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ELECTORAL CONTRIBUTIONS AND THE COST OF UNPOPULARITY

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Electoral Contributions and the Cost of Unpopularity

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Abstract

When considering contributions to electoral campaigns in the U.S., the data reveals that total contributions within industries tend to vary significantly over time. To explain this evidence, we present a model in which interest groups finance politicians that require funding for campaign advertising in exchange for policy favors. Our model predicts that interest groups related to industries that experience a rise (decline) in popularity will reduce (increase) the amount of resources devoted to campaign financing. Intuitively, an industry that suffers from a loss of popularity will face greater costs of obtaining policy favors, since it must provide candidates with greater contributions for campaign advertising, in order to compensate for its decline in reputation. The empirical analysis, based on U.S. House elections between 2000 and 2004, strongly supports this finding.

Keywords: Campaign Finance; Interest Groups; Elections;Popularity

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1 Introduction

Does the popularity of interest groups matter in electoral campaigns or are candidates the only ones who should care about their reputation? According to Kroszner and Stratmann (2000), a good reputation helps politicians in collecting higher contributions from Political Action Committees (PACs) in order to run electoral campaigns. However, politicians are often financed by interest groups (IGs) that represent distinct industries that may be more or less popular amongst the electorate. When information on campaign contributions is publicly available, informed voters should therefore react differently to politicians that are financed by one industry rather than the other.

Despite this simple observation, to the best of our knowledge, there are no studies exploring the relationship between electoral contributions and interest group popularity. We therefore focus on the role played by the reputation of business interest groups among voters, in order to gather a better insight on the determinants of campaign contributions.

By using district level data for the U.S. House of Representatives in three electoral cycles (2000, 2002 and 2004), Figure 1 shows how contributions by industry vary over time, suggesting two important empirical regularities:

1. There are some industries that contribute to electoral campaigns systematically much more than others. The largest contributors are banking and healthcare, whereas the lowest contributors are the computer and the publishing industries. As expected, among the highest contributors, we find the legal field and other important services;

2. Contributions tend to change over time, without a clear trend. For instance, contributions from the automobile industry increased over time, while the opposite is true for education. Finally, there are industries showing hump-shaped patterns (e.g., airline and sports).

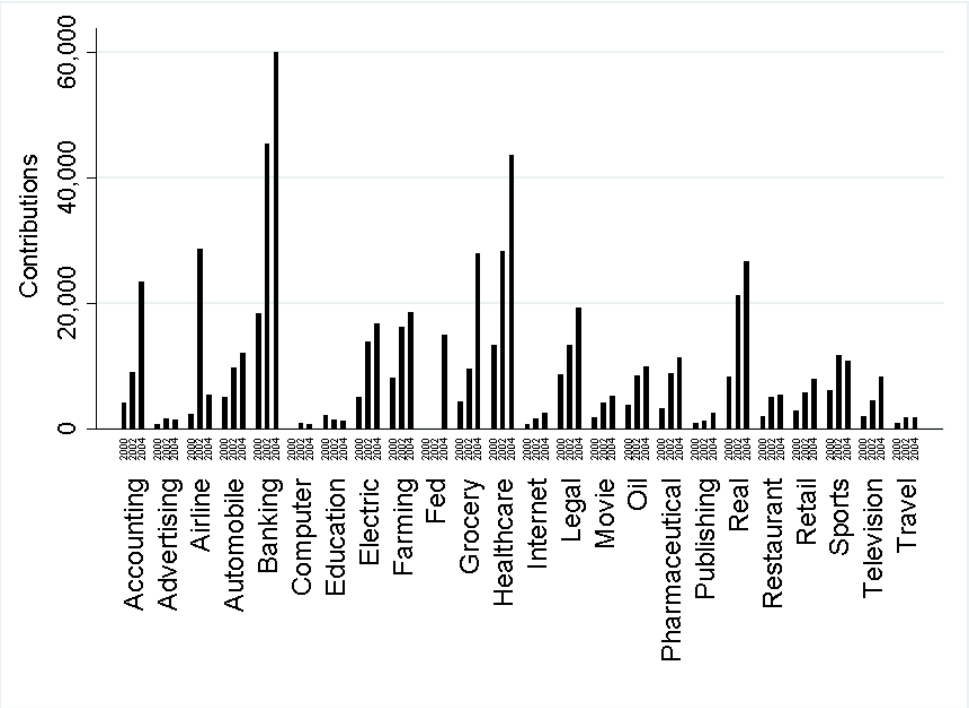

Figure 1: Campaign Contributions by Industry (U.S. House Elections)

The first stylized fact is consistent with the idea that structural characteristics matter in explaining the levels of electoral contributions. The second stylized fact indicates that contributions from business related interest groups, may also depend on some contingent factors. We argue that this second fact can be at least partially explained, if we consider that the policies advocated by a specific industry tend to be perceived less favorably if public opinion views that industry more skeptically.

The idea that popularity can influence campaign financing decisions may be justified either by informational motives or by preferences for conformity. In the first case, although citizens may be informed about which interest groups political candidates are getting their money from, they may not have all the information to evaluate the costs (or benefits) that a policy favor awarded to a specific industry will have on their welfare. Popularity may therefore represent an informative signal on the real cost of a specific policy. In the second case, individuals may derive intrinsic utility from adopting the policy stances of more popular industries. As documented by the economics and political science literature (Bernheim, 1994; Ariely et al. 2003; Klick and Parisi 2008; Sacconi and Faillo, 2010), this may be due to the fact that conformity plays a role, so that adapting one's preferences to those of the majority is a value per se. For either of these reasons, a voter will tend to evaluate the policies pursued by a given industry according to how she perceives that industry

based on public opinion.

We develop a positive theoretical model of campaign finance that incorporates this idea, and using a data set relative to U.S. House elections, we find empirical evidence that is consistent with the model. The setting we consider is one in which two parties compete in an electoral race. Organized lobbies, that share common preferences over a given policy issue, finance candidates' political campaigns demanding policy favors in return for their money. Candidates in turn require contributions to help them win the election by getting their word out to voters. Once in office, winning candidates are able to supply the favors required by their contributors. Parties have no explicit preferences on policies and are willing to tailor them to enhance their electoral prospects.

A distinctive finding of our theoretical model is that contributions are always decreasing in a given industry's relative popularity. This is because if voters are informed about the policy platforms chosen by candidates, enacting policies that are supported by industries that are considered less favorably by the majority will be more costly for candidates, since this tends to reduce popular consent. Intuitively, an interest group that suffers a decline in popularity will face higher costs of obtaining policy favors, since it must provide greater contributions for campaign advertising in order to compensate for its reputational loss. Therefore, contributors that face a negative (positive) popularity shock will tend to increase (decrease) their contributions.

This result suggests that transparency has an effect on the cost of contributions. Indeed, industries that lose popularity will find it more costly to finance politicians precisely because voters are informed on where the money for campaigns is coming from, and take this information into account when making their voting decisions. Going one step further, if an industry's unpopularity reflects information on the distance between business interests and the preferences of citizens, this will make it more costly for industries that have a negative track record to influence policy choices. Thus, transparency may represent a valuable device for reducing the possible inefficiencies that may result from privately funded political campaigns.

