Working Paper

Political-Economic Models of Misinformation: An Application to the Transparency of the TTIP Negotiations

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Following traditional trade negotiation practices, EU and US negotiators kept details of the early stages of the Transatlantic Trade and Investment Partnership (TTIP) discussions from public scrutiny, hoping to present only the outcomes of those negotiations after their completion. But EU activists reacted quickly to protest the negotiations' non-transparency. In March 2014, the Friends of the Earth sent a letter on its behalf of twenty-seven other EU NGOs to EU Commissioner for Trade Karel de Gucht, stating,

> *The European Commission has argued that secrecy in this process is inevitable because this is a matter of international relations. If these negotiations are intended to affect domestic regulations, standards and safeguards on each side, then citizens have the right to know what is being put on the table, and how this is being negotiated. The standard legislative process in the EU allows for public scrutiny of each step of policy - making as well as full involvement of the European Parliament. We would urge that those negotiations should comply with the same level of openness."* (Stoczkiewicz 2014).

This negative public reaction quickly mounted, until in the autumn of 2014 new EU Trade Commissioner Cecilia Malmström made concessions to increase TTIP transparency, later claiming,

> *One of my first decisions as Trade Commissioner was to further strengthen the transparency of the TTIP negotiations. Sharing information with the national governments of the Member States, with Members of the European Parliament and with members of national parliaments is key to ensuring democratic scrutiny of the negotiations and informed debate based on facts. … The Commission has always made all TTIP documents available to the national governments of the Member States and will continue to do so. Members of the European Parliament also have full access to the EU's proposals and positions. Furthermore, we have published virtually all the EU's negotiating positions and textual proposals. This is key because these texts will end up as a part of the final agreement. Anyone can see them – they are all on our website. We have also published summaries and explanations about our objectives in the negotiations in clear, non-legal language in all EU official languages.* (Malmström 2015)

In general, transparency advocates appreciated the increased openness, but continued to call for more:

> *Certainly, the EU commission has responded to the wave of criticism by civil society organisations against TTIP. A long list of documents, which*

they had previously kept secret, was published on its website. But the most important TTIP documents are still unavailable. No one knows what the US government is really asking from Europe. This is why many positive as well as negative claims cannot be substantiated, and exaggerations from supporters and adversaries of TTIP dominate the debate. Wikileaks's offer of a €100,000 reward for the first person to leak the most secret documents is therefore highly welcome. (Giegold 2015)

Transparency proponents continued to be irked by the inability of Members of the European Parliament to gain anything but very limited access to important negotiations documents:

Unfortunately, most politicians in the European parliament are as much in the dark as ordinary citizens. We MEPs may get access to a few more documents in the parliament's reading room than those searching the EU commission's website. Nevertheless, the most important ones containing the demands of the US government are kept secret, even from MEPs. Even worse, although there are thousands of pages of documents, readers are not allowed to take any notes. Non-native English-speaking MEPs are further deterred by highly technical trade-law jargon. And while we could employ staff who are better trained to read the documents, they are not allowed to access the reading rooms. Therefore, the right of access to documents for MEPs is largely a sham. A real understanding of what is going on is only achieved through the actual publication of documents. (Giegold 2015)

One of the key difficulties in providing access to TTIP negotiation documents is that the U.S. negotiation partners were not willing to agree to provide them to the EU public:

> *In the communication on transparency in the TTIP negotiations, Trade Commissioner Malmström bluntly stated that there is 'no intention to publish any US documents or common negotiating documents without the explicit agreement of the US'. In plain language this means: the draft text of the TTIP agreement will remain hidden from the public until negotiations are over. Citizens, journalists, scientists, and others who might provide meaningful input into the negotiations will not be able to see the relevant draft chapter on, lets* [sic] *say chemicals. Nor will they see anything that the US wants from the EU and its member states – such as opening the EU's higher education market, a priority for US businesses in the sector.* (Corporate Europe Observatory, May 5, 2015)

Calls for increased transparency in the TTIP negotiations coming from the general EU citizenry abound on the Internet:

> *"What are they afraid of? This is another example of the Commission wanting to impose a US model of secrecy on us."* (Citizen commented quoted by Panichi and Ariès 2015)

> *This is extremely simple: If this so called Trade Pact had any of the benefits porported by politicans the process wouldnt have to be carried out in complete and utter secrecy. This is about a corporate wholesale take over of European Economies, American homogony and the destruction of what little remains of our democracy. Every time these*

*politicans open their mouthes all that comes out is a string of lies, they are in the positions of power to fill their own pockets and no other reason. Any politican with the smallest sense of right and wrong wouldn't have lasted long enough in politics to take one of these positions of power. Bloody wake up! How many times are we gonna fall for this bull*hit!!!* (Citizen's online comment, Corporate Europe Observatory, May 5, 2015. Typographical and spelling errors not removed.)

While the great majority of calls for increased TTIP openness have come from the EU, various U.S. groups have been voicing similar concerns. Over seventy-five U.S. trade unions, political activist groups and academics recently sent a letter to U.S. Trade Representative Michael Froman requesting more openness in the TTIP negotiations:

The TTIP is likely to set standards that will place restrictions on the ways Congress, state legislatures and local governments can create, amend and enforce laws to respond to constituents' needs, making it particularly distressing that TTIP commitments are being made behind closed doors and without sufficient public participation or scrutiny. … If the EU is willing to publish its textual proposals, there is no reason why the U.S. cannot immediately release its own textual proposals as well. This significant change from present practice would be a major step toward the release of composite draft texts after each round. It would also help produce trade negotiations guided by the principles of democracy, transparency, and political accountability. (AFL-CIO 2015)

Defendants of non-transparency in trade negotiations are difficult to find (at least by searching Internet), and public arguments against transparency are few. I have been able to find no statements by the EU arguing for non-transparency, except that they have to be sensitive to U.S. demands for negotiation confidentiality. In the context of discussing the Transpacific Partnership negotiations, the U.S. Trade Representative made the following argument for the necessity of secrecy in trade negotiations to ensure candor among negotiators:

