the higher is $\hat{\theta}_e$.

Lemma 1 *There always exists an equilibrium in which no high-ability expert is willing to work as a bureaucrat.*

The intuition for Lemma 1 is that if no high-ability expert is willing to work as a bureaucrat, working as a bureaucrat signals low ability. The reputational gap for a high-ability expert by working as a bureaucrat instead of working in the private sector equals 1. As the most intrinsically motivated expert receives one unit payoff as a bureaucrat, no high-ability expert wants to work as a bureaucrat. It is evident that Lemma 1 hinges on the assumption that $\gamma \leq 1$.

Having established that there always exists an equilibrium in which the bureaucrat has low ability, we now examine the scope for equilibria with high-ability bureaucrats. The extension of the basic model with a market for experts does not essentially affect equilibrium behavior in period 2. Bad politicians choose $x_2 = 1$, ir-

respective of s_2. Good politicians follow the bureaucrat's recommendation, $x_2 = s_2$. The extension does not affect citizens' strategies either. As before, it is a weakly dominant strategy for each citizen to vote for the incumbent if $\hat{\theta}_p(x_1, m_1) > \theta_p$.

4.1 A Pooling Equilibrium

Suppose a pooling equilibrium, in which both types of politicians choose $x_1 = s_1$. We first determine a high-ability expert's expected reputation in this equilibrium. As both types of politicians follow the bureaucrat's recommendation, a high-ability expert anticipates that the media outlets cannot discover a scoop, $m_1 = \varnothing$. If hired, a high-ability expert's expectation about the posterior probability that she is of the high-ability type equals

$$E_h\left[\hat{\theta}_j^{bu}(x_1, \varnothing)\right] = \frac{\hat{\theta}_e}{\hat{\theta}_e + \left(1 - \hat{\theta}_e\right)\pi + (1-q)\left(1 - \hat{\theta}_e\right)(1-\pi)} \tag{9}$$

where $\hat{\theta}_e$ is the share of high-ability experts who want to work as a bureaucrat. Substituting (9) into (8), and solving for $\hat{\theta}_e$ yields

$$\begin{aligned} \hat{\theta}_e &= \frac{2\theta_e - 1 + q(1-\theta_e)(1-\pi)}{\theta_e + q(1-\theta_e)(1-\pi)} \text{ and} \\ \hat{\theta}_e &= 0 \end{aligned} \tag{10}$$

$\hat{\theta}_e = 0$ is in line with Lemma 1. Equation (10) shows that $\hat{\theta}_e > 0$ requires that $\theta_e > \frac{1-q(1-\pi)}{2-q(1-\pi)} > 0$. Moreover, it shows that for $\hat{\theta}_e > 0$, $\hat{\theta}_e$ is increasing in θ_e and q, and decreasing in π. A lower share of low-ability experts reduces polution in the pool of applicants for the job of the bureaucrat. A higher value of q and a lower value of π increase the probability that low-ability experts are unmasked. This makes the job of the bureaucrat more attractive for high-ability experts.

In the extended model, no pooling equilibrium exists in which citizens always re-elect the incumbent. An important difference between the pooling equilibrium of the basic model and the pooling equilibrium of the extended model is that $m_1 = scoop$ occurs on the equilibrium path in the extended model. If in the pooling equilibrium citizens were always to re-elect the incumbent, a bad politician would benefit from deviating by choosing $x_1 = 1$ if $s_1 = -1$. To weaken a bad politician's incentive to

choose $x_1 = 1$ when $s_1 = -1$, citizens only re-elect the incumbent if $x_1 = 1$ and $m_1 = scoop$ with probability ρ^{scoop}, where ρ^{scoop} solves

$$\begin{aligned} R - 1 + \delta(R+1) &= R + 1 + \delta\left[\left(1 - p_B^P\right) + p_B^P(1-q) + \rho^{scoop} p_B^P q\right](R+1) \\ \rho^{scoop} &= \frac{p_B^P q \delta(R+1) - 2}{p_B^P q \delta(R+1)} \end{aligned} \tag{11}$$

where $p_B^P = \hat{\theta}_e + \left(1 - \hat{\theta}_e\right)\pi$ denotes the probability that the expert's signal is correct in a pooling equilibrium. Citizens' mixed strategy makes a bad politician indifferent between $x_1 = -1$ and $x_1 = 1$ if $s_1 = -1$.

