Information & Identity: An Application to Political Campaign Media

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Abstract

This paper proposes an extension of the Identity model developed by Akerlof and Kranton (2000) that incorporates a beliefs dimension based on the consumption of information. The model is then applied to the process by which consumer-voters consume campaign media and selectively accept information to vote. Based on the assumption that political parties act to maximize their stream of future contributions, I predict that parties will engage more heavily in behavior that induces individuals to discount (opposing) information when: (1) they have a relatively smaller share of total campaign funding; and (2) the relative cost of consuming media goods is higher. Finally, empirical evidence supporting these predictions is presented from the 1992-2002 US Senate elections.
I would like to thank Professor Bruce Owen for the incredible amount of support and guidance he has provided for this thesis. His broad knowledge and considerable patience granted me the opportunity to explore and develop the ideas presented here.
Introduction

While economics rightly purports to be the study of consumption and production, it is also in large measure a study of human behavior and the outcomes of these behaviors. Since the time of Adam Smith, economists have applied their analytical efforts to render countless problems tractable, and some of the greatest fruits of their labor have been new ways of inducing ‘better’ or more efficient outcomes. In the more recent episodes of this pursuit, it is not surprising that the field has directioned some of its analytical focus onto the idiosyncrasies of human behavior, even brooking departures from its traditionally staid assumptions of rationality.

Among the most important and fascinating facets of human behavior are the ways in which people process information. It seems almost self-evident that we cannot understand human behavior without some understanding of the complex ways in which thought and information influence behavior. Considerable work has been done in this vein. For instance, Ariely, Loewenstein, and Prelec (2003) find that the process by which individuals make valuations of a product is influenced by arbitrary “anchors,” rather than being a purely rational response to information about a fundamental value of the product. In another instance, Ariely (2000) finds that the level of control consumers have over the information flow they receive can influence the behaviors they enact on the basis of the information.

Cognitive dissonance, the aspect of information processing I choose to develop in this paper, has received an extensive and empirically compelling treatment in the psychology literature. Festinger (1957) first develops the theory of cognitive dissonance and presents the first experimental evidence. In his 1957 seminal work, Festinger examines evidence that people reinforce their beliefs by processing information selectively. Festinger finds that individuals who have already purchased bets give their horses higher odds than those who are standing in line at the betting window. In another instance, women were asked to rate various kitchen appliances. When told that they were being awarded specific appliances, which were covered but placed next to them, the women rated these appliances higher. Festinger contends that the women rated these appliances relatively higher because they viewed themselves as discerning individuals who would not use unworthy appliances. Festinger conjectures that humans act to reduce cognitive dissonance, their unease about holding conflicting beliefs or actions. Often, this translates into a selective processing of information.

The overarching proposition of this paper is that the ways in which people process information is sometimes inextricably linked to their choices
of identity and with their resultant behaviors. Based on this premise, I develop a relevant framework that extends the identity model set forth by Akerlof and Kranton (2000). Finally, I develop an application of this model to the economics of political campaign media, where identities are relatively clear-cut and the role of information is salient.

Finally, the importance of informational processes in the political election process has been addressed by works such as Besley et al. (2002) and Coate (2001). The model will suggest an explanation to empirical findings such as the tendency of incumbent senators to win and face weaker opponents (Gowrisankaran, Mitchell, and Moro (2004)) and the findings of Lau and Pomper (2001)'s survey of hypotheses to explain negative campaigning. I then present empirical evidence of the model and offer policy prescriptions based on its predictions.

A General Model of Identity and Information

Modeling Identity

In the Robbers Cave experiment, two groups of boys were separated during summer camp in Oklahoma. When the groups were brought together for a tournament, the result was fighting and stereotyping. A number of similar experiments demonstrate that simple, random labels are enough to cause individuals to hold those with the same labels in higher esteem and to tend to reward them more often, even if the action is anonymous and does not impact the individual’s payoff in any way.

In their article published in the Quarterly Journal of Economics (2000), Akerlof and Kranton use instances such as these to motivate and develop a very general yet powerful model of identity and then demonstrate a number of compelling applications. For instance, Akerlof and Kranton apply their model to explain why poverty initiatives, such as Jobs Corps, that take individuals out of communities have higher success rates than similar programs such as JOBSTART that do not provide residence. In another instance, the authors (2003) use a model of identity to explain why schools with similar resources can have very disparate educational outcomes.

In general, the authors delineate four avenues by which the model of identity expands economic analysis. The first is that identity can cast light on behavior that seems ‘destructive’ or detrimental, such as self-mutilation or acts of group association such as branding. Second, the behavior of others can result in externalities rooted in identity. An instance of this might be the “injury” one receives from insult. Third, identity allows for preferences to be
changed. Finally, the authors posit that modeling identity as an economic choice captures the central role that identity plays in economic well-being.

The Akerlof & Kranton Model of Identity

We now take a closer look at the actual model of identity proposed by Akerlof and Kranton (2000). The basic premise of their model is that there exists a set $C$ of social categories, each of which is associated with a set of prescriptions. In particular, the prescriptions $P$ describe the actions and characteristics that are viewed as ideal or fitting for each social category. The quintessential instance takes as its set of social categories the two gender categories, “male” and “female.” The respective prescriptions may include muscular/thin and the relative codes of dress. To extend the example, an individual may derive a disutility insofar as he fails to conform to the prescriptions of his category. In some cases, an individual may receive a disutility insofar as he perceives that other individuals do not conform to the prescriptions of their assigned categories. Furthermore, the relative status of the individual’s social category may also affect his utility.

To capture these ideas, the authors propose the following utility function:

$$ U_j = U_j(a_j, a_{-j}, I_j) $$

The utility of an individual $j$ depends on his own actions $a_j$, the actions of others $a_{-j}$, and his identity $I_j$. It is worth noting here that consumption and externalities, the traditional economic determinants of utility, are captured via the inclusion of $a_j$ and $a_{-j}$.