We empirically test our theoretical results by assessing the impact of interest group unpopularity on campaign contributions for the U.S. House of Representatives in three electoral cycles (i.e., 2000, 2002 and 2004).[1] In order to evaluate the empirical implications of the model, we consider industry level contributions by aggregating over Political Action Committees (PACs) that belong

[1] Notice that, since 2010, the creation of Super PACs has noticeably complicated the U.S. campaign finance system. Super PACs are independent political committees that support a candidate with unlimited, often anonymous, donations from companies, unions, or individuals. Unlike traditional PACs, Super PACs cannot donate money directly to candidates, but they can favor or harm a candidate through advertisements.

to a given industry. Indeed, although organized business interests may not formally be part of a single interest group, it is reasonable to believe that distinct PACs belonging to the same industry will share the same reputation in the eyes of voters. We therefore construct a new data set by using information on contributions from the Federal Election Commission (FEC), as well as defining an unpopularity index for each business sector using a survey question from the Gallup Polls.

We first consider a traditional fixed effects panel model, and then, following Honoré (1992), we estimate a fixed effects Tobit model. The latter model accounts for the censored nature of data, due to the fact that in a given electoral race each industry does not necessarily finance every candidate. By using a censored quantile regression approach, we also control for nonadditive heterogeneity. In this way, we can test whether the relationship between an interest group's popularity and its contributions changes in districts characterized by high levels of contribution. Moreover, we show that our theoretical conclusions are robust to different econometric specifications based on previous studies. Finally, to rule out possible endogeneity issues related to our measure of unpopularity, we also carry out an instrumental variable (IV) analysis that confirms the validity of our findings.

In terms of the theoretical literature, our paper is closely related to the positive models of policy determination in a two party setting of electoral competition. Unlike models that consider the informational role of campaign spending such as Austen-Smith (1987), Potters et al. (1997), Prat (2002), Coate (2004), Ashworth (2006), we assume that voters are impressionable and can be swayed by advertisements following Baron (1994) and Grossman and Helpman (1996).

Previous empirical literature has devoted only limited attention to the relevance of the popularity of interest groups in determining campaign spending. The main focus has been on determining the impact of contributions on vote shares and estimating whether incumbent or challenger spending is more effective (Jacobson, 1990; Levitt, 1994; Gerber, 1998; Stratmann, 2002). Another major strand of literature has attempted to pin down the relationship between contributions and policy outcomes with mixed results (Ansolabehere et al., 2003; Jayachandran, 2006).

The first contributions on the determinants of campaign contributions (Pittman, 1988; Zardkoohi, 1988; Grier et al., 1994), all argue that the costs and benefits of political activity vary across industries. The idea is that the benefits of political action arise mainly from an industry's inability to solve problems of collective action or ameliorate market conditions, without government intervention. Other recent contributions in this direction include Bombardini and Trebbi (2011), that analyze the relationship between interest group size and contributions, and Chamon

and Kaplan (2013), that distinguish between the behavior of ideological versus non-ideological groups.

Bombardini and Trebbi (2011) show that larger interest groups contribute less funds, because they can alternatively offer candidates considerable direct support in the form of votes. This implies that contributions from a given industry vary across electoral districts based on the share of employees in that industry, in a given district. Our work is complementary to this paper, in that we seek to assess how business specific popularity can explain variations in campaign contributions.

Chamon and Kaplan (2013) find that ideological lobbies finance their like-minded partisan candidate when elections are close, and therefore campaigns may affect the electoral outcome. Non-ideological groups instead, contribute when elections are lopsided in the intent of "buying" policy favors from the advantaged candidate. Unlike our analysis, Chamon and Kaplan (2013) focus on the contributions of single Political Action Committees, while we consider contributions at the industry level, aggregating over PACs in order to investigate industry specific effects.

The rest of the paper is organized as follows. In Section 2, we introduce the theoretical model and in Section 3 we analyze the political equilibrium. In Section 4, we describe the data and the empirical analysis while in Section 5 we present our main results. Finally, Section 6 concludes.

2 The Model

The model considers an electoral race with three classes of agents: voters, political candidates and interest groups. More specifically, a finite number of voters indexed with $i \in I$ are called on to elect one of two candidates indexed with $j \in \{1, 2\}$. Candidates may receive contributions for campaign advertising from a finite set of interest groups $\mathcal{K} = \{1, 2...K\}$ indexed with $k \in \mathcal{K}$. The possibility of abstention is not considered.

The policy space is made up of a finite set of policies $\mathcal{N} = \{1, 2...N\}$, and each voter i has a bliss point $p_{i,n} \in \Re$ for every $n \in \mathcal{N}$ that depends on her individual *underlying* preferences for a specific policy, $\alpha_{i,n} \in \Re$, but can also be influenced by the *unpopularity* of the industry operating on that specific policy dimension, which we denote with $g_n \in \Re$. Industries with higher values of g_n are therefore considered less favorably by voters, and we assume that unpopularity has the same effect on all voters, so that:

$$p_{i,n} = \alpha_{i,n} - g_n.$$

Underlying preferences represent a voter's inclinations abstracting from additional knowledge on the popularity of a specific industry. Notice that $\alpha_{i,n}$ may also represent $i's$ past policy stance prior to a variation in g_n that affects the voter's current position. Thus, two distinct policies on different dimensions that are equally costly for voters in monetary terms, can be evaluated differently based on the relative popularity of the industries involved. For example, if on average the agricultural industry is seen more favorably with respect to the oil industry, considering an import tariff that is equally costly for a given voter, she will prefer if the tariff is applied to the former rather than to the latter industry.

This framework based on adaptive preferences is fairly general since it may be justified both by information motives and by preferences for conformity. In the first case, popularity represents a public signal on new policy relevant information, and preferences correspond to updated expected preferences.[2] In the second case instead, voters derive an intrinsic value from sharing the positions of industries that are favorably perceived by public opinion, and adapt their policy preferences in accordance with the consensus of the majority.[3]

Each voter therefore evaluates the policy vector chosen by candidates in reference to her policy preferences. Let $e \in \{1, 2\}$ denote the candidate who wins the election where $p_{j,n} \in \Re$ represents the policy chosen by candidate j on each dimension n, and $\mathbf{p}_j \in \Re^n$ is the vector of these policies. We denote $Q_i \in \Re$ as the *electoral advantage* that candidate 1 has over candidate 2, for voter i. The utility of voter i is:

$$U_i(e, Q_i, \mathbf{p}_1, \mathbf{p}_2) = \begin{cases} Q_i - \sum_n d_v(p_{i,n} - p_{1,n}) \text{ if } e = 1 \\ -\sum_n d_v(p_{i,n} - p_{2,n}) \quad \text{if } e = 2, \end{cases} \tag{1}$$

where $d_v(\cdot)$ is strictly increasing and convex in $\mid p_{i,n} - p_{e,n} \mid$ and captures the fact that voters derive less utility from policies that are farther from their bliss point on each dimension n of the policy space. We assume that voters' preferences satisfy the single crossing property so that there exists a median voter with a vector of policy preferences $\mathbf{m} \in \Re^n$. The space of policy preferences is normalized by setting $m_n = -g_n$ for each n, in other words the normalization involves setting

[2] If popularity, g_n reflects new information on the impact of a certain policy on the utility of voters, $p_{i,n}$ represents the bayesian update on the preferences of voter i, conditional on the available information at a specific point in time.

[3] In our setup conformity is more closely related with the idea that preferences may not be stable as noted by Ariely et al. (2003), and individuals modify their effective preferences based on the consensus of their social group as noted by Klick and Parisi (2008). This approach differs from that of Bernheim (1994), in which individuals act with the objective of falsifying their true preferences in order to increase their standing within a social group.

the vector of median underlying preferences to 0.