For R small enough $\rho^{scoop} \leq 0$. Then, citizens never re-elect the incumbent if $x_1 = 1$ and $m_1 = scoop$, and re-elect the incumbent if $x_1 = 1$ and $m_1 = \varnothing$ with probability $\rho^{\varnothing}$, where $\rho^{\varnothing}$ solves

$$\begin{aligned} R - 1 + \delta(R+1) &= R + 1 + \delta\left[\left(1 - p_B^P\right) + p_B^P(1-q)\right]\rho^{\varnothing}(R+1), \text{ implying} \\ \rho^{\varnothing} &= \frac{\delta(R+1) - 2}{\delta\left[\left(1 - p_B^P\right) + p_B^P(1-q)\right](R+1)} \end{aligned} \tag{12}$$

The next Lemma results.

Lemma 2 *Suppose that a pooling equilibrium of the extended model exists, in which both bad and good politicians choose $x_1 = s_1$.*
1. For $R \geq \frac{2 - \delta p_B^P q}{\delta p_B^P q}$, citizens re-elect the incumbent if $x_1 = -1$, or if $x_1 = 1$ and $m_1 = \varnothing$. They re-elect the incumbent with probability $\rho^{scoop} = \frac{p_B^P q \delta(R+1) - 2}{p_B^P q \delta(R+1)}$ if $x_1 = 1$ and $m_1 = scoop$. They send the incumbent home with probability $(1 - \rho^{scoop})$ if $x_1 = 1$ and $m_1 = scoop$.
2. For $\frac{2-\delta}{\delta} \leq R \leq \frac{2 - \delta p_B^P q}{\delta p_B^P q}$, citizens re-elect the incumbent if $x_1 = -1$. They re-elect the incumbent with probability $\rho^{\varnothing} = \frac{\delta(R+1) - 2}{\delta\left[\left(1 - p_B^P\right) + p_B^P(1-q)\right](R+1)}$ if $x_1 = 1$ and $m_1 = \varnothing$. They send the incumbent home if $x_1 = 1$ and $m_1 = scoop$. They send the incumbent home with probability $1 - \rho^{\varnothing}$ if $x_1 = 1$ and $s_1 = \varnothing$.

Lemma 2 shows that in a pooling equilibrium, citizens always re-elect the incumbent if $x_1 = -1$. If $x_1 = 1$, they re–elect the incumbent with a probability strictly smaller than one. The higher R is, the lower this probability is. Citizens follow a mixed strategy to discipline bad politicians. The higher is R, the less is the need for disciplining.

We now determine the conditions for which the pooling equilibrium exists. In the present equilibrium, for $R \geq \frac{2-\delta}{\delta}$, the bad politician's incentive to deviate is eliminated by the mixed strategy followed by the citizens. For $R < \frac{2-\delta}{\delta}$, rents from office are too small to discipline the bad politician. The pooling equilibrium does not exist.

The good politician may have an incentive to deviate if $s_1 = 1$. Then, $x_1 = -1$ ensures office, while $x_1 = 1$ leads to office with a probability strictly lower than 1. However, as a defeated bad politician does not receive any payoff in period 2, while a defeated good politician receives a payoff if succeeded by a good politician, the incentive to deviate is weaker for a good politician than for a bad one. Hence, a necessary condition for the existence of a pooling equilibrium is that

$$R \geq \bar{R}^{P,B} = \frac{2-\delta}{\delta}. \tag{13}$$

This is the same condition as the condition for the existence of a high-trust equilibrium in the basic model.

Let us now investigate how trust evolves over an electoral cycle in the pooling equilibrium of the extended model. At the beginning of the game trust equals

$$z_0 = z_x(x_1) = \frac{\left[\hat{\theta}_e + \left(1 - \hat{\theta}_e\right)\pi\right] + \delta\left\{\theta_p\left[\hat{\theta}_e + \left(1 - \hat{\theta}_e\right)\pi\right] + \frac{1}{2}(1 - \theta_p)\right\}}{1 + \delta} \tag{14}$$

with either $\hat{\theta}_e = 0$ or $\hat{\theta}_e$ given by (10). Equation (14) embodies the three dimensions of trust. The terms in square brackets capture the compentence dimension. Trust is higher if $\hat{\theta}_e > 0$. If $\hat{\theta}_e > 0$, through (10), the composition of the initial pool, θ_e, the quality of low-ability experts, π, and the freedom of the press, q, affect trust. More freedom of the press increases trust, as it increases the probability that outcomes become visible, which in turn creates an environment in which high-ability experts can shine. The term in braces represents the intension dimension. In period 2, the politician's type is important. Finally, as in period 1 also bad politicians serve the people, the politician's type does not influence period 1 outcomes. This is due to the incentive dimension of trust.