Finally, the identity $I_j$ is modeled as follows:

$$ I_j = I_j(a_j, a_{-j}; c_j, \epsilon_j, P) $$

Here, the vector $c_j$ describes $j$’s assignment of people to the relevant social categories of $C$, and $\epsilon_j$ represents the characteristics of individual $j$. It is made clear that identity is a function of several dimensions: (1) the assignment $c_j$ of $j$ and other individuals to social categories, and the social status of these categories as perceived by $j$; (2) the disparity between the prescribed characteristics in $P$ associated with $j$’s social category and his actual characteristics $\epsilon_j$; (3) the disparity between prescribed behaviors in $P$ and the actions both of the individual ($a_j$) and of others ($a_{-j}$). Akerlof and Kranton term the increases or decreases that derive from $I_j$ as the gains or losses in identity.
We briefly describe various instances of gains or losses in identity. For instance, let us consider an older man going back to school. This man may feel uncomfortable about the fact that his characteristics do not fit the prescriptions of a student. Perhaps his sister is slightly embarrassed by the action he is taking that goes against prescribed actions for a man his age. These are all encompassed by the gains or losses in identity as defined above.

The Modified Model of Identity: The Role of Information

We now propose an extension to the Identity Model presented by Akerlof and Kranton. In particular, we claim that an individual’s beliefs can have a significant influence on behavior, where we define beliefs to be the set of prescriptions derived from the stock of information goods consumed and furthermore accepted by the individual. For instance, Festinger (1957) studied the reaction of doomsday cult members to news that the world had not ended. In particular, members who had been in the cult for a longer period of time had a greater tendency to reject this news — attesting to the influence of beliefs, formed through prior informational processes, on behavior. Thus we propose the addition of a beliefs dimension to the concept of identity.

We use the following general-form utility function, drawing largely on the previous model of Akerlof and Kranton:

\[
U_j = U_j(a_j, a_{-j}, I_j)
\]

\[
I_j = I_j(a_j, a_{-j}; c_j, \epsilon_j, B_j, P)
\]

\[
B_j = B_j(J_j)
\]

Here, \(B_j\) represents \(j\)'s beliefs, while \(J_j\) represents the accumulated stock of information goods accepted by \(j\).

Under this modification, the identity \(I_j\) is a function of: (1) the assignment \(c_j\) of \(j\) and other individuals to social categories, and the social status of each of these categories; (2) the dissonance between \(P\), the prescribed characteristics and actions associated with the individual’s social category, and the prescriptions of his beliefs, \(B_j\); (3) the disparity between the prescriptions of his beliefs and his own characteristics \(\epsilon_j\); and (4) the disparity between the prescriptions of his beliefs and the actions of both himself \((a_j)\) and others \((a_{-j})\).
In particular, the modification inserts the extra layer of “beliefs” between the social prescriptions faced by the individual and his characteristics and actions. We note that this modification is subtle yet significantly alters the Akerlof-Kranton analysis. It is certainly an outgrowth of the earlier functional form, since \( J_j \), the stock of information goods consumed and accepted by the individual, is a direct result of decisions to consume and discriminate and thus a dimension of \( a_j \). However, the new model differs crucially in its assessment of the gains and losses in identity.

When we allow discounting, or the selective rejection of consumed information goods, as a choice for the individual, we see that identity may induce behavior reflective of the theory of cognitive dissonance. Mirroring this theory, our individual is also motivated to reduce the disparities between actions, characteristics, beliefs, and social norms.

Finally, we address the claim that the individual’s beliefs may be shaped by the beliefs of others around the individual by treating this as a special case of the production and consumption of information goods.

**Modeling the Economics of Political Campaign Media**

Political campaigns have long been dependent on campaign media. In the age of mass media and beyond, advertising has become the staple of any modern campaign to seek elected office. Indeed, we live in an era in which candidates and parties amass enormous war chests of contributions to facilitate election advertising. According to the Federal Election Commission, the two major party presidential candidates of 2004, George W. Bush and John Kerry, raised $367 and $298 million respectively to fund their efforts. Total related financial activity was estimated at well over $1 billion. In contrast, the largest sum raised in the 1996 election was the $45 million gathered by candidate Bob Dole. Even in the Congressional races, overall spending has steadily risen to impressive levels.

Concomitant with these significant increases in spending has been growing consternation with issues such as campaign finance and manipulation of the media. Concerns have been expressed on the possibly bleak consequences of gross imbalances in funding, and worried outlooks abound on the presence of negativity and mudslinging in advertisements. Empirical studies suggest that some of these concerns may be warranted, as negative campaigning is associated with lower voter turnout and negative views of politicians.
The policy goals here are often ill-defined and controversial. For instance, superior funding may simply reflect real social needs and support, while negativity may play a role in exposing the legitimate weaknesses of candidates. On the other hand, it may be reasonable or even imperative to prevent misinformation and limit the moneyed influences of special interests insofar as it is feasible.

In the following analysis of political campaign media, we focus on the identity-based process that drives the consumer-voter’s decision to consume information selectively and then ultimately cast a vote on this basis. We model the behavior of parties in response to this selective consumer-voter, and make predictions based on the assumption that parties will take cognitive dissonance behaviors into account when campaigning. Finally, we look for empirical evidence of this behavior by parties in US Senate elections and discuss ways to minimize attempts by parties to induce dissonance and the discounting of information by voters.