Besides the policy vector $\mathbf{p}_j$ that candidates can choose, each candidate also has certain fixed characteristics such as charisma, track record or ideology. We denote B_i as the proclivity of each voter i for the fixed characteristics of candidate 1 with respect to candidate 2. The *electoral advantage* Q_i depends on B_i, but can also be influenced by campaign advertising as described below. Whenever $B_i > 0$, a given voter i has a relative preference for candidate 1 over candidate 2. Candidates do not know the exact policy preferences of each voter, but they know the pliable policy preferences of the median voter $\mathbf{m}$, and they know that the fixed policy preferences of the median voter B_m are drawn from a known random distribution $F(B_m)$. Hence, there is always some uncertainty on the ex-ante electoral odds of one candidate with respect to the other.

We consider interest groups such as business lobbies which, as Baron (1994) has pointed out, can be viewed as groups that try to influence particularistic policies as opposed to collective policies. Moreover, interest groups are usually concerned about a limited set of issues. So, for example an interest group advocating the introduction of tariffs on steel imports will have little or no interest in policies affecting the textile industry. We capture this specialization feature by assuming that each IG is interested in a single policy dimension. An interest group therefore represents a subset of voters regarding policy dimension k, and seeks to maximize the utility of the median group member. We denote the policy preferences of the median interest group member on each dimension k with $r_k \in \Re^+$, where higher values of r_k represent more extreme preferences. Thus, each group does not face direct competition over its relevant policy dimension k, and there is at most one interest group for each policy dimension n, so that $K \leq N$.[4] Moreover, we assume that any two distinct interest groups are never identical, meaning that for any $x, y \in \mathcal{K}$ with $x \neq y$, it never holds that $r_x = r_y$ and $g_x = g_y$.

Interest groups do not have preferences on the fixed characteristics of one candidate or the other.[5] The IGs may therefore choose to contribute to both sides in the election. As long as each candidate is willing to bargain over policy k, the IG that is concerned about k has an incentive to try to influence the positions taken by both parties.

Contributions made to each candidate, which we denote $C_{1,k}$ and $C_{2,k}$ respectively, are assumed to be non-negative meaning that each interest group can offer funding to politicians but cannot

[4] In order to simplify an already intricate analysis we abstract from the issue of competition within industries.

[5] Even if interest group members were concerned about both the pliable policies as well as the fixed characteristics of candidates, there may be a coordination problem between group members regarding preferences for one candidate or the other. Indeed, it seems reasonable to assume that PACs operating in the same industry can more easily converge on a common policy dimension that involves their specific industry, rather than on other issues.

receive money from them. We also denote $\mathbf{C}_1 = \sum_k C_{1,k}$ and $\mathbf{C}_2 = \sum_k C_{2,k}$ as the total contributions received by each candidate. Each group's payoff is assumed to be separable in contributions and policy. When candidate e is elected the payoff of interest group k is:

$$U_{IG,k} = -d_{IG}(r_k - p_{e,k}) - C_{1,k} - C_{2,k}. \tag{2}$$

where $d_{IG}(\cdot)$ is strictly increasing and strictly convex in the distance between r_k and $p_{e,k}$ for each policy dimension k, and captures the fact that each interest group derives greater utility from policies closer to its bliss point.[6] The policy preferred by each IG, r_k is assumed to be publicly observable.

Candidates can run campaigns to increase their chances of being elected. However, they have no funds of their own and campaigns are entirely financed by interest groups, that may offer contributions to each candidate in return for policy favors. We assume that the difference between contributions spent on campaign advertising has a positive impact on voters' preferences for the fixed characteristics of candidates, as defined by the advertising technology, $A(\cdot)$, which is a non-decreasing function of $C_1 - C_2$. In other words, the candidate who outspends the other becomes relatively more attractive amongst voters.[7] Therefore, the expression for the electoral advantage is:

$$Q_i = B_i + A(\mathbf{C}_1 - \mathbf{C}_2). \tag{3}$$

This setup is equivalent to assuming that voters are concerned about policy but are also impressionable. In other words, voters are aware of the impact that a certain policy stance (both pliable and fixed) has on their utility, but, at the same time, campaign advertising may increase a candidate's perceived quality.[8]

Candidates may either interact with a particular interest group or not, because of exogenous reasons that we do not explicitly model. For instance, when candidates are opportunistic and therefore exclusively concerned about getting elected, they will consider a given industry specific policy to be pliable, and may be willing to cater to the interest group's policy requests in return for

[6] The assumption that the loss function of interest groups is strictly convex, while that of voters is convex implies that unlike voters, *IGs* always have an increasing marginal benefit of adopting a policy closer to their bliss point. In any case, all the results would continue to hold if the loss functions of both voters and *IGs* were strictly convex.

[7] In this setup, campaign spending cannot be seen as providing information since it does not play a role in reducing informational asymmetries but directly influences voters' perception of the popularity differential as in Baron (1994) and Grossman and Helpman (1996).

[8] Assuming that each voter is both rational and impressionable is without loss of generality and simplifies notation. All the results would hold if we assumed that the voting population were composed of two distinct groups: one rational and the other impressionable.

campaign contributions. On the other hand, candidates may have specific preferences on certain policy dimensions and may not wish to bargain over these issues regardless of the funds promised by interest groups.[9] In the latter case, there is no interaction between a candidate and a particular interest group. So for example if in a specific district a left leaning democratic candidate may not be willing to receive money from a typically right wing industry such as oil and gas, this may not necessarily be the case in another electoral district where the runner up is a more moderate democrat. We represent these different instances with an indicator function $\theta_{j,k} \in \{0,1\}$, where $\theta_{j,k} = 1$ denotes the case in which candidate j agrees to interact with interest group k, and $\theta_{j,k} = 0$ represents the case in which she chooses not to.

Each interest group makes a take-it-or-leave-it offer to candidates $j \in \{1,2\}$ in the form of a pair $(p_{j,k}, C_{j,k})$. We assume that candidates can credibly commit to implement a given policy if they are elected, and that voters observe the policies chosen by each candidate.[10] In designing its offers, an IG considers the constraints imposed by the fact that candidates need not accept a group's offer of support. A candidate that interacts with a specific interest group will in fact accept offers, only if these weakly increase her probability of being elected.

The timing of the game is as follows. In the first stage, each interest group simultaneously makes take-it-or-leave-it offers to every candidate with which it interacts. In the second stage, candidates choose their policy platforms. After the platforms are chosen, campaigns are waged and the election takes place. Finally, the candidate that receives the majority of votes wins the election and implements the policy she committed to enact.

Election Probabilities

Voter i prefers candidate 1 if:

$$B_i + A(\mathbf{C}_1 - \mathbf{C}_2) - \sum\nolimits_n d_v(p_{i,n} - p_{1,n}) + \sum\nolimits_n d_v(p_{i,n} - p_{2,n}) \geq 0. \tag{4}$$

[9] As in the citizen-candidate model of Besley and Coate (1997), candidates may not be uniquely concerned about winning the election, but could also have specific preferences over policies. In other cases, as suggested by Katrik and Mcafee (2007), candidates may be unwilling to modify their policy stance in order to signal their character or integrity.

[10] Although we consider a one-shot game, the fact that candidates can commit to carry out certain policies and interest groups can do the same with respect to their contributions, could be motivated in a repeated game in which agents may be punished in future interactions for not having fullfilled their past promises.