> *Major trade and investment negotiations address a broad range of often complex and commercially sensitive sectors and issues and often take many months or even years to conclude. In order to reach agreements that each participating government can fully embrace, negotiators need to communicate with each other with a high degree of candor, creativity, and mutual trust. To create the conditions necessary to successfully reach agreement in complex trade and investment negotiations, governments routinely keep their proposals and communications with each other confidential.* (Office of the United States Trade Representative 2012)

The European Council made similar arguments about negotiations secrecy, albeit over twenty years ago and about inter-EU negotiations, not trade negotiations. In a lawsuit brought against the EC by *The Guardian* newspaper, the EC argued,

> *The Council normally works through a process of negotiation and compromise, in the course of which its members freely express their national preoccupations and positions. If agreement is to be reached, they will frequently be called upon to move from those positions, perhaps to the*

> *extent of abandoning their national instructions on particular point or points. This process, vital to the adoption of Community legislation, would be compromised if delegations were constantly mindful of the fact that the positions they were taking, as recorded in Council minutes, could at any time be made public through the granting of access to these documents, independently of a positive Council decision.* (Council of the European Union 1994, as quoted from Stasavage 2005.)

In this article, I explore the issue of whether the two pro-non-transparency statements above are themselves written in candor. Is there something to be gained by non-transparency in trade negotiators, or is that secrecy merely a product of governments' "capture" by multinational corporations?

There exists very little economic literature covering the topic of transparency of trade negotiations, and much less exploring the issue of whether public transparency can ever have harmful effects. Exceptions are studies by Stasavage (2004, 2005, 2007), in which the author develops game-theoretical models to argue that transparency may have public benefits as well as public costs. The driving force behind Stasavage's results are that negotiators subject to close scrutiny might *posture*. Negotiations break down as negotiators try to convince domestic public that they are loyal to the public interest, and end up being uncompromising:

> *Existing work emphasizes that public debate helps to reduce polarization and promote consensus, but I argue that when debate takes place between representatives the opposite may be true. When representatives make decisions in public, they face incentives to use their actions as a signal of*

loyalty to their constituents, potentially ignoring private information about the true desirability of different policies. Anticipating this, constituents will not alter their prior policy beliefs following a debate of this type. When representatives instead make policy decisions in private, they are more likely to allow private information to influence their actions. (Stasavage 2007)

In the current article, I take a different tack than the one taken by Stasavage. My analysis will focus on the costs to political agents of generating and processing information. I argue that "too much information" can be just as much a political tool as "not enough information."

Game 1: A Model of Citizen Choices of Facts among "Spin"

The first model I present is Game 1, which is made up of n simultaneously played "one-fact" games, Game 1.1, game 1.2, … , Game 1.n. Figure 1 presents the extensive form of one-fact Game 1.j. The extensive forms of the n-1 other one-fact games are identical to Game 1.j. Game 1.j has two players: Nature (N) and a Citizen (C), and three periods. In Period 1, the Citizen decides whether to pay a per-fact cost $c(n)$ to "inspect" the results of upcoming plays by Nature in the one-fact game. We assume $c'(n) > 0$; that is, the per-fact cost of inspection is monotonically increasing function of the number of facts that the Citizen must inspect (that is, in the number of one-fact games she must play simultaneously). This assumption represents the idea that citizen's fact-processing abilities are limited; limited brain power, time, energy, etc. make it so that when a citizen is confronted with the task of judging the veracity of many political claims, the more that

must be judged, the less the amount of time, energy, and brain power that can be devoted to critically examining each claim.

Period 2 of the one-fact game begins with nature drawing a "fact" from a binomial distribution of random variable X. For any $Q \in [0, 1]$, let $b(X, Q)$ be the probability density function parameterized by Q:

(1) $b(X,Q) = Q^{1-X}(1-Q)^{X}$ for $X \in \{0,1\}$.

For $X = 0$, we call X a "leftist fact," and for $X = 1$, we call it a "rightist fact." It will sometimes be useful to label facts by the symbols "←L" and "R→".

At the same time that Nature is generating the fact X, Nature also chooses randomly whether to "spin" the fact. Consider another random variable, S (called "spin"), which is also generated from a binomial distribution parameterized by a real number $a \in$ in [0, 1].

(2) $b(S,a) = a^{1-S}(1-a)^{S}$ for $S \in \{0,1\}$.

Consider the following function, which we call the "appearance function":

(3) $A(X,S) = \begin{cases} X \text{ if } S = 0 \\ |1-X| \text{ if } S = 1 \end{cases}$.

When $S = 0$, the fact X is "not spun," and so it "appears" as its own value. When $S = 1$, the fact X is "spun," and so if the fact is actually 0, it "appears" to be 1, and if the fact is actually 1, it appears to be 0. We might illustrate an agent who is "not fooled by appearances" as seeing the following:

$A(0, 0)$ = "←L", $A(0, 1)$ = "ꓥ→", A(1, 0) = "R→", and A(1, 1) = "←ꓤ".

However, if the Citizen is "fooled by appearances," she simply see the "arrows" and not the "letters" of the (spun or not-spun) fact: $A(0, 0)$ = "←", $A(0, 1)$ = "→", A(1, 0) = "→", and A(1, 1) = "←". So, a spun fact appears as its opposite: a leftist fact appears to be rightist, and a rightist fact appears to be leftist. We assume that the citizen can be "fooled by appearances," knowing the functional form of $b(X, Q)$ and its domain, but not the value q. Since were the citizen to know the value of q she would know $b(X, q)$, we can also call the value of q "the truth." We assume that the citizen also knows the probability with which facts are spun, a, and that spinning is generated by the binomial process defined in (2).