The Model of the Consumer-Voter

Incorporating the role of beliefs via our modified theory of identity, we propose the following model of the individual consumer-voter’s utility. Following Akerlof and Kranton (2000), we first designate a set of social categories $C = \{G, R\}$ — G and R may be thought of as Green and Red, representing non-overlapping membership in two different political parties or some other politically-charged dichotomy of social categories. Furthermore, let the prescriptions $P$ specify the ideal behaviors, characteristics, and beliefs

<table>
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<th>Year</th>
<th>Raised</th>
<th>Spent</th>
<th>No. of Candidates</th>
</tr>
</thead>
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<tr>
<td>1999-2000</td>
<td>$1,047.3M</td>
<td>$1,005.6M</td>
<td>2416</td>
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<tr>
<td>1997-1998</td>
<td>$781.3M</td>
<td>$740.4M</td>
<td>2100</td>
</tr>
<tr>
<td>1995-1996</td>
<td>$790.5M</td>
<td>$765.3M</td>
<td>2416</td>
</tr>
<tr>
<td>1993-1994</td>
<td>$740.5M</td>
<td>$725.2M</td>
<td>2376</td>
</tr>
<tr>
<td>1991-1992</td>
<td>$659.3M</td>
<td>$680.2M</td>
<td>2950</td>
</tr>
<tr>
<td>1989-1990</td>
<td>$471.7M</td>
<td>$446.3M</td>
<td>1759</td>
</tr>
<tr>
<td>1987-1988</td>
<td>$477.6M</td>
<td>$459.0M</td>
<td>1792</td>
</tr>
<tr>
<td>1985-1986</td>
<td>$472.0M</td>
<td>$450.9M</td>
<td>1873</td>
</tr>
<tr>
<td>1983-1984</td>
<td>$397.2M</td>
<td>$374.1M</td>
<td>2036</td>
</tr>
<tr>
<td>1981-1982</td>
<td>$354.7M</td>
<td>$342.4M</td>
<td>2240</td>
</tr>
</tbody>
</table>

Source: The Federal Election Commission
expected of each category in C. It is reasonable to expect that these include
the action of voting for an election outcome associated with G ($V_j = G$) or
with R ($V_j = R$), where the voting action $V_j$ is in $j$’s vector of actions $a_j$.

In our simple model, we will assume that all media goods are bundled
with information goods at no additional cost to the consumer, and that
no information goods are otherwise produced or consumed. Furthermore,
assume that only two types of information goods can be produced, those
that favor the prescriptions of G and those that favor the prescriptions of R.
We will assume that all individuals choose membership in G or R and do so
rationally to maximize expected utility. Membership is mutually exclusive
but flexible, thus an individual may choose to ‘switch’ his social category as
his beliefs change from his consumption of information goods. Furthermore,
we will assume that an individual cannot select the information goods to
which he is exposed while consuming media goods. However, the individual
may choose to reject the content of consumed information goods.

In total, the individual does have three choices: the consumption of
media goods, the choice of voting (and for whom), and the ability to discount
or selectively reject some of the information goods consumed.

For an individual $j$, we model his cumulative stock of accepted informa-
tion goods as a stochastic process given consumption of media goods $m$ in
the following form:

$$J_j(m) = \sum_{i=1}^{m} \xi_j(i)\beta_j(i)$$

In the above expression, $\xi_j$ describes the information that the individual
is exposed to by his consumption of the marginal media good, while $\beta_j$
informs us of whether the individual chooses to dismiss or accept its content.
Exposure $\xi_j(i) = 1$ if the $i$th media good prescribes G, and $\xi_i = -1$ if
the $i$th media good prescribes R. The acceptance variable $\beta_j(i) = 1$ if the
information good is accepted, and $\beta_i = 0$ if the individual chooses to reject
it. Thus $J_j$ takes on positive and negative values to indicate the prescriptive
leanings of $j$’s stock of accepted information goods.

Because we have assumed that individuals cannot consume media goods
discriminately, the probability that a media good consumed by an individual
will prescribe G is simply given by the proportion of total campaign media
expenditures incurred by party G. Thus, taking $e_m^G$ and $e_m^R$ as the expendi-
tures on media by G and R respectively, $\xi_j(i)$ is modeled as follows for all $i$
(independently):

$$\lambda = \frac{e_m^G}{e_m^G + e_m^R}$$
\[
\begin{align*}
\Pr\{\xi_j(i) = 1\} &= \lambda \\
\Pr\{\xi_j(i) = -1\} &= 1 - \lambda
\end{align*}
\]

We will allow individuals to choose to discount information goods that do not conform with their currently espoused social category. Thus the acceptance variable \(\beta_j\) is conditional on both the social category of the individual and the prescriptive bent of the information good consumed. We model the random variable \(\beta_j(i)\) as follows, for all \(i\):

\[
\begin{align*}
\Pr\{\beta_j(i) = 1\} &= 1 - \delta 1\{c_j(j)(i) = G\} \cap \{\xi_j(i) = -1\} - \delta 1\{c_j(j)(i) = R\} \cap \{\xi_j(i) = 1\} \\
&= \begin{cases} 
1 & \text{if prescription of } \xi_j(i) \text{ matches } c_j(j)'s \\
1 - \delta & \text{if prescription of } \xi_j(i) \text{ does not match } c_j(j)'s
\end{cases}
\end{align*}
\]

\[
\begin{align*}
\Pr\{\beta_j(i) = 0\} &= \delta 1\{c_j(j)(i) = G\} \cap \{\xi_j(i) = -1\} + \delta 1\{c_j(j)(i) = R\} \cap \{\xi_j(i) = 1\} \\
&= \begin{cases} 
0 & \text{if prescription of } \xi_j(i) \text{ matches } c_j(j)'s \\
\delta & \text{if prescription of } \xi_j(i) \text{ does not match } c_j(j)'s
\end{cases}
\end{align*}
\]

\(\delta \in (0, 1)\)

Here, an indicator variable \(1\{A\} = 1\) if \(A\) is true, and 0 otherwise. \(\delta\) represents the discount rate on information practiced by members of category G with respect to information goods prescribing R and by members of category R on goods prescribing G. Finally, we note that \(c_j(j)\) is not constant. Hence the relevant probabilities may change for an individual \(j\) as \(j\) consumes goods and assumes different social categories. Thus we index \(c_j(j)\) by \(i\) as well.