Figure 2 illustrates that the decision on x_1 does not affect trust. The reason is that in a pooling equilibrium, decisions do not contain information about the

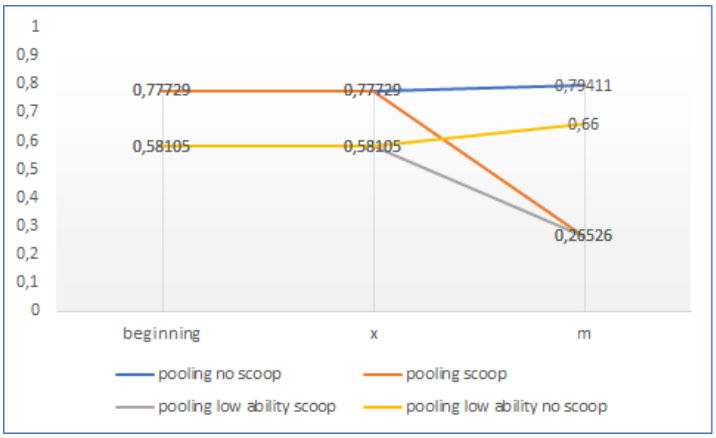


Figure 2: Trust in the pooling equilibrium of the extended model ($\theta_e = 0.7$ and $\pi = 0.6$).

politician's type. Moreover, in our model, the probability with which a bureaucrat receives a particular signal does not depend on her type.

Finally, news affects trust. A scoop shows that the decision on x_1 was wrong. No scoop increases the likelihood that the decision on x_1 was correct. Moreover, if $\hat{\theta}_e > 0$, news contains information about the bureaucrat's ability. A scoop is clear evidence that the bureaucrat is of low ability, lowering trust to

$$z_{xm}(x_1, scoop) = \frac{\delta\left[\theta_p \pi + (1-\theta_p)\frac{1}{2}\right]}{1+\delta}.$$

By contrast, good news increases the likelihood that the bureaucrat is of high ability

$$\hat{\theta}_e(x_1, \varnothing) = \frac{\hat{\theta}_e}{\hat{\theta}_e + \left(1-\hat{\theta}_e\right)\left[\pi + (1-q)(1-\pi)\right]} > \hat{\theta}_e.$$

Trust becomes

$$\begin{aligned} z_{xm}(x_1, \varnothing) &= \frac{\hat{\theta}_e(x_1, \varnothing) + \left[1 - \hat{\theta}_e(x_1, \varnothing)\right]\pi}{1+\delta} \\ &+ \frac{+\delta\left\{\theta_p\left[\hat{\theta}_e(x_1, \varnothing) + \left[1 - \hat{\theta}_e(x_1, \varnothing)\right]\pi\right] + (1-\theta_p)\frac{1}{2}\right\}}{1+\delta} > z_0. \end{aligned}$$

Note that news contains information about the bureaucrat's ability, not about the politician's type.

4.2 A Partially Separating Equilibrium

Now consider a partially separating equilibrium, in which good politicians choose $x_1 = s_1$, and bad politicians choose $x_1 = 1$. As above, for the competence dimension of trust, the share of high-ability experts in the pool of experts who are willing to work as a bureaucrat is key. As this share depends on $E_h\left[\hat{\theta}_j^{bu}(\Omega)\right]$, we first determine this expectation in a partially separating equilibrium.