If voters play undominated strategies then candidate 1 is elected if:

$$B_m + A(\mathbf{C}_1 - \mathbf{C}_2) - \sum_n d_v(m_n - p_{1,n}) + \sum_n d_v(m_n - p_{2,n}) \geq 0. \tag{5}$$

Since $F(B_m)$ and $\mathbf{m}$ are publicly known, the probability that candidate 1 is elected, which we denote $\pi_1(\mathbf{C}_1, \mathbf{C}_2)$, is equal to

$$\pi_1(\mathbf{C}_1, \mathbf{C}_2) = 1 - F[-A(\mathbf{C}_1 - \mathbf{C}_2) + \sum_n d_v(m_n - p_{1,n}) - \sum_n d_v(m_n - p_{2,n})], \tag{6}$$

where $\pi_2(\mathbf{C}_1, \mathbf{C}_2) = 1 - \pi_1(\mathbf{C}_1, \mathbf{C}_2)$.[11] Thus, each candidate's probability of being elected depends on the contributions received and on the policies that both candidates commit to implement if elected.

Functional Forms

For reasons of tractability, we assume $F(\cdot)$ to be a uniform distribution with mean $\frac{b}{f}$ and density f, where b represents the ex-ante voter bias in favor of candidate 1. We also assume that the advertising function is separable in total contributions received by each candidate so that $A(\mathbf{C}_1 - \mathbf{C}_2) := h(\mathbf{C}_1 - \mathbf{C}_2)$, where h is a positive constant, implying that the advertising technology is linear.[12]

It follows that the expression for the probability of electing candidate 1 conditional on the policies announced and contributions received by each candidate, represented by expression (6), becomes:

$$\pi_1(\mathbf{C}_1, \mathbf{C}_2) = \frac{1}{2} + b + f\left[h(\mathbf{C}_1 - \mathbf{C}_2) - \sum_n d_v(g_n + p_{1,n}) + \sum_n d_v(g_n + p_{2,n})\right], \tag{7}$$

$$\text{for } \left(h(\mathbf{C}_1 - \mathbf{C}_2) - \sum_n d_v(g_n + p_{1,n}) + \sum_n d_v(g_n + p_{2,n})\right) \in \left[-\frac{1}{2f} + \frac{b}{f}, \frac{b}{f} + \frac{1}{2f}\right].$$

Without loss of generality, we assume that candidate 1 is more popular prior to campaigns being waged, so that $0 < b < 1/2$.

Expression (7) clearly illustrates that by accepting contributions from an interest group, a

[11] Since $F(\cdot)$ is a continuous function the event that the median voter is indifferent has measure zero, therefore considering strict or weak inequalities is equivalent. To simplify notation we thus assume that candidate 1 is elected in case of indifference.

[12] This assumption simplifies exposition. All of our results would continue to hold even if the advertising technology were concave.

candidate receives a benefit in terms of enhancing her probability of winning, if she outspends the other candidate. On the other hand, by enacting policies that are distant from those of the median voter, candidates lose vote shares. Notice also that, since $A(\cdot)$ is additively separable in its arguments, each party can make its decisions regarding contributions and policies independently of its knowledge or beliefs about the incentives facing the other candidate. This allows us to abstract from issues related to the fact that the interest groups' offers are communicated privately or publicly.

3 Political Equilibrium

A political equilibrium consists of: (i) a pair of policies $\left\{p_{1,n}^*, p_{2,n}^*\right\}$ for each n, (ii) a pair of contributions $\left\{C_{1,k}^*, C_{2,k}^*\right\}$ for each interest group k, (iii) an electoral probability $\pi_1(\mathbf{C}_1^*, \mathbf{C}_2^*)$ (where $\pi_2(\mathbf{C}_1^*, \mathbf{C}_2^*) = (1 - \pi_1(\mathbf{C}_1^*, \mathbf{C}_2^*))$, such that interest group and candidate strategies must be mutual best responses given voter behavior, and voter behavior must be consistent with interest group and candidate strategies.[13]

In this setting, the problem can be seen as one of direct control. In other words, each interest group k chooses a pair of policies $(p_{1,k}^*, p_{2,k}^*)$ to maximize its expected profit (or minimize its loss) provided that its contribution offers are sufficiently large to be accepted by the candidate. Interest group $k's$ offer to each candidate can therefore be represented by the following maximization problem:

$$\begin{aligned} \underset{(p_{j,k}, C_{j,k})_{j\in\{1,2\}}}{Max} \quad & -\pi_1(\mathbf{C}_1, \mathbf{C}_2)[\theta_{1,k} d_{IG}(r_k - p_{1,k})] \\ & -(1 - \pi_1(\mathbf{C}_1, \mathbf{C}_2))[\theta_{2,k} d_{IG}(r_k - p_{2,k})] - C_{1,k} - C_{2,k}, \end{aligned} \tag{8}$$

subject to the participation constraints:

$$\pi_1(\mathbf{C}_1, \cdot) \geq \pi_1(\mathbf{C}_1^{-k}, \cdot), \tag{9}$$

$$\pi_2(\cdot, \mathbf{C}_2) \geq \pi_2(\cdot, \mathbf{C}_2^{-k}), \tag{10}$$

where $\mathbf{C}_j^{-k} = \sum_{n\neq k} C_{j,l}$ denotes the total contributions to candidate j in the absence of contribu-

[13] The assumption that voters observe the policies chosen by each candidate could be relaxed. In principle, even if policies were unobservable, as long as voters are informed about $\mathbf{m}$, $F(B_m)$, the preferences of the interest group, and those of candidates, they can potentially infer the equilibrium contributions and policies of each candidate.

tions from interest group k. The participation constraints imply that each candidate that interacts with interest group k (those for which $\theta_{j,k} = 1$) will accept the offer, only if she is weakly better off by accepting rather than refusing. If the candidate refuses the offer from interest group k, she always prefers to choose the policy preferred by the median voter, $m_k = -g_k$, as this maximizes her vote share in the absence of contributions from k. It follows that candidates that do not interact with a given interest group k (those for which $\theta_{j,k} = 0$), also choose $m_k = -g_k$. Moreover, for all policy dimensions for which there is no active interest group, each candidate naturally chooses policy $m_n = -g_n$.

We denote candidate $j's$ probability of being elected in the absence of contributions from interest group k, with π_j^{-k}. When designing contribution offers to each candidate, each IG anticipates that $\pi_j^{-k} = \pi_1(\mathbf{C}_1^{-k}, \mathbf{C}_2^{-k})$ where:

$$\pi_1(\mathbf{C}_1^{-k}, \mathbf{C}_2^{-k}) = \frac{1}{2} + b + f\left[h(\mathbf{C}_1^{-k} - \mathbf{C}_2^{-k}) - \sum\nolimits_{n \neq k} d_v(g_n + p_{1,n}) + \sum\nolimits_{n \neq k} d_v(g_n + p_{2,n})\right], \quad (11)$$

and takes this probability as given. Notice that $\mathbf{C}_1^{-k}$ and $\mathbf{C}_2^{-k}$ are out of equilibrium contributions. However, since each candidate's choice of policy on a given dimension is independent of her choice on other policy dimensions, this implies that out of equilibrium contributions are uniquely pinned down by equilibrium behavior. Therefore, denoting $\mathbf{C}_j^{-k*}$ as equilibrium contributions to candidate j disregarding those from interest group k, it follows that $\mathbf{C}_j^{-k} = \mathbf{C}_j^{-k*}$ for any j. Therefore we have that $\pi_1^{-k} = \pi_1(\mathbf{C}_1^{-k*}, \mathbf{C}_2^{-k*})$ and $\pi_2^{-k} = 1 - \pi_1(\mathbf{C}_1^{-k*}, \mathbf{C}_2^{-k*})$.