Finally, we describe a utility function that incorporates this informational process in our modified model of identity. Specifically, \(j\)'s utility is affected by the deviation of his belief prescriptions from his social category prescriptions, and by the deviation of his actions — voting in this case — from his belief prescriptions. The first effect is captured by a term decreasing utility commensurate to the degree that the cumulative stock of accepted information goods prescribes the other social category. The second effect figures in a term that decreases utility from not voting as prescribed by the individual's beliefs, which are commensurate to the cumulative stock.
of accepted information goods that prescribe the individual’s chosen social category. Thus we define the utility function $U_j(m, c_j(j), V_j)$ as follows:

$$U_j(m, c_j(j) = G, V_j) = W(m) - I^G_{\text{belief}}(-J_j(m))1_{\{-J_j(m) > 0\}} - I^G_{\text{action}}J_j(m)1_{\{V_j = G\}^C1_{\{-J_j(m) > 0\}}}$$

$$U_j(m, c_j(j) = R, V_j) = W(m) - I^R_{\text{belief}}J_j(m)1_{\{-J_j(m) > 0\}} - I^R_{\text{action}}(-J_j(m))1_{\{V_j = R\}^C1_{\{-J_j(m) > 0\}}}$$

In the above, $\{V_j = G\}^C$ denotes the complement of $\{V_j = G\}$, which is the case where the individual either votes R or refrains from voting. ($\{V_j = R\}^C$ is analogous in meaning.) Also remember that $J_j(m) > 0$ indicates that the cumulative stock of accepted information goods favors the prescriptions of G, while $-J_j(m) > 0$ indicates that it is weighted towards R. $W(m)$ is the non-identity utility derived from the consumption of media goods $m$. As earlier, the individual has a choice between social categories through $c_j(j)$, and we have separated the respective utilities here for simplicity. The individual will also maximize utility along this dimension. As outlined above, the two identity effects are present for each social category. For instance, the coefficient $I^G_{\text{belief}}$ weights the disparity between prescriptions and beliefs for an individual in social category G, and the coefficient $I^G_{\text{action}}$ weights the disparity between the actions and beliefs for an individual in social category G.

It is worth noting here that our utility function wholly ignores the expected pecuniary payoff from the act of voting (the pecuniary payoff from experiencing the desired election result rather than the other result, multiplied by the probability of being the decisive voter). This payoff is extremely small in large elections, and we choose to ignore it here. The interested reader can find a treatment of this payoff in McKelvey and Patty (1999).

**The Model of the Election and Party Behavior**

For the purposes of our analysis, we choose to view the political party as a body that maximizes its future stream of political contributions. Much like the economic treatment of government agencies, we will view the political party as maximizing its own influence rather than profit.

Building on this premise of political motivation, we propose a game theoretic approach to party behavior and make the following assumptions. We assume that future contributions to a party are proportional to the
share of the vote received by the party in the election today. Further, we will assume that the party influences the election through two factors: (1) the funds spent on the production of information goods, and (2) the amount of dissonance-inducing behavior and messages present in the media goods. In our model, we will further assume that the amount of present campaign funds is exogenously determined, and that each party will then choose to spend all present funds to maximize future contributions. The second factor comes from the idea that candidates choose the relevant content and issues of the campaign.

Defining Election Results

Before exploring the behavior of parties, we must define a model of the election that gives cogent election results to which the outlined payoff concepts can be applied. *Election results* are constructed in the following manner:

1. The the voting choice of each individual is modeled as a stochastic process, wherein the individual chooses at each point in time to either consume an additional unit of media goods or to vote (as well as which social category to espouse). Each individual has the utility function described earlier and faces a cost of voting $C_{\text{vote}}$ and a cost of media consumption $C_{\text{media}}$. The cost of voting is the cost of commitment to the social category, including the risk of future losses in identity due to changes in beliefs or even due to eventual changes in the prescriptions associated with the social category. In addition, political activity in general can be costly. The cost of media consumption is simply the opportunity cost of consumption — the value of the time spent consuming these goods. In particular, the pecuniary cost of media consumption is assumed to be relatively trivial. At each point in time, the individual makes his decision by maximizing his expected marginal utility over (marginal) cost.

2. We first claim that given the production choices of the parties and a discount factor, the individual’s probability of not voting converges to zero as time goes to infinity. The individual’s respective probabilities of voting G or R also converge to real values in $[0,1]$ (say, to values X and Y).

3. Given a population of such individuals, the law of large numbers assures us that the fraction of the populace voting for G and R converge to X and Y as the population goes to infinity and individuals are given as much time as needed to vote.
Figure 1: The decision to vote G or R is captured by the stochastic process $J_j(m)$ as illustrated here. The thresholds A and B are the thresholds of consumption (of information goods) at which the voter-consumer will decide to vote G and R, respectively. The election result X is the probability of $J_j(m)$ hitting A before B, while Y is the probability of hitting B before A. For further details on these probabilities and for a delineation of the relevant thresholds A and B, please refer to Appendix A.

4. We take the values X and Y to be the election results for parties G and R respectively. We justify this based on the consistency criterion of sorts that we have outlined in these steps.

**Game-Theoretic Predictions**

Finally, we discuss a little further the role of dissonance-inducing behavior in this game. Each party plays a level of dissonance-inducing behavior, essentially choosing a discount factor $\delta \in (0,1)$. The higher of the two discount factors played by the parties will be the discount factor applied
to the consumer-voters in the election results determining the payoffs to the parties. This is based on the logic that if one campaign focuses on controversial issues or engages heavily in negative campaigning, the other campaign is forced to address these issues and voters are likely to become more polarized in their views. Furthermore, we can attach a cost to playing higher discount factors, since we claim that more extreme views or negative campaign ads are likely to reduce future contributions via an increase in the costs of political activity. Indeed, Ansolabehere et. al. (1994) show that higher levels of negative campaigning are associated with decreased voter turnout.