In a partially separating equilibrium, citizens may face four situations, depending on x_1 and m_1. The following posteriors about the bureaucrat's type hold for the four situations:

$$\begin{aligned}
\hat{\theta}_j^{bu}(-1,\varnothing) &= \frac{\hat{\theta}_e}{\hat{\theta}_e + \left(1-\hat{\theta}_e\right)\pi + (1-q)\left(1-\hat{\theta}_e\right)(1-\pi)} > \hat{\theta}_e \\
\hat{\theta}_j^{bu}(-1,scoop) &= 0 \\
\hat{\theta}_j^{bu}(1,\varnothing) &= \frac{\{\theta_p + (1-\theta_p)[1+(1-q)]\}\hat{\theta}_e}{\theta_p\left[\hat{\theta}_e + \left(1-\hat{\theta}_e\right)\pi + (1-q)\left(1-\hat{\theta}_e\right)(1-\pi)\right] + (1-\theta_p)[1+(1-q)]} > \hat{\theta}_e \\
\hat{\theta}_j^{bu}(1,scoop) &= \frac{(1-\theta_p)\hat{\theta}_e}{(1-\theta_p) + \theta_p\left(1-\hat{\theta}_e\right)(1-\pi)} < \hat{\theta}_e.
\end{aligned}$$

From $x_1 = -1$, citizens infer that the *politician* is good. As a result, news contains much information about the *bureaucrat*'s competence: $m_1 = scoop$ is clear evidence of a low-ability bureaucrat. $m_1 = \varnothing$ boosts the bureaucrat's reputation. If $x_1 = 1$, news contains much less information about the bureaucrat's competence: bad news can be the result of a bad politician who has discarded the bureaucrat's recommendation or the result of a low-ability buraucrat who has received an incorrect signal.

At the beginning of the game, a high-ability expert anticipates the above posteriors and the chances that these posteriors occur. A high-ability bureaucrat's expected reputation is

$$\begin{aligned}
E_h\left[\hat{\theta}_j^{bu}(x_1,s_1)\right] &= \frac{1}{2}\theta_p\hat{\theta}_j^{bu}(-1,\varnothing) + \left(\frac{1}{2}\theta_p + (1-\theta_p)\left(\frac{1}{2}+\frac{1}{2}(1-q)\right)\right)\hat{\theta}_j^{bu}(1,\varnothing) + \\
&\quad \frac{1}{2}(1-\theta_p)\,q\hat{\theta}_j^{bu}(1,scoop). \qquad (15)
\end{aligned}$$

For the partially separating equilibrium, we cannot derive an analytical expression

for $\hat{\theta}_e$. However, using (8) and the posteriors $\hat{\theta}_j^{bu}(x_1, m_1)$, it is easy to see that $E_h\left[\hat{\theta}_j^{bu}(x_1, s_1)\right]$ is lower in the partially separating equilibrium than in the pooling equilibrium. The reason is that policy decisions by bad politicians blur information about the bureaucrat's ability. When policy decisions contain less information about the bureaucrat's type, it is more difficult to demonstrate high ability. As a result, the job of a bureaucrat becomes less attractive for high-ability experts.

One can verify that the share of high-ability experts in the pool of applicants for the job of a bureaucrat, $\hat{\theta}_e^{PS}$, is increasing in θ_p and q. Hence, when it is more likely that the government is ruled by a good politician, high-ability experts are more willing to work for the government. More freedom of the press allows for better bureaucrats, because a higher likelihood of unmasking a low-ability bureaucrat makes the job of a bureaucrat for high-ability experts attractive.

We now investigate the election outcome in a partially separating equilibrium. Citizens re-elect the incumbent if $x_1 = -1$, as $\hat{\theta}_p(-1, m_1) = 1 > \theta_p$. Citizens send the incumbent home if $x_1 = 1$ and $m_1 = scoop$, as $\hat{\theta}_p(1, scoop) < \theta_p$. The posterior probability that the incumbent is good, conditional on $x_1 = 1$ and $m_1 = \varnothing$ equals

$$\begin{aligned} \hat{\theta}_p(1, \varnothing) &= \frac{\frac{1}{2}\theta_p\left[p_B^{PS} + (1-q)(1-p_B^{PS})\right]}{\frac{1}{2}\left[p_B^{PS} + (1-q)(1-p_B^{PS})\right] + \frac{1}{2}(1-q)(1-\theta_p)} < \theta_p \\ \text{with } p_B^{PS} &= \hat{\theta}_e + \left(1 - \hat{\theta}_e\right)\pi \end{aligned}$$

Thus, citizens also send the incumbent home if $x_1 = 1$ and $m_1 = \varnothing$. Hence, in the partially separating equilibrium, $x_1 = -1$ ensures re-election, while $x_1 = 1$ leads to a certain election defeat.