Thus, whenever an IG interacts with a given candidate, it will provide her with at least the amount of contributions that are strictly necessary to convince candidate j to adopt the desired policy. Inducing a candidate to choose a policy that is more unpopular, is increasingly costly and requires an adequate compensation in terms of campaign advertising. For each candidate j, the minimally acceptable contributions are thus increasing in $p_{j,k}^*$. Solving for $C_{j,k}^*$ the participation constraints (9) can therefore be represented in the following way:

$$C_j^{k*} \geq d_v(g_k + p_{j,k}^*)/h, \text{ for every } j, \quad (12)$$

where the right hand side of (12) represents interest group $k's$ minimum cost function of enacting policy $p_{j,k}^*$.

In equilibrium, interest groups that interact with candidates always provide contributions to

influence policy. Each IG therefore induces every financed candidate to behave as if it were selecting a policy on dimension k, that minimizes the sum of the interest group's and the voters' losses:

$$p^*_{j,k} = \arg\max_{p_{j,k}}[-\pi_j^{-k} d_{IG}(r_k - p_{j,k}) - d_v(g_k + p_{j,k})/h] \text{ for every } j. \tag{13}$$

Industries that suffer a loss in popular consensus will therefore enact weakly more moderate policies (i.e., $p^*_{j,k}$ is non-increasing in g_k). The rise in unpopularity may lead to a reduction in equilibrium policies, since it makes more extreme positions more costly to sustain. However, the absolute value of the policy variation is always less than the variation in unpopularity, so that for any $g_k > g'_k$ it is always the case that $(g_k + p^*_{j,k}) > (g'_k + p'^*_{j,k})$. This occurs as long as the interest's group loss function is strictly convex implying that the IG always has an increasing cost of enacting a policy farther from its bliss point. These results are reassumed in the following proposition:

Proposition 1 *For any level of interest group preferences r_k: (i) the policy, $p^*_{j,k}$ chosen by each candidate $j \in \{1, 2\}$ on dimension k is non-increasing in the unpopularity of the contributing interest group, g_k and; (ii) the minimum amount of contributions needed to obtain policy $p^*_{j,k}$ is strictly increasing in g_k (Proof in the Appendix).*

It is important to notice, that if electoral motives play a role the relationship between $C^*_{j,k}$ and g_k may in some particular cases be non-monotonic. For example, a given interest group characterized by preferences r_k and unpopularity g_k may be more willing to provide one candidate with additional contributions to enhance her electoral odds, with respect to a less popular IG with different preferences. *A priori*, we therefore cannot exclude that overall contributions from a more popular industry may exceed those of a less popular one.

Nevertheless, as long as each interest group has different marginal returns from increasing the electoral odds of one candidate with respect to the other, at most one IG in a given electoral competition may be willing to finance a given candidate for electoral motives. To see this, notice that contributing more than what is strictly necessary to support the desired policy represents a public good for all groups that prefer a certain candidate's platform. As in other situations involving voluntary provision of public goods, if the group that benefits most from contributing for electoral motives is willing to do so, all the other IGs will free ride on this group's behavior. It follows that, excluding the interest group for which electoral motives apply in a given district, all the remaining IGs will exhibit a positive relationship between contributions and policy:

Proposition 2 *If each IG has different marginal returns from increasing the electoral odds of one candidate over the other, then there exist at least* $K-1$ *interest groups that finance candidates exclusively for influence motives. For these IGs, contributions to each candidate* $j \in \{1,2\}$ *are strictly increasing in the interest group's unpopularity,* g_k *(Proof in the Appendix).*

Notice that the condition for marginal returns to differ for each interest group is easily satisfied. More specifically, a sufficient condition for this to occur is that a group with more extreme preferences can never be more popular than one with less extreme preferences. Indeed, as long as unpopularity is positively correlated with extremity of preferences, this is always the case. Even if this sufficient condition were violated, in order for electoral motives to apply for two distinct $IG's$, not only must a more extreme interest group be more popular than a less extreme one, but the difference in popularity between the two groups must be equal to a specific value. This is clearly a very particular case which we can reasonably rule out.

To see why contributions are strictly increasing in unpopularity for all interest groups for which only influence motives apply, recall that for these IGs, the participation constraint is satisfied with equality. Using (12), this implies that for at least $K-1$ interest groups, contributions are exactly equal to the cost of policy favors:

$$C_j^{k*} = d_v(g_k + p_{j,k}^*)/h \text{ for every } j. \tag{14}$$

Since by Proposition 1 policy $(g_k + p_{j,k}^*)$ is always strictly increasing in g_k, it follows immediately that for at least $K-1$ interest groups, also contributions (C_j^{k*}) are strictly increasing in unpopularity, as stated in Proposition 2. This result represents the main empirical implication of the model that we seek to verify in the next section.

A corollary to Propositions 1 and 2 is that only the ex-ante advantaged candidate can receive contributions to enhance her electoral odds. Thus there is always a non-negative relationship between π_1^{-k} and b, from which it follows that contributions are always weakly increasing in the ex-ante electoral advantage.[14]

[14] A formal proof of this corollary is provided in the appendix.

4 Empirical Analysis

4.1 Data

To construct our sample, we combined various data sources: the Federal Election Commission, for information on electoral campaigns; the Bureau of Economic Analysis for industry-level data; and the Gallup Polls to create an index of unpopularity for business sectors. Table 1 reports some descriptive statistics and the classification of sectors according to their average unpopularity. Combining all data sources, we obtain a minimum number of observations equal to $33,035$.

The dependent variable is the amount of contributions that a candidate received from Political Action Committees in three electoral cycles (2000, 2002, 2004), as reported by the FEC. We use information from the Center for Responsive Politics to classify PAC money by industry. The average contribution is $\$11,135$, with the highest contribution level equal to $\$2,800,000$. Because some IGs do not finance both candidates, our sample contains $13,797$ censored observations.

To measure interest groups' unpopularity, we use a reputation index based on voters' perceptions. This index was constructed by classifying the replies over the period $(2001-2004)$ on the following question taken from the Gallup Polls: "For each of the following business sectors in the United States, please say whether your overall view of it is Very positive, Somewhat positive, Neutral, Somewhat negative, or Very negative". The index ranges from 0 to 100, where higher values denote less popular sectors.[15] The average unpopularity is 47.5. In Appendix B, we provide a detailed description on how the index is constructed. The second part of Table 1 shows that the oil sector is the least popular, while the most popular is the computer sector. Among the most unpopular we find the legal field, healthcare, and pharmaceuticals. In contrast, sectors related to food are rather popular.

Since we consider the effect of interest group's popularity (at the national level) on district level contributions, it is important to control for variables that can potentially affect how voters perceive the interest group, influencing the amount of resources that an interest group must devote to campaign financing. For this reason, we control for two important variables: the number of workers employed and the value-added of each industry at the national level. For instance, one can argue that workers might consider the sector in which they are employed to be more positive than

[15] Notice that contributions are at the industry level, while our popularity index is constructed at the sectoral level. That is, we are assuming that industries' popularity is more homogenous within sectors than among sectors. In addition, for the first electoral cycle, we assume that the unpopularity index for 2001 coincides with the unpopularity index for 2000. We remove this hypothesis when we estimate a lagged-variable specification.

others, simply because they favorably view their employer.[16] The mean sector occupies about 5 million workers, with the largest sector employing 13.5 million individuals and the smallest sector employing $386,000$ workers. Also, voters may consider high-value added sectors as better employment opportunities increasing their perception of the sector's popularity, thus diminishing the amount of contributions that an interest group must pay to obtain voters' support. Obviously, other possible channels can explain why the effects of these two control variables on contribution levels, could go in the opposite direction. For example, high-value added sectors may offer more generous contributions simply because they have a greater amount of disposable funds. In general, the value added varies greatly across interest groups. Data on employment and value added comes from the aggregation of Annual Industry Accounts, an annual series provided by the Bureau of Economic Analysis, and we used the $1997 - 2013$ data set.