Next we assume that the citizen's objective is to observe a drawn (and potentially spun) fact, and use it to estimate whether q is less than or equal to 0.5, and then use that estimate to "choose a government." That is, the citizen is trying to figure out the "truth," which may be leftist (if $q \leq 0.5$) or rightist (if $q > 0.5$). If the truth is leftist, the consumer wants to choose a leftist government, and does so by choosing $v = 0$. It the truth is rightist, the citizen wants to choose a rightist government by choosing $v = 1$.

Even though the citizen is fooled by appearances, we allow her to choose, at a cost, whether to "inspect" a "fact" (whether it has been spun or not). Her inspection choice variable is i, which when set to zero implies no inspection, and when set to one implies that inspecting a fact "unspins" it. That is, leftist facts that appeared to be rightist when not inspected are seen to be truly leftist after inspection (and similarly with rightist facts). The cost of an inspection is $c(n) > 0$.

We assume that a citizen's utility depends on whether she has chosen the correct kind of government. She receives one util when she chooses government correctly (that is, if

she has chosen a leftist government if the truth is on the left and a rightist government if the truth is on the right). She receives no utils if she chooses government incorrectly. Her utility also depends on whether she has conducted an inspection. So the citizen's utility is described by (4):

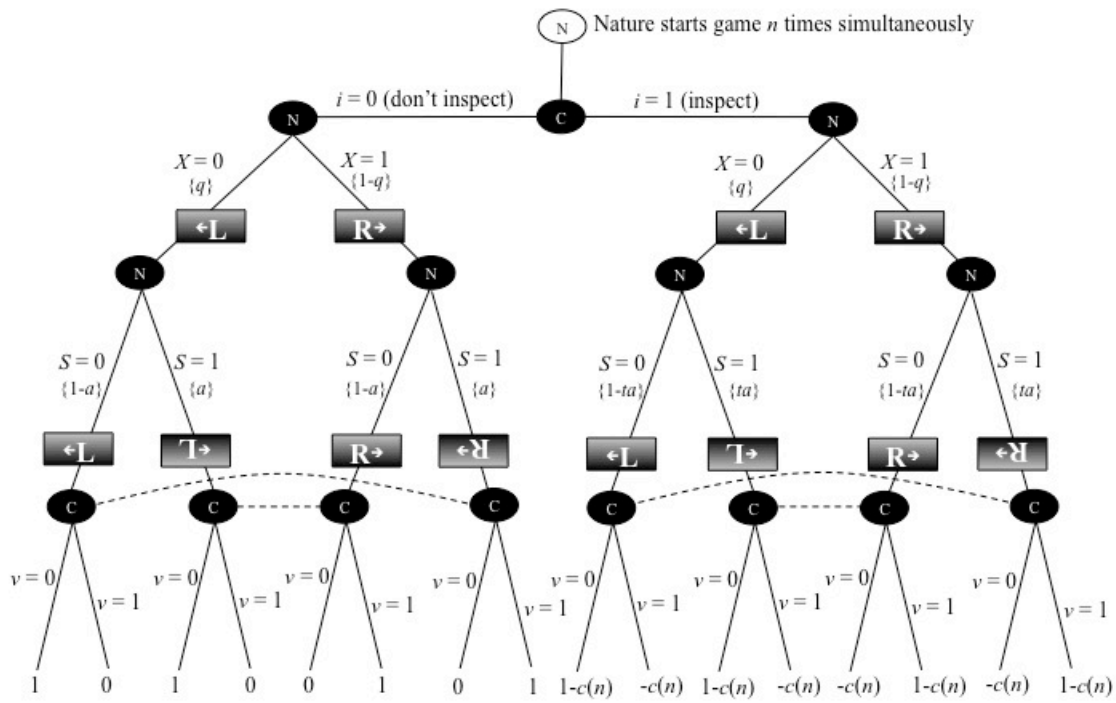

Figure 1. One of n identical one-fact games in Game 1

$$(4)\quad U_C(i,v,X,n) = -ic(n) + \begin{cases} 0 \text{ if } v \neq X \\ 1 \text{ if } v = X \end{cases}$$

I assume that the citizen chooses whether to inspect facts and how to vote, with the objective of maximizing her expected utility. Her choices, their outcomes, and the model's random elements are illustrated in figure 1, which shows an extensive for of a two-player game, where the players are nature N and the citizen C. The citizen makes the

first move, deciding before the fact "appears" whether to inspect or not inspect the fact. Nature then generates a fact, drawing a leftist fact with probability q, or a rightist fact with probability 1-q. Then nature spins the fact with probability a, or does not spin it, with probability 1-a. If, however, the Citizen chooses to inspect a fact, it reduces the probability that a spun fact "stays spun." That is, instead of being "spun" with probability a, a fact is "effectively spun" (i.e., "spun" but not "unspun") with probability ta, where $t \in (0, 1)$.

In the appendix, I show that the citizen depicted in figure 1 will choose to inspect the fact if $c(n) < (1-t)a$. That is, letting an asterisk denote an ex-ante optimal decision,

$$(5)\quad i^* = \begin{cases} 0 \text{ if } c(n) > (1-t)a \\ 1 \text{ if } c(n) < (1-t)a \end{cases}.$$

Note that the citizen is indifferent between inspecting and not inspecting if $c(n) = (1-t)a$.) The result shown in (5) is intuitive. The cost of inspecting a fact is $c(n)$. The benefit of inspecting equals the value of choosing the correct government (which is 1) times the increase in the probability of finding a spin if one inspects (which is $(1-t)a$.). In this model, because having to play additional one-fact games raises the per-fact cost of inspection, then it lowers the probability that the citizen installs the optimal government. This statement is formalized in Proposition 1.

Proposition 1. Assume $a \leq q \leq 1-a$. There is a level of inspection cost, call it c′, such that for any $c > c'$, the probability of the consumer choosing the wrong government is higher than if the inspection cost is at any level $c < c'$.