What are the conditions for the existence of a partially separating equilibrium? As in the basic model, by choosing $x_1 = -1$, a bad politician gives up her preferred policy, but ensures re-election. The implication is that a bad politician's incentive to deviate is the same as in the partially separating equilibrium of the basic model, $\bar{R}^{PS,b} = \bar{R}^{P,b}$. A good politician may have an incentive to deviate if $s_1 = 1$. By choosing $x_1 = s_1 = 1$, a good politician's payoff is

$$R + \left(2p_B^{PS} - 1\right)(1 + \delta\theta_p).$$

By choosing $x_1 \neq s_1 = 1$, his payoff is

$$R - \left(2p_B^{PS} - 1\right) + \delta\left(R + 2p_B^{PS} - 1\right)$$

A good politician wants to deviate if

$$R > \bar{R}^{PS,g} = \frac{\left(2p_B^{PS} - 1\right)\left[2 - \delta\left(1 - \theta_p\right)\right]}{\delta}$$

The higher is p_B^{PS}, the higher is $\bar{R}^{PS,g}$. If $p_B^{PS} = \frac{1}{2}$, then $\bar{R}^{PS,g} = 0$. If $p_B^{PS} = 1$, then $\bar{R}^{PS,g} > \bar{R}^{PS,b}$. The implication is that an $P_B^{PS} \in \left(\frac{1}{2}, 1\right)$ exists for which $\bar{R}^{PS,g} = \bar{R}^{PS,b}$. Hence, $R \leq \min : \left\{\bar{R}^{PS,g}, \bar{R}^{PS,b}\right\}$, is a necessary condition for the partially separating equilibrium to exist.

Recall that in the basic model, the bad politician's incentive to deviate ($\bar{R}^{PS,b}$) determines the condition for the existence of a partially separating equilibrium. In the extended model, the good politician's incentive might be decisive. The reason is that in our model serving the people requires information. In the basic model, a good politician knows how to serve the people. In the extended model, a good politician relies on a bureaucrat who might be wrong. If the bureaucrat's recommendation contains little information, a good politician cannot serve the people. His decisions will be driven by rents from office. Leaving a legacy does not require information. The bureaucrat's ability is therefore less important for a bad politician.

We now examine how trust evolves over the electoral cycle in a partially separating equilibrium of the extended model. At the beginning of the game trust equals

$$z_0 = \frac{\theta_p p_B^{PS} + \frac{1}{2}\left(1 - \theta_p\right) + \delta\left(\frac{1}{2}\theta_p p_B^{PS} + \left(1 - \frac{1}{2}\theta_p\right)\left[\theta_p p_B^{PS} + \frac{1}{2}\left(1 - \theta\right)\right]\right)}{1 + \delta} \tag{16}$$

Trust in the extended model is lower than in the basic model, because $p_B^{PS} < 1$. Through $\hat{\theta}_e$, freedom of the press, q, affects z_0.

The decision on x_1 contains information about the politician's type: $x_1 = -1$ is clear evidence that the politician is good [replace θ_p in (16) by 1]; $x_1 = 1$ increases the likelihood that the politician is bad [replace θ_p in (16) by $\frac{\theta_p}{\theta_p + 2(1-\theta_p)}$]. Hence, if $x_1 = 1$, trust decreases, while if $x_1 = -1$, it increases. News also affects trust.

