Appendix 1: A Signaling Model of Political Propaganda

1. Model Setup

There are two players in the game: the government and a representative citizen. Since the paper focuses on the role of propaganda in influencing citizen beliefs rather than coordination among citizens, they will be treated as a single entity and represented by one agent. The government is endowed with a strength θ, which can be high (h) or low (l). This strength refers to the government's ability of social control and capacity to maintain political order when it is challenged. In particular, when the government faces a rebellion by the citizen, it will survive with probability h if its strength is h and survive with probability l if its strength is l, hence $1 > h > l > 0$. We also assume that $h + l < 1$. I will call the type h government a strong government and the type l government a weak government. The government's strength is its private information. The citizen has a prior belief that the government's θ is h with probability π and l with probability $1 - \pi$. The government's utility when it stays in power is 1. To simplify the algebra, it is assumed that the cost of suppressing a rebellion reflects the resources and capability of the regime and has therefore been incorporated into the probability of surviving the rebellion.

The government can choose the amount of propaganda to produce. The cost of producing amount p of propaganda for a type θ government is $c(p, \theta) = p^2/\theta$, which satisfies $c(0, \theta) = 0$, $c_p(p, \theta) > 0$, $c_{pp}(p, \theta) > 0$, and $c_p(p, l) > c_p(p, h)$. Thus, both the total and marginal cost of propaganda are increasing, and both total and marginal costs are lower for type h. In other words, it is easier for a strong government to produce any given level of propaganda and any marginal unit of propaganda. Intuitively, this assumption means that a government that is strong in social control can carry out propaganda activities and make ordinary people participate or observe the rituals more easily and without trouble than a weak government. For example, to organize a parade celebrating the regime's achievements, a strong government can deploy fewer personnel (police officers, community organizers, etc.) than a weak government to make the same number of citizens participate in the event. To focus on the potential signaling effect of propaganda, I do not assume any indoctrination role for the propaganda. In other words, the government's propaganda will not

change the citizen's (dis)satisfaction with the government or her intention to rebel conditional on her belief about the probability that the rebellion will succeed.

The citizen can choose action $a \in \{0, 1\}$, where $a = 0$ means staying quiet and $a = 1$ means rebelling against the government. If the citizen decides to challenge the government, she pays a cost of r whether the challenge is successful or not. If the challenge is successful, she gets a benefit of b. The utility of living under the current regime is normalized to be 0.

The two players' utility can be summarized as follows, with $U_g(\theta)$ and U_c respectively denoting the utility of a government with type θ and the utility of the citizen:

$$U_g(\theta) = \begin{cases} 1 - c(p, \theta), & if \ a = 0 \\ \theta - c(p, \theta), & if \ a = 1 \end{cases} \tag{1}$$

and

$$U_c = \begin{cases} 0, & if \ a = 0 \\ b(1 - \theta) - r, & if \ a = 1. \end{cases} \tag{2}$$

The values of r and b will obviously affect the citizen's choice of action. To avoid trivial and uninteresting cases (i.e., cases in which the citizen always rebels regardless of the strength of the government, or never rebels), I assume that r follows a prior uniform distribution on $[b(1 - h), b(1 - l)]$, and its value will be realized after the government makes its propaganda decision (the results of the model will be similar if some other continuous distribution is assumed). This means that, after observing the amount of propaganda produced by the government, the citizen will rebel if she knows the government is of type l, and will not rebel if she knows the government is of type h. If she cannot tell whether the government is strong or weak, the citizen will rebel if the realized r is lower than $\pi b(1 - h) + (1 - \pi)b(1 - l)$ and not rebel otherwise. Therefore, ex ante the citizen's probability of rebellion is $1 - \pi$ if she cannot tell the government's type following its propaganda production.

The game proceeds as follows: 1) nature decides the type of the government and the government learns of its type; 2) the government decides how much propaganda to produce, and then the cost of rebellion is realized; 3) the citizen decides whether or not to rebel; 4) payoffs are assigned. This is a game of incomplete information, and I use the solution concept of perfect Bayesian equilibrium, augmented by the Cho-Kreps Intuitive Criterion.