Proof. For any $c > (1-t)a$, the citizen does not inspect, and makes the wrong choice if a leftist fact is flipped (which occurs with probability qa) or if a rightist fact is

flipped (which occurs with probability $(1-q)a$.) The probability of making the wrong choice in government is the sum of these probabilities, a. For any $c < (1-ta)$, the citizen does inspect, and makes the wrong choice if a leftist fact is flipped and not detected as such (which occurs with probability tqa) or if a rightist fact is flipped and is not detected as such (which occurs with probability $(1-q)ta$.) The probability of making the wrong choice in government is the sum of these probabilities, ta. Since $t \in (0, 1)$, $(1-q)a < (1-q)ta$, so the probability of making the wrong choice in government is higher when $c > (1-a)$ than when $c < (1-a)$.

Proposition 1 has an obvious implication: as the number of facts drawn (n) increases so does the per-fact cost of inspection. For sufficiently high values of n, the per-fact costs of inspection will be great enough to prevent the Citizen from choosing to inspect the facts, and on average the government installed will deviate from the optimal government.

Game 2: Another Model of Citizen Choices of Facts among "Spin"

Consider a random variable $X = \mu + \varepsilon$, where μ is a constant real number, and $\varepsilon \sim N(0, \sigma^2)$. Assume that draws from the distribution of ε are independent. Interpret any value of X as representing a "fact" about the effects of government policy. When $X < \mu$, the fact is a "leftist" fact, and when $X > \mu$, the fact is a "rightist" fact.

Next consider a Citizen who obtains utility by choosing a government. C's choice variable is v, which must be chosen from the real number line. C desires to install a government that is not too far "left" or too far "right"; rather, C wants to install a

government that balances leftist facts and the rightist facts to develop a policy based on evidence from the facts at hand. The Citizen's utility function is

$$(6)\, U_C(v,\mu) = K - [v-\mu]^2,$$

Where K is a positive constant.

When citizen C chooses v, she does not know μ. Rather, she gains information about μ from draws of the random variable X out of its distribution. She knows that X is distributed normally, but does not know the mean or variance of the distribution. In addition, C can learn about any fact by "inspecting it." But the inspection process is itself flawed, so that sometimes C perceives facts to be more "rightist" or more "leftist" than they actually are. C's perceived value of a fact is determined by a random process, where the perceived value of a fact is its true value plus a normally distributed random variable: $Y = X + \omega$, where the draws of w are independent and identically distributed as $\omega \sim N(0, g(n))$. Assume that $g(n)$ is positive and monotonically increasing for all n. The idea is that the citizen is forced to inspect all the facts in a sample, and must do so in a fixed amount of time or with a fixed amount of personal energy or resources. The greater the number (n) of facts inspected, the less time there is to spend on each fact, and so the greater is the variance of the size of the misjudgment. The citizen estimates μ by using the best unbiased estimate of it that is linear in the perceived values of the drawn facts. This is well known to be the sample mean:

$$\hat{\mu} = \frac{1}{n}\sum_{i=1}^{n} Y_i .$$

The citizen's objective, then, is to solve

$$\max_{v}\left\{K-\left[v-\hat{\mu}\right]^2\right\}$$

Solving the problem above is equivalent to solving the problem below:

$$\underset{v}{Min}\left\{\left[v-\hat{\mu}\right]^2\right\}=\underset{v}{Min}\left\{\left[v-\frac{1}{n}\sum_{i=1}^{n}Y_i\right]^2\right\}=\underset{v}{Min}\left\{\left[v-\frac{1}{n}\sum_{i=1}^{n}\left(\mu+\varepsilon_i+\omega_i\right)\right]^2\right\}$$

The solution to the problem above is to set v equal to $\hat{\mu}$, which is the mean of the sample of perceived values of the drawn facts. Note that $(\varepsilon+\omega) \sim N(0, \sigma^2 + g(n))$. The statistical properties of $\hat{\mu}$ under these assumptions are well known:

$v=\hat{\mu}=\frac{1}{n}\sum_{i=1}^{n}\left(\mu+\varepsilon_i+\omega_i\right) \sim N(\mu, \sigma^2 + g(n))$. From (6), the realized utility of the consumer is,

$$(7)\, U_C\left(v,\mu\right)=K-\left[\hat{\mu}-\mu\right]^2=K-\left[\frac{1}{n}\sum_{i=1}^{n}\left(\mu+\varepsilon_i+\omega_i\right)-\mu\right]^2=K-\left[\frac{1}{n}\sum_{i=1}^{n}\left(\varepsilon_i+\omega_i\right)\right]^2,$$

And expected utility is

$$(8)\;\; EU_C\left(n\right)=K-E\left(\left[\frac{1}{n}\sum_{i=1}^{n}\left(\varepsilon_i+\omega_i\right)\right]^2\right)=K-E\left(\frac{1}{n^2}\left[\sum_{i=1}^{n}\varepsilon_i^2+\sum_{i=1}^{n}\omega_i^2\right]\right)$$

$$=K-\left(\frac{1}{n^2}\sum_{i=1}^{n}Var\left(\varepsilon_i\right)\right)-\left(\frac{1}{n^2}\sum_{i=1}^{n}Var\left(\omega_i\right)\right)=K-\frac{\sigma^2}{n}-\frac{g\left(n\right)}{n}.$$

Finally, note the effect of an increase in the sample size on expected utility:

$$(9)\;\; \frac{dEU_C\left(n\right)}{dn}=\frac{d\left[K-\frac{\sigma^2}{n}-\frac{g\left(n\right)}{n}\right]}{dn}=-\left(\frac{\sigma^2}{n^2}+\frac{g\left(n\right)-ng'\left(n\right)}{n^2}\right)=\frac{g'\left(n\right)}{n}-\frac{\sigma^2+g\left(n\right)}{n^2}.$$

Because g is increasing in n, the sign of the expression above is ambiguous. That is, increasing the sample size may *decrease* expected utility. The intuition behind this result is that, *ceteris paribus*, while increasing the sample size n (that is, obtaining additional "facts") provides the citizen with a better estimate of the mean of the distribution of facts X (which is also the mean of the distribution of the perceived facts Y), increasing sample size leaves less time per fact for inspection, and so can increase the variance of the estimate of μ, and so decrease the accuracy of the citizen's estimate of the optimal government to be installed. Thus, more "facts" need not make the citizen better off; since the citizen has limited resources with which to inspect the facts to estimate their mean, her assessment of the "facts" may worsen as the sample size increases.