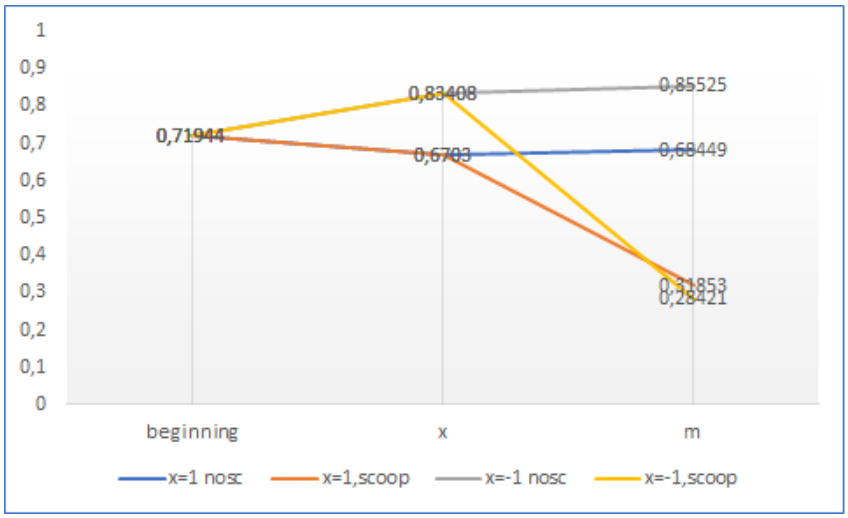


Figure 3: Trust in the partially separating equilibrium of the extended model ($\theta_e = 0.7$ and $\pi = 0.6$).

If $x_1 = -1$, a scoop is clear evidence that the decision on x_1 was incorrect. As the politician is good if $x_1 = -1$, a scoop reveals that the bureaucrat is of low ability and has received an incorrect signal. Hence, as illustrated by Figure 3, trust dramatically decreases to

$$z_{xn}(-1, scoop) = \frac{\delta\pi}{1+\delta}.$$

If $x_1 = -1$, $m_1 = \varnothing$ increases the probability that the bureaucrat is of high ability. Trust increases to

$$z_{xm}(-1, \varnothing) = \hat{\theta}_j^{bu}(-1, \varnothing) + \left[1 - \hat{\theta}_j^{bu}(-1, \varnothing)\right]\pi.$$

Finally, consider how news affects trust if $x_1 = 1$. A scoop shows that x_1 has been incorrect. Moreover, it increases both the probabilities that the bureaucrat is of low ability, and that the politician is bad

$$\hat{\theta}_p(1, scoop) = \frac{\theta_p\left(1 - \hat{\theta}_e\right)(1-\pi)}{\theta_p\left(1 - \hat{\theta}_e\right)(1-\pi) + (1-\theta_p)}.$$

Trust decreases to

$$z_{xm}(1, scoop) = \frac{\delta\left\{\theta_p\left(\left[\hat{\theta}_j^{bu}(1, scoop) + \left(1 - \hat{\theta}_j^{bu}(1, scoop)\right)\pi\right]\right) + (1-\theta_p)\frac{1}{2}\right\}}{1+\delta}.$$

In Figure 3, $z_{xm}(-1, scoop) < z_{xm}(1, scoop)$. This, however, hinges on the parameter values. From $x = -1$ and $m_1 = scoop$ citizens infer that the politician is good and the bureaucrat is of low-ability. If $x = 1$, a scoop gives less clear information about the politician's type and the bureaucrat's ability.

No scoop, $m_1 = \varnothing$, increases the probability that the politician is good

$$\hat{\theta}_p(1, \varnothing) = \frac{\frac{1}{2}\theta_p\left(\hat{\theta}_e + \left(1-\hat{\theta}_e\right)\pi\right) + \frac{1}{2}\theta_p\left(1-\hat{\theta}_e\right)(1-\pi)(1-q)}{\frac{1}{2}\theta_p\left(\hat{\theta}_e + \left(1-\hat{\theta}_e\right)\pi\right) + \frac{1}{2}\theta_p\left(1-\hat{\theta}_e\right)(1-\pi)(1-q) + \frac{1}{2}(1-\theta_p) + \frac{1}{2}(1-\theta_p)(1-q)},$$

and that the bureaucrat is of high ability. Trust increases to

$$\begin{aligned} z_{xm}(1, \varnothing) &= \frac{\frac{1}{2}\left\{\hat{\theta}_p(1, \varnothing)\left[\hat{\theta}_j^{bu}(1, \varnothing) + \left(1 - \hat{\theta}_j^{bu}(1, \varnothing)\right)q\right] + \left[1 - \hat{\theta}_p(1, \varnothing)\right]\frac{1}{2}\right\}}{1+\delta} \\ &+ \frac{\delta\left\{\theta\left(\hat{\theta}_j^{bu}(1, \varnothing) + \left(1 - \hat{\theta}_j^{bu}(1, \varnothing)\right)q\right) + \left[1 - \theta_p(1, \varnothing)\right]\frac{1}{2}\right\}}{1+\delta} \end{aligned}$$

A comparison between Figure 2 and 3 shows that at the beginning of the game, trust in the pooling equilibrium is higher than in the partially separating equilibrium. In this sense, the pooling equilibrium is again the high-trust equilibrium. Electoral incentives induce politicians to serve the electorate's interests in the first period. Further in the electoral cycle, trust responds heavier in the partially separating equilibrium than in the pooling equilibrium. The reason is that the partially separating equilibrium allows for more learning about the politician's type.