2. Analysis

This is a standard signaling game in the style of Spence (1973). As in any signaling game, there are potential separating equilibria and potential pooling equilibria in this game. In a separating equilibrium the two types of government choose different level of p, and hence their types are revealed. The citizen will rebel if she observes the government's type is l and not rebel if she observes the government's type is h. Since in this equilibrium the weak government's type is revealed, there is no point in producing any propaganda, and hence it will choose $p = 0$. Let the equilibrium level of propaganda produced by the strong government be p^*. For both types of government to have incentive to stick to their respective equilibrium strategy rather than emulating the other type's strategy (and be taken by the citizen as being of the other type), it must be that (following equations 1 and 2):

$$U_g^*(h) = 1 - c(p^*, h) \geq h \tag{3}$$

and

$$U_g^*(l) = l \geq 1 - c(p^*, l). \tag{4}$$

Define $\underline{p}$ and $\overline{p}$ by

$$1 - c(\underline{p}, l) = l \tag{5}$$

and

$$1 - c(\overline{p}, h) = h. \tag{6}$$

In other words, $\underline{p}$ is the propaganda level that leaves the weak government indifferent between producing no propaganda and being known as the weak government on the one hand, and producing that level of propaganda and being (mistakenly) regarded as a strong government on the other hand. Similarly, $\overline{p}$ is the propaganda level that leaves the strong government indifferent between producing that level of propaganda and being known as strong on the one hand, and producing no propaganda and being (mistakenly) regarded as a weak government on the other hand. If $\overline{p} > \underline{p}$,

any level of propaganda between the two values can serve to signal high strength in a separating equilibrium. Because $c(p, \theta) = p^2/\theta$ and $h + l < 1$, equations (5) and (6) indicate that indeed $\overline{p} > \underline{p}$. Therefore any propaganda level $\hat{p}$ in the interval $[\underline{p}, \overline{p}]$ can be the p^* and signal a strong government in a separating equilibrium. Such an equilibrium can be supported by the citizen's belief that the probability that the government is of type h is

$$\mu(\theta_h) = \begin{cases} 0, & if \ p < p^*; \\ 1, & \text{otherwise.} \end{cases} \tag{7}$$

However, propaganda levels $\hat{p} > \underline{p}$ fail the Intuitive Criterion, because the strong government with strength h can strictly benefit from deviating to propaganda level $\underline{p}$ if the citizen believes such a deviating government is a strong government, whereas the weak government with strength l can never strictly benefit from such a deviation no matter what the citizen will believe. Therefore according to the Intuitive Criterion, the citizen should believe that a government that deviates to $\underline{p}$ must be of type h, and hence the strong government will indeed deviate to $\underline{p}$. This discussion leads to the following proposition.

Proposition 1. *There is a unique separating perfect Bayesian equilibrium in the game that satisfies the Intuitive Criterion, in which the strong government chooses a propaganda level p^* that solves $1 - c(p^*, l) = l$, i.e., $p^* = \sqrt{l - l^2}$, and the weak government chooses no propaganda. The citizen will not rebel if the observed level of government propaganda is p^*or higher, and rebel otherwise.*

Next consider potential pooling equilibria. In a pooling equilibrium, the citizen cannot tell whether the government is strong or weak from the level of propaganda it produces, and so treats the government as being weak with probability $1 - \pi$. Since the prior distribution of the rebellion cost is uniform on the interval $[b(1 - h), b(1 - l)]$, the citizen's ex-ante probability of rebellion in such an equilibrium is $1 - \pi$ as discussed earlier. Suppose the two types of government pool at p^*, their payoffs are then respectively

$$U_g^*(h) = \pi + (1 - \pi)h - c(p^*, h) \tag{8}$$

and

$$U_g^*(l) = \pi + (1 - \pi)l - c(p^*, l). \tag{9}$$

Define $\tilde{p}$ by

$$\pi + (1 - \pi)l - c(\tilde{p}, l) = l. \tag{10}$$

In other words, $\tilde{p}$ is the highest level of propaganda that type l is willing to pool to; for any higher level of propaganda, the cost of producing the propaganda is too high and a weak government would rather produce nothing and be known as the weak type. The following belief of the citizen will support any propaganda level $p^* \in [0, \tilde{p}]$ in a pooling equilibrium:

$$\mu(\theta_h) = \begin{cases} \pi, & \text{if } p = p^*; \\ 0, & \text{otherwise.} \end{cases} \tag{11}$$

However, such a pooling equilibrium cannot satisfy the Intuitive Criterion. To see this, define p', which is greater than p^*, by

$$\pi + (1 - \pi)l - c(p^*, l) = 1 - c(p', l). \tag{12}$$

That is, given the pooling equilibrium at p^*, p' is the highest propaganda level that the weak government is willing to choose if the citizen mistakes it for a strong government. Then, if the strong government will strictly benefit from deviating to p', the pooling equilibrium at p^* will fail the Intuitive Criterion. In other words, the strong government will deviate to p' if

$$\pi + (1 - \pi)h - c(p^*, h) < 1 - c(p', h). \tag{13}$$

Substituting from equation (12) and utilizing $c(p, \theta) = p^2/\theta$, inequality (13) is equivalent to

$$p'^2 - p^{*2} = l(1 - \pi)(1 - l) < h(1 - \pi)(1 - h), \tag{14}$$

which always holds. The above discussion yields the following proposition.