Game 3. A Model in which One Interest Group Spins Facts

Next I present a model in which a biased interest group can spin facts in an effort to win the political support of a representative citizen. I call this Game 3. Like Game 1, Game 3 consists of n simultaneously-played "one-fact" games, Game 3.1, … , Game 3.n. I show the extensive form of one such one-fact game in in figure 2. Without loss of generality, I assume that the interest group, denoted G_L, is leftist. Whether the truth is leftist or rightist depends once again on Nature. When $t = 0$, the truth is leftist. When $t = 1$, the truth is rightist. G_L, observes the truth, and decides whether to spin the fact to make it appear other than it is. The citizen then sees the appearance of the truth in all of the one-fact games, and must decide whether to vote for a leftist or rightist government. Payoff functions are shown in (12) and (13).

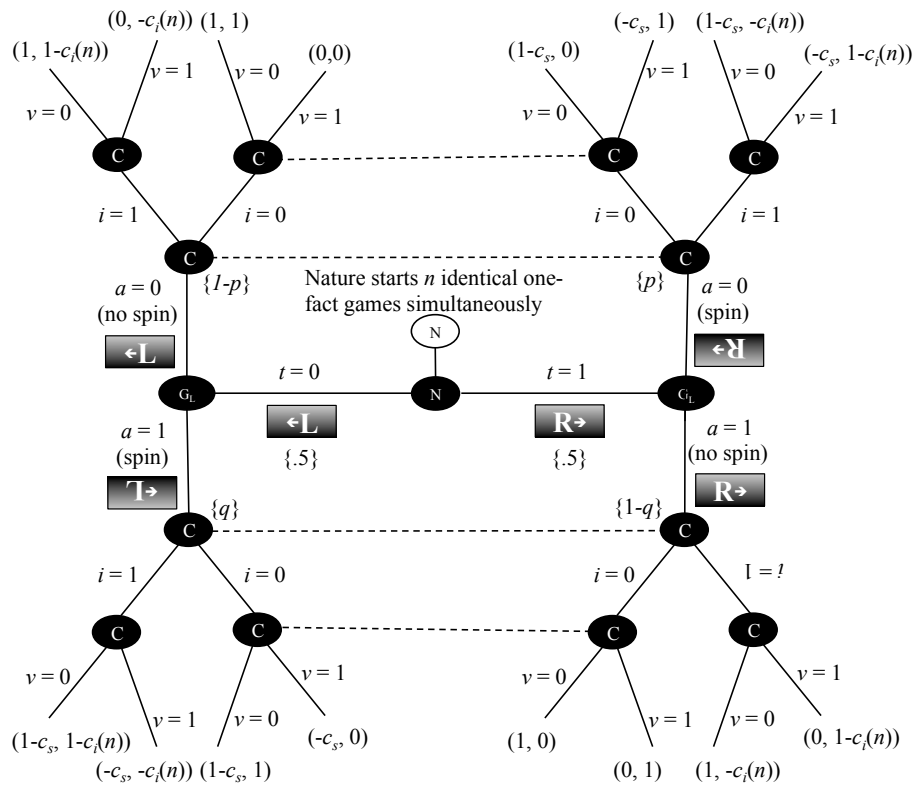

Figure 2. The external form of one of *n* one-fact games played between a fact-spinning interest group and a citizen

(10) $s(a,t)=\begin{cases} 0 \text{ if } t=a \\ 1 \text{ if } t\neq a \end{cases}$

(11) $e(v,t)=\begin{cases} 0 \text{ if } t\neq v \\ 1 \text{ if } t=v \end{cases}$

(12) $U_{GL}(v,a,t)=(1-v)-c_s s(a,t)$

(13). $U_C(v,i,t)=e(v,t)-c_i i$

Game 3 is a type of signaling game, and is common with signaling games, we use the pure-Strategy Bayesian Nash equilibrium concept (Gibbons 1992, pp. 173-210). There are four potential types of such equilibria for the game. (1) "Never spin"; (2) "Always

spin"; (3) "Spin when You Shouldn't and Don't Spin when You Should"; and (4) "Spin when the Truth Is Inconvenient."

I show in the Appendix that there is only one pure-strategy perfect Bayesian Nash equilibrium in this game, and it is the "Spin when the Truth is Inconvenient" strategy. In Game 3, since the interest group is biased left, the truth is "inconvenient" when Nature generates a rightist fact. Only in this case will the leftist interest group attempt to spin the fact—and the group will do this only in the case in which inspection costs are sufficiently low (below 0.5). Because again we assume that per-fact inspection costs increase with the number of facts that must be inspected, when Nature generates beyond some number of facts, it no longer is profitable for the Citizen to inspect the facts. As a result, the Citizen is more likely to be fooled by the interest groups "spinning" of the facts, and install a government that is leftist.