Contributions also depend on the candidate's probability of election excluding contributions from interest group k, π_j^{-k}. By definition, this counterfactual probability is unobservable. Therefore, we proxy π_j^{-k} with the candidate's vote share observed after the electoral cycle. The use of this proxy is based on the results obtained by Levitt (1994). In his seminal paper, Levitt carries out a panel data analysis to measure the impact of campaign contributions on vote shares. He concludes that campaign spending has an extremely small impact on election outcomes. This is the same idea adopted by Pettersson-Lidbom (2001) and Bombardini and Trebbi (2011). In a study on the strategic use of debt under electoral campaigns, Pettersson-Lidbom proxies the probability of electoral defeat with the ex-post election outcome. Similarly, Bombardini and Trebbi inversely approximate the ex-ante electoral uncertainty with the ex-post vote margins. Due to the possible presence of more than two candidates, the average vote share is 44.6 ($< 50\%$). We define those elections in which a candidate's odds of winning are greater than 75% as lopsided elections. These races account for one-third of the sample. However, since the post-election vote share contains two types of errors, those related to differences between ex-ante and ex-post shares and the errors due to the inclusion of IG k, we also test the validity of our main results by using information on incumbent candidates. Almost every election sees the participation of an incumbent. As we will see, our results on the relationship between contributions and popularity are robust to different measures of π_j^{-k}. Finally, we use the percentage of women employed in professional roles as instrument for industries' unpopularity. In Table 1, we can see that, on average, 18% of professionals

[16] Workers should favorably view the lobbying effort of their corresponding interest groups, if their interests are aligned.

are women, and this percentage is always lower than male employment. We leave the discussion on the validity of the IV for the next section.

Table 1: Descriptive statistics and Unpopularity Rank

Descriptive statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
Contributions ($US)	40837	11,135	37,561	0	2,800,000
Unpopularity	38822	47.499	27.931	1	100
Votes	40352	44.617	28.281	0	100
Employment (millions)	34857	5.012	4.367	0.386	13.54
VA (hundreds of billions $)	34857	4.369	4.277	0.24	19.876
Incumbent	40837	0.467	0.499	0	1
Lopsided	40750	0.356	0.479	0	1
Female employment (professionals)	30793	0.178	0.129	0.012	0.461

Average Unpopularity by Sectors (from the most to the least popular)			
Industry	Rank	Industry	Rank
Computer industry	1	Airline industry	14
Restaurant industry	2	Sports industry	15
Grocery industry	3	Telephone industry	16
Farming and agriculture	4	Television and radio industry	17
Retail industry	5	Advertising industry	18
Travel industry	6	Movie industry	19
Real Estate industry	7	Electric and gas utilities	20
Banking	8	The federal government	21
Internet industry	9	Pharmaceutical industry	22
Publishing industry	10	Healthcare industry	23
Automobile industry	11	The legal field	24
Accounting	12	Oil and gas industry	25
Education	13		

4.2 Methodology

Our analysis aims to establish a link between electoral contributions and the unpopularity of an IG. In particular, we want to test the existence of a positive relationship between contributions to each candidate j from interest group k and the unpopularity of the interest group (Proposition 2). Given the structure and the nature of our dataset, we must take into account several important issues. First, we must consider that economic sectors are extremely heterogeneous and this heterogeneity may affect the relationship between contributions and popularity. Second, electoral contributions are left-censored at zero because an IG may decide not to finance a specific candidate. In this case, dropping all the censored observations would lead to biased and inconsistent estimates. Third, unobserved heterogeneity may have a nonadditive structure, interacting with observed variables. Therefore, a mean estimator may not be particularly informative and we should test whether our theoretical conclusions are robust along the entire distribution of the dependent variable. This problem is simply omitted in traditional censored models, where a location shift is imposed. Finally, the unpopularity index may be correlated with the error term for various reasons; therefore, we may have endogeneity problems. Our analysis proceeds by steps, where each step addresses a specific issue taking into account all the results coming from previous steps.

4.2.1 *Additive Heterogeneity and Censoring*

By exploiting the panel structure of our dataset, we first estimate the impact of unpopularity on electoral contributions using a fixed effects estimator.[17] This will allow us to control for the omission of time-invariant characteristics such as interest group preferences. More specifically, we estimate the following model:

$$c_{jkdt} = \alpha + \beta\pi_{jdt} + \gamma g_{kt} + \delta' X_{kt} + \mu_k + \mu_t + \varepsilon_{jkdt}, \tag{15}$$

where c_{jkdt} represents the amount of contributions to each candidate j from interest group k, in district d, at time t; π_{jdt} is the vote share of candidate j, in district d, at time t; g_{kt} is the unpopularity index for the interest group k at time t; X_{kt} is a matrix of time-varying characteristics used as control variables; μ_k is the sector-specific effect; μ_t are time dummies and ε_{jkdt} is the error term. The usual assumption is that errors are independently and identically distributed. Since both contributions and residuals exhibit a highly skewed distribution, we transform our variables

[17] The decision to estimate a fixed effects model is supported by a Hausman specification test (Hausman, 1978).

by taking the natural logarithms.

Despite the interesting properties of model (15), this specification does not take into account of the fact that data are censored. At the same time, standard censored regression models are described by non linear functions and therefore the usual maximum likelihood estimator for fixed effects leads to biased and inconsistent results.[18] To avoid these problems, we use the semi-parametric estimator for fixed effects Tobit models proposed in Honoré (1992). This method is particularly suitable for panel data with just two or three periods. We use a trimmed least squares estimator, obtaining parameters that are both asymptotically consistent and easy to calculate.

When data are censored, the observed c_{jkdt} is defined by the following measurement equation:

$$c_{jkdt} = \begin{cases} c^*_{jkdt} \text{ if } c_{jkdt} > 0 \\ 0 \text{ if } c_{jkdt} = 0 \end{cases} \tag{16}$$

where c^*_{jkdt} is a latent variable that is observed for contributions greater than zero and censored otherwise.

Therefore, the estimated model is

$$c^*_{jkdt} = \beta \pi_{jdt} + \gamma g_{kt} + \delta' X_{kt} + \mu_k + \rho t + \varepsilon_{jkdt}, \tag{17}$$

where ρt captures the existence of a time-trend emerging from (15).[19] Notice that, with respect to the standard Tobit model, we do not need to assume either a parametric form for the disturbances or homoskedasticity across observations.

4.2.2 *Alternative Specifications*

After having controlled for heterogeneity and censoring, we check how regression coefficients behave when our specification is modified by adding or removing some regressors. In particular, we modify equation (17) to show that the unpopularity index is not proxying other channels of contribution already discussed in the literature.

[18] The terminology censored regression model could be misleading in this case. Following Wooldridge (2002), we should refer to our model as a corner solution model. In a corner solution model, the issue is not data observability, but measures such as $E(c_{jkdt})$ and the marginal effects of the explanatory variables on the outcome variable. In this setting, OLS estimation leads to estimates that are biased and inconsistent, whereas Tobit estimates are consistent and asymptotically normal (Amemiya, 1973).