Proposition 2. *There is no pooling equilibrium in the game that satisfies the Intuitive Criterion.*

The unique perfect Bayesian equilibrium satisfying the Intuitive Criterion in the propaganda game, then, is the separating equilibrium in which a strong government chooses a sufficiently high level of propaganda to distinguish itself from a weak government.

Appendix 2: Wording of Survey Questions

1. Satisfaction with China's overall situation:

   "How do you feel about the overall situation in China today?"
   A. satisfied
   B. somewhat satisfied
   C. neither satisfied nor dissatisfied
   D. somewhat dissatisfied
   E. dissatisfied

2. Satisfaction with the central government:

   "How satisfied are you with the work of the central government?"
   A. satisfied
   B. somewhat satisfied
   C. neither satisfied nor dissatisfied
   D. somewhat dissatisfied
   E. dissatisfied

3. Satisfaction with the local government:

   "How satisfied are you with the work of your local government?"
   A. satisfied
   B. somewhat satisfied
   C. neither satisfied nor dissatisfied
   D. somewhat dissatisfied
   E. dissatisfied

4. The government's competence in governance:

   "What do you think of the Chinese government's competence in governance?"
   A. high
   B. somewhat high
   C. intermediate
   D. somewhat low
   E. low

5. China's political system:

   "How appropriate do you think our current political system is for the country?"
   A. appropriate
   B. somewhat appropriate
   C. neither appropriate nor inappropriate
   D. somewhat inappropriate
   E. inappropriate

6. The government's capacity for social stability:

   "What do you think of the Chinese government's capacity in maintaining social stability?"
   A. high
   B. somewhat high
   C. intermediate
   D. somewhat low
   E. low

7. Willingness to participate in political activities:

   "Are you willing to participate the following activities to express your views and opinions?
   (1) Local elections (e.g., village, people's congress, and neighborhood elections)
   (2) Elections on campus
   (3) Assemblies, processions and demonstrations
   (4) Strikes

   A. I already participated in such activities before
   B. yes
   C. maybe
   D. no

8. Political efficacy (the first question measures internal efficacy and the second measures external efficacy, with answers appropriately coded for each so that higher scores indicate higher efficacy):

   "Do you agree with the following statements?"
   (1) Politics are too complicated for people like me to understand.
   (2) People like me can have an influence on the government's decision making.
       A. agree
       B. somewhat agree
       C. neither agree nor disagree
       D. somewhat disagree
       E. disagree

Appendix 3: Additional Statistical Results

Note: The following results are referenced in the main body of the paper but not included in the tables.

	Local Election	Campus Election	Pro-China
	Willingness to Participate in State-Sanctioned Elections and Pro-China Sentiments		
Propaganda Score	0.004	0.005	0.010
	(0.024)	(0.024)	(0.024)
Academic Standing	0.059*	0.055*	0.020
	(0.031)	(0.031)	(0.031)
External Efficacy	0.317***	0.094*	-0.030
	(0.058)	(0.056)	(0.056)
Internal Efficacy	-0.036	0.041	-0.037
	(0.053)	(0.053)	(0.053)
Female	-0.271**	0.232**	-0.031
	(0.115)	(0.113)	(0.114)
Income	0.016	0.104***	-0.038
	(0.038)	(0.037)	(0.038)
CCP Member	0.118	0.482***	0.211
	(0.146)	(0.145)	(0.144)
Intercept 1	0.221	-0.634**	-3.681***
	(0.310)	(0.313)	(0.351)
Intercept 2	1.675***	0.787**	-2.148***
	(0.315)	(0.312)	(0.313)
Intercept 3	3.468***	2.016***	-0.931***
	(0.332)	(0.316)	(0.305)
Intercept 4			0.568*
			(0.304)
Observations	1077	1081	1076

Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$