Conclusions

Given the authoritarian history of government on Earth, it is not surprising that peoples living in representative democracies tend to favor—or at least think they favor--more government openness to less. In this article I present models that suggest, however, that the "optimal government transparency" problem may not have a corner solution: it may not be desirable for government to be absolutely transparent in all that it does. I think most take this for granted in our personal lives; we all understand the importance of private conversations, and that sometimes information can be withheld for good purposes. This is not to say that less government transparency is always better, but rather simply that non-transparency can bring benefits as well as costs, and perfect transparency

is not necessarily socially optimal. In this article I have attempted to gain insight into these issues using three game-theoretical models that suggest that "more facts" may not lead to "more information"—or at least not more usable information. The models are based on the argument that the social process of mapping "facts" into policy decisions is complex, and requires employment of scarce resources. If those scarce resources have to be spread out to process more facts, that processing may be less efficient, and in the end may result in a poorer estimation of "reality" than would a more judicious public presentation of facts.

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Appendix

Model in which Nature Spins Facts Randomly

(A.1) $$\Pr\left(\underbrace{X=0}_{\leftarrow L}\middle|\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=$$

$$\frac{\Pr\left(\overbrace{A(X,S)=0}^{\leftarrow}\middle|\overbrace{X=0}^{\leftarrow L},i=0\right)\Pr\left(\overbrace{X=0}^{\leftarrow L}\right)}{\Pr\left(\underbrace{A(X,S)=0}_{\leftarrow}\middle|\underbrace{X=0}_{\leftarrow L},i=0\right)\Pr\left(\underbrace{X=0}_{\leftarrow L}\right)+\Pr\left(\underbrace{A(X,S)=0}_{\leftarrow}\middle|\underbrace{X=1}_{R\rightarrow},i=0\right)\Pr\left(\underbrace{X=1}_{R\rightarrow}\right)}$$

$$\frac{(1-a)q}{(1-a)q+a(1-q)}=\delta_0.$$

Similarly,

(A.2) $$\Pr\left(\underbrace{X=1}_{R\rightarrow}\middle|\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=\frac{a(1-q)}{(1-a)q+a(1-q)}=1-\delta_0.$$

(A.3) $$\Pr\left(\underbrace{X=0}_{\leftarrow L}\middle|\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=\frac{aq}{aq+(1-a)(1-q)}=1-\delta_1.$$

(A.4) $$\Pr\left(\underbrace{X=1}_{R\rightarrow}\middle|\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=\frac{(1-a)(1-q)}{aq+(1-a)(1-q)}=\delta_1.$$

When the non-inspecting citizen sees " $\leftarrow$", her expected utility from choosing a leftist government would be,

$$\text{(A.5.}L\text{)}\ EU_C\left(v=0\,\middle|\,\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=\delta_0\cdot 1+(1-\delta_0)\cdot 0=\delta_0\,.$$

If she chose a rightist government, her expected utility would be,

$$\text{(A.5.}R\text{)}\ EU_C\left(v=1\,\middle|\,\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=\delta_0\cdot 0+(1-\delta_0)\cdot 1=1-\delta_0\,.$$

The citizen's ex-ante optimal choice of government will be leftist if and only if $\delta_0 \geq 1-\delta_0$, which can be shown to occur if and only if $q \geq a$. Using an asterisk to denote the optimal choice, then, we have

$$\text{(A.6)}\ v^*\left(\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=\begin{cases}0 \text{ if } q>a\\ 1 \text{ if } q\leq a\end{cases}\,.$$

The result immediately above is intuitive: when observing what appears to be a leftist fact, the citizen will choose a leftist government unless the probability that the fact is spun (and so appears to be a rightist fact) is greater than the probability that it is a leftist fact.

Assuming $q > a$ and substituting (A.6) into (A.5.L) shows that citizen's maximized expected utility after observing what appears to be (and may actually be) a leftist fact is

$$\text{(A.7)}\ EU_C^*\left(\underbrace{A(X,S)=0}_{\leftarrow},i=0\right)=\delta_0\,.$$

When the non-inspecting citizen sees " $\rightarrow$", her expected utility from choosing a leftist government would be,

$$\text{(A.8.}L\text{)}\ EU_C\left(v=0\,\middle|\,\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=(1-\delta_1)\cdot 1+\delta_1\cdot 0=1-\delta_1\,.$$

If she chose a rightist government, her expected utility would be,

$$\text{(A.8.}R\text{)}\ EU_C\left(v=1\middle|\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=(1-\delta_1)\cdot 0+\delta_1\cdot 1=\delta_1\,.$$

The citizen's ex-ante optimal choice of government will be rightist if and only if $\delta_1 \geq 1-\delta_1$, which can be shown to occur if and only if $q \leq 1-a$. Using an asterisk to denote the optimal choice, then, we have

$$\text{(A.9)}\ v^*\left(\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=\begin{cases} 0 \text{ if } q>1-a \\ 1 \text{ if } q\leq 1-a \end{cases}\,.$$

Assuming $q \leq 1-a$ and substituting (A.9) into (A.8.R) shows that the non-inspecting citizen's maximized expected utility after observing what appears to be (and may actually be) a rightist fact is

$$\text{(A.10)}\ EU_C^*\left(\underbrace{A(X,S)=1}_{\rightarrow},i=0\right)=\delta_1\,.$$

The probability of a fact appearing leftist is,

$$\text{(A.11).}\Pr\left(\underbrace{A(X,S)=0}_{\leftarrow}\right)=\Pr(X=0,S=0)+\Pr(X=1,S=1)=q(1-a)+(1-q)a$$

The probability of a fact appearing rightist is,

$$\text{(A.12).}\Pr\left(\underbrace{A(X,S)=1}_{\rightarrow}\right)=\Pr(X=0,S=1)+\Pr(X=1,S=0)=qa+(1-q)(1-a)$$

From (A.1)-(A.4), (A.7), and (A.10)-(A.12) and assuming $a < q \leq 1\text{-}a$, we have that before witnessing the fact (whether spun or not), the non-inspecting citizen's optimized expected utility is,