The game we have outlined yields two important predictions (see Appendix A for the analysis yielding these predictions). The first is that parties with relatively less campaign funds are more likely to engage in dissonance-inducing behavior. The second, and more policy-relevant, prediction is that lower opportunity costs of media consumption will reduce the incentives for dissonance-inducing behavior.

We focus on the second prediction, since it will serve as the basis for our claims that increasing consumer control over media and increasing media accessibility may reduce the amount of cognitive dissonance that we see in elections. Insofar as we believe that information should not be unduly dismissed, this may be a desirable policy goal.

The Empirical Case

With these empirical predictions, I present an empirical case for the model of information and identity as we have applied it to campaign media. To reiterate, our application of the model of identity predicts: (1) that the parties with lower shares of total campaign funds will engage in higher amounts of dissonance-inducing behavior, and (2) that lower opportunity costs of media consumption will result in reduced amounts of dissonance-inducing behavior. I present empirical results that focus on negative campaigning and then suggest further directions for research.

Negative Campaigning

In the political science literature, a distinction is drawn between positive and negative campaigning. Positive campaigning encompasses those messages which focus on the candidate’s own programs, proposals, qualifications, and so forth. Negative campaigning focuses on the opponent candidate, often emphasizing deficiencies with the intent of bringing about the rejection of the
opponent’s messages. Thus we classify the majority of negative campaigning as dissonance-inducing, and seek to test our previously outlined predictions.

Much of the data we use is drawn from an updated data set that was compiled by Lau and Pomper (2001) and that is made available by the authors online. In this data set, the authors examine US Senate elections in the years from 1992 to 2002 and in particular complete the task of coding the content of the campaigns carried out by each candidate. For each election, Lau and Pomper examine all the newspaper and magazine stories of the last eight weeks of each campaign that are available in the Lexis/Nexis database. If there were more than five articles from any given week, the authors restricted their selection to regional articles and then randomly selected five, thus generating a maximum of forty articles per campaign. Following guidelines established by Franklin (1992), Lau and Pomper code each statement by a candidate or campaign as positive or negative and derive the percentage of negative statements as a measure of negativity.

Although focused codings of television advertising may yield more strictly quantitative measures for the purposes of testing our predictions, recent political science literature, including Ansolabehere et al. (1994) and Franklin (1991), consider the newspaper codings to be a more comprehensive measure of negativity in campaigns, since they include the coverage of speeches and interviews by political experts. We make use of data generated by this coding in this study and leave the discussion of other possible codings to our later section on suggested further research.

Lau and Pomper’s data set provides us with the coded measures of negativity, the relative campaign funds, and the incumbency status for the major party candidates of 192 Senate elections from 1992 to 2002, giving us a total of 384 candidates as observations. (A small fraction of original observations lack one or more of the requisite data and are omitted.) To these data, we add a proxy for the opportunity costs of media consumption — the average real annual wages across the election state. We take these to be the finalized average annual wages for the state divided by the national CPI index for the corresponding year. Both figures are available online from the Bureau of Labor Statistics.

Results

We now present our empirical results and conclusions. A simple regression is run with our measure of negativity as the dependent variable. The included explanatory variables are the relative share of campaign funding, average real annual wages across the state, and dummies for party and in-
<table>
<thead>
<tr>
<th>Year</th>
<th>Sample Size (n)</th>
<th>Negative Campaigning</th>
<th>Relative Campaign Spending</th>
<th>State Average Annual Pay</th>
<th>Incumbent</th>
<th>CPI</th>
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<td>1992</td>
<td>68</td>
<td>38.11%</td>
<td>17.24%</td>
<td>$24160.88</td>
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<td></td>
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<td>1994</td>
<td>66</td>
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<td>18.10%</td>
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<td>62</td>
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<td>20.89%</td>
<td>$29442.84</td>
<td>41.94%</td>
<td>163.0</td>
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<tr>
<td>2000</td>
<td>64</td>
<td>31.27%</td>
<td>16.20%</td>
<td>$33162.59</td>
<td>40.63%</td>
<td>172.2</td>
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<tr>
<td>2002</td>
<td>58</td>
<td>32.64%</td>
<td>14.88%</td>
<td>$32705.14</td>
<td>37.93%</td>
<td>179.9</td>
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</table>
Table 3: The OLS Regression of Negative Campaigning (%) in the 1992-2002 Senate Races Explained by Relative Spending and Real Wages

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>Std.Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Campaign Spending (%)</td>
<td>-0.133***</td>
<td>0.039</td>
</tr>
<tr>
<td>State Average Annual Real Wages (Nominal/CPI)</td>
<td>0.098***</td>
<td>0.030</td>
</tr>
<tr>
<td>Incumbent</td>
<td>-5.695*</td>
<td>2.223</td>
</tr>
<tr>
<td>Party (Democratic)</td>
<td>-4.506**</td>
<td>1.616</td>
</tr>
<tr>
<td>1992 Dummy</td>
<td>6.336*</td>
<td>2.837</td>
</tr>
<tr>
<td>1994 Dummy</td>
<td>12.118***</td>
<td>2.854</td>
</tr>
<tr>
<td>1996 Dummy</td>
<td>7.225*</td>
<td>2.879</td>
</tr>
<tr>
<td>1998 Dummy</td>
<td>1.110</td>
<td>2.885</td>
</tr>
<tr>
<td>2000 Dummy</td>
<td>-2.278</td>
<td>2.881</td>
</tr>
<tr>
<td>Constant</td>
<td>25.882***</td>
<td>6.105</td>
</tr>
</tbody>
</table>

n 384
Adjusted R^2 0.190

*p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001.

cumbency status. These dummies are included since they may have an effect on the dependent variable that is not independent of the relative share of campaign funding. Another reason to control for the effect of incumbency is that our model assumes all information goods are consumed during the election process whereas an incumbent may already be well-known prior to the election process. We also include year dummies to control for time trends.