4.3 A Separating Equilibrium

Now suppose that $\bar{R}^{PS,B} > R > \bar{R}^{PS,G}$. As discussed above, in this case neither a pooling equilibrium nor a partially separating equilibrium exists. A fully separating equilibrium exists, in which good politicians choose $x_1 = -1$ and bad politicians choose $x_1 = 1$. Citizens re-elect the incumbent only if $x_1 = -1$. High-ability experts never accept the job of a bureaucrat. They cannot demonstrate their competence,

as neither bad nor good politicians base x_1 on s_1. Hence, $p_B^S = \hat{\theta}_j(x_1, m_1) + [1 - \hat{\theta}_j(x_1, m_1)] = \pi$.

Under which conditions does this separating equilibrium exist? For a good politician, $x_1 = -1 \neq s_1$ yields a payoff $R - (2\pi - 1) + \delta(R + (2\pi - 1))$, and $x_1 = 1 = s_1$ yields a payoff $R + (2\pi - 1) + \delta\theta_p(2\pi - 1)$. Hence, choosing $x_1 = -1$ is an optimal response if

$$R > \bar{R}^S = \frac{(2\pi - 1)[2 - \delta(1 - \theta_p)]}{\delta}$$

As before, choosing $x_1 = 1$ benefits the bad politician if $R > \frac{2-\delta}{\delta}$. As $\bar{R}^S < \bar{R}^{PS,g}$, the partially pooling, partially separating and separting equilibrium cover the entire parameter space.

In the separating equilibrium trust is (very) low. At the beginning of the game, it equals $z_0 = \frac{\frac{1}{2}+\delta\pi}{1+\delta}$. The main benefit of a separating equilibrium is selection.

Proposition 2 summarizes the above discussion and presents our main results.

Proposition 2 *On the basis of politicians' strategies, three equilibria of the extended game can be distinguished.*
1. If rents from office are high, $R \geq \frac{2-\delta}{\delta}$, a pooling equilibrium exists in which $x_1 = s_1$. It offers a wide scope for a good bureaucracy. Trust is high and relatively stable. Political turnover is low. More freedom of the press decreases political turnover.
2. If rents from office are low, $R < \min : \left\{\frac{2-\delta}{\delta}, \bar{R}^{PS,g}\right\}$, a partially separating equilibrium exists in which good politicians choose $x_1 = s_1$, and bad politicians choose $x_1 = 1$. It offers a moderate scope for a good bureaucracy. Trust is moderately high and volatile. Political turnover is high.
3. If rents from office are moderate, $\bar{R}^S < R < \frac{2-\delta}{\delta}$, a separating equilibrium exists in which good politicians choose $x_1 = -1$ and bad politicians choose $x_1 = 1$. The bureaucrcay is bad. Trust is low and relatively stable. Political turnover is high.

For $\bar{R}^{PS,g} > \frac{2-\delta}{\delta}$, Proposition 2 reinforces Proposition 1, which highlighted the intention and incentive dimensions of trust. Strong electoral incentives lead to decision making in period 1 that is intended to serve citizens' interests. Weak electoral incentives induce politicians in period 1 to honor their types. For $\bar{R}^{PS,g} > \frac{2-\delta}{\delta}$, Proposition 2 adds to Proposition 1 the intuitive result that the higher is the probability that the incumbent in period 1 responds to information provided by the bureaucrat, the more high-ability experts are willing to work as a bureaucrat. Electoral concerns

induce politicians to serve the people, and thus to respond to information. This attracts high-ability experts to the public sector.

Concerning political turnover, Proposition 2 is consistent with Nunn et al. (2017) who report evidence that in high-trust countries political turnover is lower than in low-trust countries. In high-trust countries, citizens attribute bad news less to the mistakes of politicians. They attribute it too low-ability experts.