(A.13) $EU_C^{**}\left(i=0\right)=\Pr\left(\leftarrow\right)EU_C\left(v^*\left(\leftarrow\right)\middle|,i=0\right)+\Pr\left(\rightarrow\right)EU_C\left(v^*\left(\rightarrow\right)\middle|i=1\right)$

$$=\left[q\left(1-a\right)+\left(1-q\right)a\right]\frac{q\left(1-a\right)}{q\left(1-a\right)+\left(1-q\right)a}+\left[qa+\left(1-q\right)\left(1-a\right)\right]\frac{\left(1-q\right)\left(1-a\right)}{qa+\left(1-q\right)\left(1-a\right)}$$

$$=q\left(1-a\right)+\left(1-q\right)\left(1-a\right)=1-a.$$

Inspecting a fact reduces the probability that it will appear to be the opposite of what it actually is—that is, it is less likely that a fact is effectively spun. Letting $t \in (0, 1)$ be a parameter, we can model inspection by saying that the probability that nature effectively spins a fact is ta. The fixed ("set-up) cost of inspecting a field is c. Note that since $t \in (0, 1)$, the assumption $a < q \leq 1\text{-}a$ implies $ta < q \leq (1\text{-}ta)$. Using these facts and mimicking the calculations used above, the inspecting citizen's optimized expected utility is,

(A.14) $EU_C^{**}\left(i=1\right)=\left(1-ta\right)-c$.

Equations (A.13) and (A.14) imply that the citizen will choose to inspect the fact when $(1 - ta) - c > (1 - a)$, that is, $c < (1\text{-}t)a$. Calling i^* the optimal inspection choice, we have,

(A.15) $i^*=\begin{cases} 0 \text{ if } c<\left(1-t\right)a \\ 1 \text{ if } c>\left(1-t\right)a \end{cases}$.

(Note that the citizen is indifferent between inspecting and not inspecting if $c = (1\text{-}t)a$.)

Model in which One Interest Group Spins Facts

"Spin when You Shouldn't, Don't Spend when You Should" $\left(\underbrace{a=1}_{\rightarrow},\underbrace{a=1}_{\rightarrow}\right)$:

Suppose that (a=1, a=1) is part of a pure-strategy Bayesian Nash equilibrium (*psBNe*).

By Bayes' rule,

$$\Pr\left(t=0\middle|a=1\right)=\frac{\overbrace{\Pr\left(a=1\middle|t=0\right)}^{1}\overbrace{\Pr\left(t=0\right)}^{0.5}}{\underbrace{\Pr\left(a=1\middle|t=0\right)}_{1}\underbrace{\Pr\left(t=0\right)}_{0.5}+\underbrace{\Pr\left(a=1\middle|t=1\right)}_{1}\underbrace{\Pr\left(t=1\right)}_{0.5}}=0.5,$$

and Pr(t=1| a=1) = 0.5, as well.

C must decide whether to inspect by comparing ex-ante expected utilities from inspecting (i = 1) and not inspecting (i = 0).

If *C* chooses not to inspect (i = 0), then she solves

$$\max_{v\in\{0,1\}}\left\{\underbrace{\underbrace{\Pr\left(t=0\middle|a=1\right)}_{0.5}U_c\left(v,i=0,t=0\right)+\underbrace{\Pr\left(t=1\middle|a=1\right)}_{0.5}U_c\left(v,i=0,t=1\right)}_{EU_c\left(v,i=0,a=1\right)}\right\}$$

Note that

$$EU_c\left(v=0,i=0,a=1\right)=\underbrace{\Pr\left(t=0\middle|a=1\right)}_{0.5}\underbrace{U_c\left(v=0,i=0,t=0\right)}_{1}+\underbrace{\Pr\left(t=1\middle|a=1\right)}_{0.5}\underbrace{U_c\left(v=0,i=0,t=1\right)}_{0}=0.5$$

$$EU_c\left(v=1,i=0,a=1\right)=\underbrace{\Pr\left(t=0\middle|a=1\right)}_{0.5}\underbrace{U_c\left(v=1,i=0,t=0\right)}_{0}+\underbrace{\Pr\left(t=1\middle|a=1\right)}_{0.5}\underbrace{U_c\left(v=1,i=0,t=1\right)}_{1}=0.5$$

Therefore if she does not inspect, *C* is indifferent between voting left or voting right:

v^*(i=0, a =1) = {0, 1}, and $EU_C^*\left(i=0,a=1\right)=0.5$.

If C does inspect, she will receive with certainty one util from voting correctly and will pay the inspection cost of c_i with certainty. So, $EU_C^*(i=1,a=1)=1-c_i$. Therefore, when $c_i < 0.5$, (that is, when inspection costs are sufficiently low), she inspects: $EU_C^*(i=1,a=1)>EU_C^*(i=0,a=1)$, so $i^* = 1$. Now suppose $c_i < 0.5$. Consider the case in which $t = 0$. Since $i^* = 1$, G_L believes that C is going to inspect and then vote left: $v = 0$. But then G_L should play $a = 0$ (not spin), receiving a payoff of 1 instead of $1 - c_s$. So, no *psBNe* involves the (a=1, a=1) strategy when $c_i < 0.5$.

Suppose $c_i \geq 0.5$. Then from above we know that the high inspection costs lead to no inspection: $i^* = 0$. So when G_L spins ←L to appear as →, C gets no new information from G_L's action: Pr(t=0| a=1) = 0.5, and $EU_C^*(i=0,a=1)=0.5$, as above.

- Suppose equilibrium involves (a=1, a=1, v=0, v=0) or (a=1, a=1, v=0, v=1). When $t = 0$, G_L should not spin (that is, should play $a = 0$), since C will vote for him ($v = 0$) anyway. So neither (a=1, a=1, v=0, v=0) nor (a=1, a=1, v=0, v=1 can be part of a *psNBe*.
- Suppose equilibrium involves (a=1, a=1, v=1, v=0) or (a=1, a=1, v=1, v=1). When $t = 1$, G_L should spin the fact to the left (play $a = 0$), because it will lead to him remaining in government and receiving a payoff of $1 - c_s$, which exceeds the payoff from not spinning (playing $a = 1$), which is 0. So, neither (a=1, a=1, v=1, v=0) nor (a=1, a=1, v=1, v=1) can be part of a *psNBe*.