From the results of our empirical analysis, we see that the data strongly corroborates the predictions of our model. In a number of ways, this expands the interpretations of negativity in the political science literature. Lau and Pomper (2001) find a similar negative correlation between negativity and relative campaign funding. Their interpretation of this finding is based on previous political science literature, including Pfau and Kenski (1990), Johnson-Cartee and Copeland (1991), and Jamieson (1992):

“Since negative campaigning is generally believed to be a very efficient way to win votes, candidates with relatively fewer campaign resources than their opponents, who need to get more ‘bang for their buck’, will be more likely to engage in negative campaigning.”

However, the economist is wont to ask why all candidates would not seek to maximize the ‘bang for their buck’, and Lau and Pomper leave this issue unaddressed. Other political science literature, including Guskind and Hagstrom (1988), Tinkham and Weaver-Lariscy (1995), and Hale et al.
seek to explain the empirical result that incumbents engage in less negativity with the claim that challengers are more willing to absorb the risks of negative campaigning. It appears that the political science literature has come to the conclusion that negative campaigning is analogous to an asset bearing higher returns but also characterized by significantly higher risks. Even with this unexplained conclusion, this theory of negative campaigning cannot fully explain the behavior we observe. In particular, Lau and Pomper cannot explain their result that the closeness of the race appears to have no significant effect on the amount of negative campaigning, contrary to their expectations.

By approaching the issue of negative campaigning from a model of identity, we are able to explain the behavior we see with a game-theoretic analysis. The results are congruent with the behavior we expect from parties seeking to maximize their share of election results with a cost to dissonance-inducing behavior. Our model predicts that relative paucity of campaign funds will result in higher levels of negativity in a campaign, on grounds that are less suspect from the economist’s point of view.

Finally, our model yields a prediction that has possible ramifications for policy-making. The empirical results support our claim that lower opportunity costs to the consumption of information result in reduced incentives to engage in negative campaigning or other dissonance-inducing behavior.

If we adopt the stance that it is desirable for individuals to weigh information without bias as far as this can be achieved without intrusion, we may wish to encourage policies that lower the relative costs of consuming information. The growth of new media technologies, for instance, affords consumers more control and choice over their consumption of information goods. This essentially allows consumers to receive a higher density of relevant information good per media good and effectively reduces the opportunity cost of consuming information goods relevant to their voting choices. In fact, by affording consumers more choice and control over information goods, the growth of the Internet as a medium and the deregulation of broadcast media may have played a role in the time trend drop in negativity that we see in our regression results over the last decade. Future research is needed to find evidence of such gains and to ascertain the magnitude of these gains if they should exist.
Conclusion

This paper considers the role of information and beliefs in influencing the behavior that decides economic outcomes. We expand on Akerlof and Kranton’s conception of identity with the addition of a beliefs construct that can have significant ramifications on the gains and losses from identity. This provides us with a framework with which to understand the ways in which the consumption of information can influence the decisions of individuals concerning who they are and ultimately how they behave.

This is the case in our treatment of political campaign media, where we claim that the influence of information on the gains and losses from identity of voter-consumers figures significantly in the behaviors of the campaigns that produce the information goods. This treatment gives us a plausible explanation for some of the myriad campaign behaviors that we observe but could not fully explain with the current political science literature.

Along with intimations that lowering the costs of information access and encouraging technology may reduce attempts by campaigns to induce voters to reject information, the simple model of information and identity opens up political campaign media for many avenues of further research. As described earlier, it may behoove us to study the effect of evolving media technologies and of increased consumer control over media on dissonance-inducing campaign media. A related endeavor would be the task of developing a model to ascertain the welfare costs of dissonance-inducing behavior by campaign media. Finally, a relatively simpler bit of further research would be to adopt other measures of dissonance-inducing behavior, such as ones that focus solely on television advertisements or other media, and carry out an empirical study similar to this study. One possibility may be to code television advertisements based on the frequency of a certain set of keywords, which may hinge on the polarizing (and thus dissonance-inducing) effects of addressing certain divisive issues, such as abortion.

Outside of the topic of campaign media, economic analyses that tie identity with information may offer explanations for phenomena in many other areas. These include the study of organizations and education — areas in which an individual’s identity may figure prominently in their willingness to accept information. Models relating identity and information may also be relevant to explanations of advertising and patterns of consumption — areas in which beliefs and the past consumption of information can change the utility preferences of individuals. They may also be applicable to the rule of law — the informational process by which the application of laws generates incentives for behavior — and other areas where the formation of
incentives depends on the consumption of information. Finally, basic behavioral tendencies such as cognitive dissonance can be explained to some degree by this approach. Recognizing the interaction between identity and information allows us to apply economic analysis in new ways and to new fields, hopefully to pursue better outcomes to behaviors better explained.
Appendix A: Mathematical Notes on the Model

We now provide some mathematical material to detail the results we have used but only outlined earlier for the sake of clarity. In particular, we detail the process of constructing election results from the utility function of the individual and demonstrate its convergent behavior. We also briefly present the computational results that yield our predictions and outline a number of additional assumptions that simplify our results but were omitted from the main body of the paper.