[19] We use a time-trend variable because Honoré's method does not allow for the inclusion of dummy variables. Moreover, since our panel is of length three, we employ the extended version of Honoré's estimator, where the initial estimator gives equal weight to all the pairs of observations.

First, we include a squared term for the employment level. In a recent paper, Bombardini and Trebbi (2011) find a hump-shaped relationship between the share of voting population represented by an IG and its electoral contributions. The authors explain this evidence with a bargaining model in which the size of an IG affects both the amount of surplus that can be shared with a candidate and the strength of voter support that the IG can offer to each candidate. The former channel is responsible for the increasing part of the relationship between contributions and the IG's size, while the latter channel is responsible for the decreasing part of this relationship. In principle, a positive coefficient for the unpopularity index could mask this behavior. Indeed, if workers consider the industry in which they are employed to be more popular than others, large sectors can be characterized by a high level of popularity. On the other hand, if voters believe that small industries are less successful in distorting policies through lobbying activities, then even small sectors will be characterized by a high level of popularity. As a result, the inclusion of a squared term for the employment share should invalidate our conclusions, reducing the correlation between popularity and electoral funds. Second, in elections where one candidate is very likely to win, she may not maximize contributions, and hence not promise the maximum number of political favors. In close races instead, candidates may try to exploit the full potential of contributions by offering as many favors as possible (Snyder, 1990). We therefore consider both lopsided and close races separately in order to verify this hypothesis.[20] Third, we aim to exclude the possibility that our results may depend on the decision to proxy the electoral probabilities (net of the contribution of IG k) with the vote shares. We therefore run our regressions replacing the post-election vote shares with a dummy variable indicating candidates that are incumbent. This decision is supported by an extensive empirical literature. Many studies have documented the growing trend of the incumbency advantage in the U.S. (see, e.g., Cover, 1977; Cox and Morgenstern, 1993; Cox and Katz, 1996). In a more recent paper, Lee (2001) shows that an incumbent has a higher probability of winning the second election, even though the two candidates are ex-ante identical.

4.2.3 *Nonadditive Heterogeneity*

Although Honoré's estimator does not require the usual Tobit assumptions on the errors' structure, this technique only provides a single parameter for the entire distribution of the dependent variable. This means that, by imposing a constant coefficient for the unpopularity index, this estimator does not account for nonadditive heterogeneity. On the contrary, the way in which heterogeneity

[20] We define as lopsided elections those elections in which a candidate has a vote share greater than 75%.

affects the relationship between popularity and contributions may change across the distribution of the latter. In this case, a mean estimator would not be particularly informative. Vice versa, given the fact that a quantile identifies points in the distribution of the dependent variable where idiosyncratic shocks and/or omitted factors are boosting or reducing the amount of contributions, a quantile regression model represents a suitable way to address this issue. Hence, a positive coefficient of g_{kt} along the entire distribution of contributions will provide further evidence of a robust correlation between unpopularity and hard money.

Following Chernozhukov and Hong (2002), we use a censored quantile regression method to test for the possibility of nonadditive heterogeneity. To estimate the vector of parameters, Chernozhukov and Hong use an approximation of the conditional quantile estimator proposed by Powell (1986). Since standard methods are not appropriate for estimation of a censored quantile regression model with unobserved individual heterogeneity, we now use a pooled regression approach. Therefore, in each race, we have a repetition of the candidate's vote share for every interest group. In practice, we estimate a quantile regression for the entire sample, then we drop the observations for which the predicted value of the dependent variable is less than the censoring value. By using the new subsample, we repeat this procedure iteratively until the absolute loss function converges to a local minimum. Standard errors are obtained by using a bootstrap method.

4.2.4 *Reverse Causality*

Since interest groups' popularity is based on voter perceptions, a simultaneity problem can arise. It may in fact be the case that, by observing contribution levels, voters may change their opinion about the interest group. For example, if voters view contributions as a signal of corruption, they may be disappointed by interest groups contributing more to electoral campaigns.

We adopt three different strategies to estimate equation (15). First, we replace the unpopularity index at time t with its value at time $t-1$. The use of a lagged independent variable should partially relax the reverse causality problem. Second, since the use of lagged variables could also be misleading, we replace the unpopularity index with a measure that should be less sensitive to simultaneity considerations. To support our analysis, we use a different indicator of IG's unpopularity based on a survey conducted by Harris Polls.[21] In particular, we consider the answers to the following question: "Do you think each of the following (sectors) generally do a good or bad

[21] Unfortunately, Harris Polls cover only nine sectors. Harris Polls are available on the Web: (www.harrisinteractive.com/NewsRoom/HarrisPolls)

job of serving their consumers?". With respect to our main indicator, this indicator should be less exposed to reverse causality problems. Indeed, in the Gallup index, several dimensions can influence citizens' evaluations of business sectors. Among others, these dimensions include consumers' opinions, investment decisions, social responsibility, taxation regimes and political participation. Political participation in the form of electoral contributions can be a channel through which simultaneity problems may arise. In contrast, the Harris index is more related to the ability of a sector to serve its consumers, inviting respondents to distinguish between this specific dimension and other more endogenous dimensions. Finally, we use an IV approach to control for the endogeneity bias.

A valid instrument must be strongly correlated with the unpopularity index (instrument relevance), but be completely uncorrelated with the error term (instrument exogeneity). As excluded instrument, we use the fraction of women occupied in professional roles.[22] The data source is the Equal Employment Opportunity Commission which collects data from public and private employers, and unions and labor organizations on the composition of their work forces by sex and race. Concerning the instrument relevance, there is a wide literature showing that corporate reputation is a positive function of female employment at the top occupations. For instance, Brammer et al. (2009) find that the presence of women on top positions is favorably viewed in those sectors that operate close to final consumers. The idea is that industries guaranteeing equal opportunities can have a popularity premium. Inglehart et al. (2002) document the growing support for gender equality in public opinion and how this concept is intimately involved in the process of democratization. Other studies suggest that men's preferences towards redistribution have changed over time. According to Doepke and Tertilt (2009), human capital accumulation may have increased men's incentives to share power with women. Similarly, Fernández et al. (2013) argue that female participation in the labor market has shaped men's preferences in favor of gender equality. Finally, Jensen and Oster (2009) have shown that media exposure positively effects the way in which female participation in society is perceived by public opinion. The first stage regression confirms the relevance of our instrumental variable.

Concerning the instrument exogeneity, our instrument is unlikely to be correlated with unobservable variables influencing total contributions for at least two reasons. First, we excluded

[22] The definition of professional roles includes those occupations requiring either college graduation or experience of such kind and amount as to provide a comparable background: accountants and auditors, airplane pilots and navigators, architects, artists, chemists, designers, dietitians, editors, engineers, lawyers, librarians, mathematicians, natural scientists, registered professional nurses, personnel and labor relations specialists, physical scientists, physicians, social scientists, teachers, surveyors and kindred workers.

those occupations that typically set broad policies. Second, as shown in Table 1, the fraction of men employed as professionals is always larger than the fraction of women employed in the same roles. Therefore, it is difficult to imagine a significant impact of female managerial decisions on the industry's campaign financing strategies.