So, no *psBNe* involves the (a=1, a=1) strategy when $c_i \geq 0.5$.

Conclusion: no *psBNe* involves the (a=1, a=1) "Spin when You Shouldn't, Don't Spin when You Should" strategy.

"Never Spin" $\left(\underbrace{a=0}_{\leftarrow},\underbrace{a=1}_{\rightarrow}\right)$:

Suppose that "Never Spin" is part of a *psBNe*. Then $p = 0$, $q = 0$. If C sees $\leftarrow$, she believes $\leftarrow$L. If C sees $\rightarrow$, she believes R$\rightarrow$.

Suppose $t = 1$. Suppose that G_L follows the assumed equilibrium strategy and so plays $a = 1$. Since C believes that there has been no spin, she plays $v = 1$. $U_{GL}(v=1, a=1, t=1) = 0$. But if G_L diverges from the equilibrium strategy and plays $a = 0$, then C figures (incorrectly) that there's been no spin, and plays $v = 0$ without inspecting. Then $U_{GL}(v=0, a=0, t=1) = 1 - c_s$. So, assuming $c_s < 1$, we have that when $t = 1$, G_L increases her payoff by diverging from the equilibrium strategy. Therefore "Never Spin" cannot be part of a *psBNe*).

Conclusion: no *psBNe* involves the (a=0, a=1) "Never Spin" strategy.

"Always Spin" $\left(\underbrace{a=1}_{\rightarrow},\underbrace{a=0}_{\leftarrow}\right)$:

Suppose $t = 0$. If C sees $\rightarrow$, she believes $\leftarrow L$. She feels no need to inspect, and plays $v = 0$. But given $v = 0$, G_L should not spin.

Conclusion: no *psBNe* involves the (a=1, a=0) "Always Spin" strategy.

"*Spin if the Truth Is Inconvenient"* $\left(\underbrace{a=0}_{\leftarrow},\underbrace{a=0}_{\leftarrow}\right)$:

By Bayes' rule,

$$\Pr\left(t=0\middle|a=0\right)=\frac{\overbrace{\Pr\left(a=0\middle|t=0\right)}^{1}\overbrace{\Pr\left(t=0\right)}^{0.5}}{\underbrace{\Pr\left(a=0\middle|t=0\right)}_{1}\underbrace{\Pr\left(t=0\right)}_{0.5}+\underbrace{\Pr\left(a=0\middle|t=1\right)}_{1}\underbrace{\Pr\left(t=1\right)}_{0.5}}=0.5.$$

To establish any equilibrium, first we must determine whether *C* will decide to inspect.

Suppose *C* doesn't inspect, then after she sees ←, she solves,

$$\max_{v\in\{0,1\}}\left\{\underbrace{\underbrace{\Pr\left(t=0\middle|a=0\right)}_{0.5}U_c\left(v,i=0,t=0\right)+\underbrace{\Pr\left(t=1\middle|a=0\right)}_{0.5}U_c\left(v,i=0,t=1\right)}_{EU_c\left(v,i=0,a=1\right)}\right\}.$$

Calculating, we see that

$$EU_c\left(v=0,i=0,a=0\right)=\underbrace{\Pr\left(t=0\middle|a=0\right)}_{0.5}\underbrace{U_c\left(v=0,i=0,t=0\right)}_{1}+\underbrace{\Pr\left(t=1\middle|a=0\right)}_{0.5}\underbrace{U_c\left(v=0,i=0,t=1\right)}_{0}=0.5$$

$$EU_c\left(v=1,i=0,a=0\right)=\underbrace{\Pr\left(t=0\middle|a=0\right)}_{0.5}\underbrace{U_c\left(v=1,i=0,t=0\right)}_{0}+\underbrace{\Pr\left(t=1\middle|a=0\right)}_{0.5}\underbrace{U_c\left(v=1,i=0,t=1\right)}_{1}=0.5$$

Therefore, $EU_C^*\left(i=0,a=0\right)=0.5$.

Suppose *C* does inspect. Then she always supports the correct government: when $t = 0$ she plays $v = 0$, and when $t = 1$ when plays $v = 1$. So

$EU_C^*\left(i=1,a=0\right)=1-c_i$.

So, if $c_i < .5$, $i^* = 1$, and if $c_i > .5$, $i^* = 0$.

If $c_i < .5$, then $EU_C^*\left(i=1,a=0\right)=1-c_i>EU_C^*\left(i=0,a=0\right)=.5$; so, if $c_i < .5$, $i^* = 1$, and *C* always votes correctly. In this case, when $t = 1$, GL cannot gain from spinning even if the truth is inconvenient.

Conclusion: If $c_i < .5$, no *psBNe* involves the (a=0, a=0) "Spin if the Truth Is Inconvenient" strategy.

However, if $c_i > .5$, C does not inspect. When $t = 0$, GL's assumed equilibrium strategy is to not spin (sets $a = 0$). From the expected utilities derived above we see that C is indifferent between voting $v = 0$ and $v = 1$ (supporting a leftist or rightist government), and her expected utility is .5. So playing either $v = 0$ or $v = 1$ cannot be ruled out as an equilibrium choice. If C plays $v = 0$, G_L's best strategy is then not to spin (play $a = 0$).

If $t = 1$, G_L's assumed equilibrium strategy is to spin (play $a = 0$). Again, C is indifferent between $v = 0$ and $v = 1$, so neither can be ruled out as an equilibrium choice. Letting C play $v = 0$, G_L maximizes her payoff by spinning (playing $a = 0$).

Conclusion: If $c_i > .5$, (a=0, a=0) "Spin if the Truth Is Inconvenient" is part of a *psBNe* stategy.