Constructing Election Results

We begin by describing the voting choice of the individual. Recall that the utility function \( U_j(m, c_j(j), V_j) \) was defined as follows:

\[
U_j(m, c_j(j) = G, V_j) = W(m) - I_{\text{belief}}^G J_j(m) \mathbf{1}_{-J_j(m) > 0} - I_{\text{action}}^G J_j(m) \mathbf{1}_{V_j = G} \mathbf{1}_{J_j(m) > 0}
\]

\[
U_j(m, c_j(j) = R, V_j) = W(m) - I_{\text{belief}}^R J_j(m) \mathbf{1}_{J_j(m) > 0} - I_{\text{action}}^R J_j(m) \mathbf{1}_{V_j = R} \mathbf{1}_{-J_j(m) > 0}
\]

Let us further assume that when an individual consumes a political information good, his marginal change in utility is impacted more significantly by the actual content of the information good than by the marginal effect of this content on his behavioral prescriptions. Specifically in this case, we would be claiming that an individual would find the consumption of an opposing information good more distasteful than the small additional disutility received from consuming an agreeable information good but persisting in not voting. We express this assumption as the condition:

\[
I_{\text{belief}}^R > I_{\text{action}}^S \text{ for any } R, S \in C
\]

With this condition and the utility above, we quickly see that any individual with a stock of accepted information leaning towards category G \((J_j > 0)\) will choose to espouse social category G to maximize expected utility. Likewise, any individual with a stock of accepted information goods that are weighted towards category R \((J_j < 0)\) will choose to espouse social category R.

This allows us to model the decision to vote around the stochastic process \( J_j(m) \). In the region \( J_j(m) > 0 \), we have a random walk with the probabilities of moving up or down defined by the selective information consumption...
of a social category G individual. Likewise, in the region $J_j(m) < 0$, the process follows the selective information consumption of a social category R individual. To complete this model, we need to describe the behavior of the individual at $J_j(m) = 0$ and determine the thresholds at which the individual is compelled to vote.

![Diagram](image-url)

Figure 2: The decision to vote G or R is captured by the stochastic process $J_j(m)$ as illustrated here. The thresholds A and B are the thresholds of consumption (of information goods) at which the voter-consumer will decide to vote G and R, respectively.

We now find the relevant threshold for the social category G individual $j$. This threshold A is the point at which the individual’s expected utility from voting per unit cost of voting exceeds the expected utility from an additional media good (and its associated information good) per unit cost of the media good. The expected utility from an additional media good over
its cost is:

\[
\frac{\mathbb{E} \left[ \frac{\partial U_j(m, c_j(j) = G, V_j = G)}{\partial m} \right]}{C_{\text{media}}} = \frac{\frac{\partial W}{\partial m} - I_{\text{action}}^G \mathbb{E} \left[ \frac{\partial J_j(m)}{\partial m} \right] | c_j(j) = G}{C_{\text{media}}} = \frac{\frac{\partial W}{\partial m} - I_{\text{action}}^G \mathbb{E} [\xi_j(m) \beta_j(m) | c_j(j) = G]}{C_{\text{media}}} = \frac{\frac{\partial W}{\partial m} - I_{\text{action}}^G (\lambda - (1 - \delta)(1 - \lambda))}{C_{\text{media}}}
\]

The individual’s expected utility from voting over the cost of voting is:

\[
\frac{\mathbb{E}[U_j(m, c_j(j) = G, V_j = G) - U_j(m, c_j(j) = G, V_j \neq G)]}{C_{\text{vote}}} = \frac{I_{\text{action}}^G J_j(m)}{C_{\text{vote}}}
\]

Then by the threshold condition described above, we find that the social category G individual j will vote G if and only if:

\[
J_j(m) \geq \frac{\frac{\partial W}{\partial m} - I_{\text{action}}^G (\lambda - (1 - \delta)(1 - \lambda))}{I_{\text{action}}^G} C_{\text{vote}} = A
\]

An analogous process yields a threshold B for the social category R individual j to vote R, if and only if:

\[
J_j(m) \leq -\frac{\frac{\partial W}{\partial m} - I_{\text{action}}^R ((1 - \delta) \lambda - (1 - \lambda))}{I_{\text{action}}^R} C_{\text{vote}} = -B
\]

Finally, we assume that an individual at \( J_j(m) = 0 \) will not espouse either social category and will therefore consume his next unit of media without discounting.

With the details provided above, we can find the probabilities over an infinite time frame that the stochastic process \( J_j(m) \) will hit the threshold A before -B and vice versa. We note that each individual begins with \( J_j(0) = 0 \), at which point they will consume a media good and accept the associated information good. With some algebraic manipulation of probabilities, we
find:

\[
\Pr\{j \text{ votes } G\} = \Pr\{J_j \text{ hits } A \text{ before } -B \mid J_j \text{ begins at } 0\} = \frac{\lambda P_1^{A,0}}{1 - \lambda P_1^{0,A} - (1 - \lambda)P_{-1}^{0,-B}} = \frac{\lambda P_1^{A,0}}{\lambda P_1^{A,0} + (1 - \lambda)P_{-1}^{-B,0}}
\]

In the above, the probability \( P_{c}^{a,b} = \Pr\{J_j \text{ hits } a \text{ before } b \mid J_j \text{ begins at } c\} \) for any values of a, b, and c. Likewise, we find that:

\[
\Pr\{j \text{ votes } R\} = \Pr\{J_j \text{ hits } -B \text{ before } A \mid J_j \text{ begins at } 0\} = \frac{(1 - \lambda)P_{-1}^{-B,0}}{\lambda P_1^{A,0} + (1 - \lambda)P_{-1}^{-B,0}}
\]

Now if we can ascertain real values for \( P_1^{A,0} \) and \( P_{-1}^{-B,0} \), we have found the election results X and Y to which the individual’s respective probabilities of voting G or R converge. We note that each probability deals with \( J_j \) in a region over which the discounting behavior of the individual is uniform. This uniform behavior allows us to derive each of these probabilities using standard methods of dealing with random walks. Here, we will use a simple first-step analysis, an outline of which can be found in most texts on stochastic modeling. Alternatively, one could transform the walk into a martingale and applying Doob’s optional stopping theorem. However, the result that we derive here is much simpler in form and is more readily applied to our model.