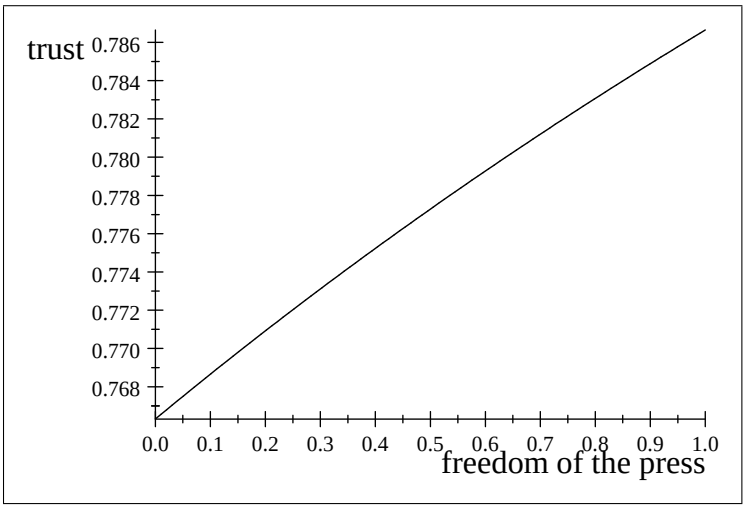
Item 3 in Proposition 2 shows that for $\bar{R}^{PS,g} < \frac{2-\delta}{\delta}$ stronger incentives, may backfire. They may induce good politicians to distort policy in period 1. As a result, the effect of higher rents for office on trust can be non-monotonic: Weak incentives leading to moderate trust, moderate incentives leading to low trust, and strong incentives leading to high trust.

Extending the basic model with a market for experts raises a multiple equilibrium problem. Lemma 1 says that there always exists an equilibrium in which no high-ability expert applies for the job of a bureaucrat. This means, for example, that if rents from office are high, a pooling equilibrium exists in which the bureaucrat is surely of the low-ability type, and a pooling equilibrium exists in which the bureaucrat might be of the high-ability type. The latter outcomes require a sufficient share of high-ability experts willing to accept the job as a bureaucrat. This suggests that screening might be important to sustain a pooling equilibrium in which the bureaucrat might be of the high-ability type. In some countries, experts have to perform tests to become a bureaucrat. Such tests influence the share of low-ability experts in the pool of applicants for the job of a bureaucrat.

Another kind of multiple equilibrium problem exists for low rents from office. The threshold $\bar{R}^{PS,g}$ shows that a low value of p_B^{PS} relaxes the condition for the existence of the bad, separating equilibrium. As the partially separating equilibrium allows for a high-ability bureaucrat, a partially separating equilibrium and a separating equilibrium exist for the same parameters. Lack of competent bureaucrats may thus lead good politicians to behave badly in period 1.

Using the outcomes presented in this section, we can determine the relationship between our measure of the freedom of the media and trust. Figure 4 illustrates this relationship for the pooling equilibrium. A higher value of q increases trust at the beginning of the game, z_0. Interestingly, in our model, more freedom of the press does not discipline politicians. It creates an environment in which low-ability

bureaucrats are unmasked, and high-ability bureaucrats can shine.



The relationship between q and ζ.

5 Discussion

Our paper makes two contributions to the literature. The first contribution is methodological. We model trust by adding a pollster to a political-economic model. This forces us to explicitly define trust in government and make explicit assumptions about how citizens interpret a trust question. In practice, we do not know how citizens interpret trust in government questions in a survey. For example, when answering how much a person trusts the government, we do not know whether a person is backward or forward-looking. Our model shows how persons' answers depend on this feature. Therefore, it may help to empirically investigate how people interpret trust in government questions. Second, by having surveys among citizens at different points in time, we can investigate how trust in government evolves over the electoral cycle and responds to information and changes in the environment. Our model generates various testable predictions. For example, our model shows how and why trust depends on the freedom of the press. The predictions of our model are consistent with Nunn et al. (2017) who find that when outcomes are bad, high-trust countries are less likely to experience political turnover.

In the introduction, we have distinguished empirical studies that investigate the drivers of individual trust and empirical studies that try to explain aggregated trust by various measures of institutions. The present paper focuses on aggregated

trust. However, the same framework can be used to study individual trust. As Nannicini et al. (2013) we could distinguish between civic and uncivic citizens or following Crutzen et al. (2020), we could allow for policies that affect different groups in society differently. Then, individual trust would depend on which interests politicians promote in equilibrium. We leave applying our approach to individual trust for the future.

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