**Deriving the Predictions**

We first give the results of the first-step analysis. Then, due to the complexity of the resulting functions that describe the respective probabilities of voting G and R, we take a computational approach to deriving the predictions of the model.
By first step analysis, we derive the following values of $P_{1A.0}$ and $P_{-1B.0}$:

$$P_{1A.0} = \frac{1 - \delta(1 - \lambda) + \sqrt{(1 - \delta(1 - \lambda))^2 - 4\lambda(1 - \delta)(1 - \lambda)}}{(1 - \delta(1 - \lambda) + \sqrt{(1 - \delta(1 - \lambda))^2 - 4\lambda(1 - \delta)(1 - \lambda)})^A - (2\lambda)^A}$$

$$P_{-1B.0} = \frac{1 - \delta(1 - \lambda) + \sqrt{(1 - \delta(1 - \lambda))^2 - 4\lambda(1 - \delta)(1 - \lambda)}}{(1 - \delta(1 - \lambda) + \sqrt{(1 - \delta(1 - \lambda))^2 - 4\lambda(1 - \delta)(1 - \lambda)})^B - (2(1 - \lambda))^B}$$

Substituting these terms into the earlier expressions for $Pr\{j \text{ votes } G\}$ and $Pr\{j \text{ votes } R\}$ results in complex expressions. Furthermore, substituting the expressions for the thresholds A and B only exacerbates the difficulties of handling $Pr\{j \text{ votes } G\}$ and $Pr\{j \text{ votes } R\}$. Therefore, we use a computational approach in Mathematica to discern our predictions.

Let the party act to maximize its future stream of contributions $S = S_+ - S_-$, where $S_+$ is determined by the party’s election result and $S_-$ is determined by the strategy $\delta$ played by the party. We must delineate a function $S_-$ describing the cost of playing different values of $\delta$. As outlined earlier, this cost is incurred via losses to the future stream of contributions to the party. Since we have assumed that $S_+$ is proportional to the party’s election result, it is easiest to describe the cost of $\delta$ as a function $S_-(\delta)$ that maps to a negative impact in the election result space. In other words, we define the cost of $\delta$ in terms of an equivalent loss in election results. Then a party, if we momentarily ignore the strategic aspect of the game, would maximize its total future stream of contributions by playing the $\delta$ at which the marginal loss in equivalent election result is equal to the marginal gain to its actual election result:

$$\frac{\partial S_+}{\partial \delta} = \frac{\partial S_-}{\partial \delta}$$

In the following illustrative examples, we take as the marginal cost function of $\delta$:

$$\frac{\partial S_-}{\partial \delta}(\delta) = -0.1 + 0.45\delta + 0.1 \frac{C_{\text{vote}}}{C_{\text{media}}} \delta^2$$

23
There are several characteristics of this function worth noting. First, the party is not penalized for very low levels of dissonance-inducing behavior. Second, the last term assigns an increasing marginal cost to dissonance-inducing behavior, since more people are likely to withhold contributions at increasingly higher levels due to the higher costs of the behavior as a political commitment. In this particular function, this term is also proportional to the amount of media consumed, which we assume is inversely proportional to the relative cost of the media.

The Effect of Relatively Imbalanced Campaign Funding on Dissonance-Inducing Behavior

First, we examine the relationship between the relative imbalance of campaign funding and the amount of dissonance-inducing behavior predicted. In this example, we assign the values $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{2}$, $\frac{\partial W}{\partial m} = 3$, and $I^G_{\text{action}} = I^R_{\text{action}} = 1$.

Figures 3-8 present the graphs of $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ over $\delta$. Recall that each party would most prefer the outcome where these lines intersect. In each of the following cases, party G is the relatively underfunded party, and it is this party that dictates the level of $\delta$ that applies in our game scenario. In the Nash equilibrium, G will play the value $\delta = \delta^*$ at which its $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ intersect, while R’s best response is to play $\delta = 0$. By observing the points at which $\frac{\partial S^G}{\partial \delta} = \frac{\partial S^G}{\partial \delta}$, we see that parties with relatively less campaign funds are more likely to engage in higher amounts of dissonance-inducing behavior ($\delta$).

![Figure 3](image1.png) \hspace{1cm} ![Figure 4](image2.png)

Figure 3: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\lambda = \frac{49}{100}$

Figure 4: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\lambda = \frac{49}{100}$
The Effect of the Relative Price of Media Consumption on Dissonance-Inducing Behavior

The analysis of the effect of the relative price of media consumption on dissonance-inducing behavior is analogous to the approach taken in the previous section. We present two example cases here, the first with relatively balanced campaign funding and the second with relatively less balanced funding. Here again, party G determines the level of dissonance-inducing behavior that ultimately results. In the first instance (Figs. 9-14), we hold the values \( \lambda = \frac{49}{100}, \frac{\partial W}{\partial m} = 3, \) and \( I_{\text{action}}^G = I_{\text{action}}^R = 1. \) In the second (Figs. 15-20), we hold the values \( \lambda = \frac{1}{3}, \frac{\partial W}{\partial m} = 3, \) and \( I_{\text{action}}^G = I_{\text{action}}^R = 1. \) Again, observing the points at which \( \frac{\partial S_G}{\partial \delta} + \frac{\partial S_G}{\partial \delta} = \frac{\partial S_R}{\partial \delta} \), we see that lower relative prices of media consumption engender lower amounts of dissonance-inducing behavior (\( \delta \)).
Figure 9: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta} \frac{1}{2}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{4}$

Figure 10: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{4}$

Figure 11: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta} \frac{1}{8}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{8}$

Figure 12: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{8}$

Figure 13: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta} \frac{1}{15}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{15}$

Figure 14: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{15}$
Figure 15: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{2}$

Figure 16: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{2}$

Figure 17: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{4}$

Figure 18: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{4}$

Figure 19: $\frac{\partial S^G}{\partial \delta}$ and $\frac{\partial S^G}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{8}$

Figure 20: $\frac{\partial S^R}{\partial \delta}$ and $\frac{\partial S^R}{\partial \delta}$ graphed over $\delta \in (0,1)$: $\frac{C_{\text{media}}}{C_{\text{vote}}} = \frac{1}{8}$
Bibliography