Finally, to account for the censoring problem, we also estimate a censored quantile regression model with IV. As shown by Chernozhukov and Hansen (2008) and Chernozhukov et al. (2014), this technique produces estimates robust to weak instruments. The discontinuity of the unpopularity index does not allow us to use a quantile regression technique also at the first stage. Therefore, we estimate the control variable using the empirical cumulative distribution function of the residuals from the first stage OLS regression. Notice that with this specification we can control for both heterogeneity and endogeneity in an extremely flexible framework. This flexibility is also the reason why this approach outperforms Tobit-IV estimates even when they are theoretically efficient (see Chernozhukov et al., 2014).

5 Results

Table 2 reports the results from estimating equations (15) and (17). Column 1 presents the linear fixed effects estimates without control variables for the whole sample. The coefficient on the unpopularity index is positive and significant, but this coefficient could be extremely biased because of the lack of important time-varying regressors and the presence of censored observations. Column 2 deals with the former problem introducing two important sectoral variables, namely, the value added of the sector and the number of total workers employed. According to Table 2, electoral contributions are positively associated with the employment level. That is, the smaller the sector, the lower the electoral contributions. The value added of a sector, representing its contribution capacity, is positively associated with the amount of money given to candidates. Moreover, when we include these controls, the marginal effect of unpopularity increases. However, this effect comes mainly from the selection bias due to missing information.[23] Finally, on average, contributions in 2000 are lower than contributions in 2002 and 2004. Columns 3 and 4 propose the same estimates of Columns 1 and 2 only for those observations characterized by a positive level of contributions. Notice that, now, all coefficients decrease significantly. Therefore, because of

[23] The coefficient of unpopularity for Column 1, when the sample is that of Column 2, is 0.428. This means that for the excluded sectors the relationship between unpopularity and contributions is weaker. The same bias is observed for the Tobit estimates.

the censoring problem, our results might underestimate the real impact of some covariates on the dependent variable. For this reason, in Columns 5 and 6 we report the fixed effects Tobit estimates obtained with Honoré's method. Three important facts emerge immediately. First, the impact of unpopularity on electoral funds is positive and statistically significant, especially when we control for important sectoral variables. This confirms the theoretical prediction contained in Proposition 2. Second, the censoring mechanism mainly affects the impact of vote shares on contributions. That is, uncensored observations show a high correlation between π_{jdt} and c_{jkdt}. On the contrary, the coefficient of the unpopularity index tends to be more stable. Indeed, by looking at the last column of Table 2, we have that a 1% increase in the unpopularity index is associated with a 0.37% increase in the contributions paid by IGs. This value comes from the multiplication of the coefficient of g_{kt} by the probability of being uncensored (0.58) and coincides with the linear coefficient estimated in Column 2. Finally, there is evidence of a time trend determining the amount of electoral contributions between 2000 and 2004. However, due to measurement choices, the coefficient of g_{kt} could be potentially biased. This problem will be addressed in the last part of the section.

Table 2: Fixed effects estimates

	Linear (all obs.)		Linear (uncens. obs.)		Tobit	
Constant	-2.005***	-7.262***	7.091***	5.890***		
	(0.266)	(0.563)	(0.188)	(0.316)		
Unpopularity	0.414***	0.365***	0.156***	0.140***	0.646*	0.643**
	(0.075)	(0.076)	(0.041)	(0.042)	(0.384)	(0.319)
Probability	1.631***	1.631***	0.292***	0.293***	5.810***	5.809***
	(0.015)	(0.015)	(0.028)	(0.028)	(0.221)	(0.220)
Employment		1.004***		0.236***		0.748
		(0.125)		(0.064)		(0.514)
Value Added		0.128**		0.018		0.056
		(0.052)		(0.023)		(0.102)
Year 2002	0.901***	0.889***	0.084***	0.085***		
	(0.061)	(0.066)	(0.027)	(0.029)		
Year 2004	0.926***	0.756***	0.273***	0.241***		
	(0.057)	(0.070)	(0.024)	(0.031)		
Time					0.242***	0.216***
					(0.042)	(0.046)
Observations	33,035	33,035	19,237	19,237	33,035	33,035
R-squared	0.426	0.429	0.214	0.215		

Robust standard errors in parentheses.

Significant at *10%; **5%; ***1%

To probe further our conclusion that the unpopularity of an interest group is positively associated with its contribution levels, we augment our econometric model by considering possible confounding specifications. Table 3 proposes a battery of alternative models. Column 1 examines whether the unpopularity index is proxying for nonlinear effects related to the size of interest groups. As previously mentioned, workers may have different reasons to consider as more popular very large and very small sectors. However, even with this specification, contributions remain positively associated with unpopularity. In addition, the point estimate is now larger than before. In Column 2, we estimate our model considering only lopsided elections. The coefficient on the

unpopularity index remains positive and statistically significant. The same is true in Column 3, where we consider only close races, but the coefficient of g_{kt} is smaller with respect to that of lopsided races. This is consistent with the idea that in lopsided races, characterized by less uncertainty on the election outcome, candidates are less inclined to "sell" policy favors in exchange for contributions, and therefore policy favors are more costly. Notice that the coefficient on the probability of winning is higher in close races than in lopsided elections. This evidence suggests that returns to electoral probabilities are not constant. In this respect, a quantile regression analysis should uncover this kind of behavior. To control for the endogeneity of the vote shares, in Column 4 we replaced the ex-post election margins with the information on incumbent candidates. Nonetheless, our conclusions are robust to all specifications proposed in Table 3.

Table 3: Fixed effects Tobit (alternative models)

	Emp. sq.	Lopsided	Close	Incumbent
Unpopularity	0.682**	0.920***	0.665*	1.827***
	(0.347)	(0.300)	(0.385)	(0.541)
Probability	5.808***	2.735***	11.023***	
	(0.220)	(0.076)	(0.230)	
Incumbent				6.360***
				(0.095)
Employment	1.568	2.145	1.279	3.157*
	(1.250)	(2.190)	(1.275)	(1.878)
Employment sq.	-0.038	-0.078	-0.025	-0.134
	(0.063)	(0.097)	(0.066)	(0.087)
Value Added	0.028	0.143	-0.015	0.127
	(0.099)	(0.133)	(0.112)	(0.129)
Time	0.231***	0.864***	0.088*	0.563***
	(0.050)	(0.072)	(0.053)	(0.071)
Observations	33,035	11,580	21,455	33,349
Standard errors in parentheses.				
Significant at *10%; **5%; ***1%				

Even if our specifications avoid the strong parametric assumptions of traditional Tobit estimators, they cannot capture nonadditive heterogeneity in the effects of explanatory variables across

the distribution of contributions. Moreover, the impact of unpopularity on contributions might change when contributions rise. To address these issues, we use the censored quantile regression technique proposed by Chernozhukov and Hong (2002). Figure 2 shows both the coefficients and the confidence intervals of the censored quantile regression.

Since until the 30th quantile observations are censored, the first coefficient refers to this quantile. The estimated coefficient of the unpopularity index is always positive and statistically significant at 5%. In other words, even a censored quantile regression confirms the validity of Proposition 2. However, we can notice a tendency of this coefficient to decrease when contribution levels increase. The existence of decreasing marginal returns reveals a concave relationship between unpopularity and contributions. Since a nonlinear relationship could be due to some unobserved factors influencing the relationship between unpopularity and contributions, additional robustness checks are needed. In contrast, the marginal impact of the electoral probability is first increasing and then decreasing in the contribution levels. In other words, the probability of winning is extremely important to raise money in close races. The employment level impacts significantly on contributions only in the lowest and in the highest deciles, whereas the coefficient of the value added is always positive and statistically significant.

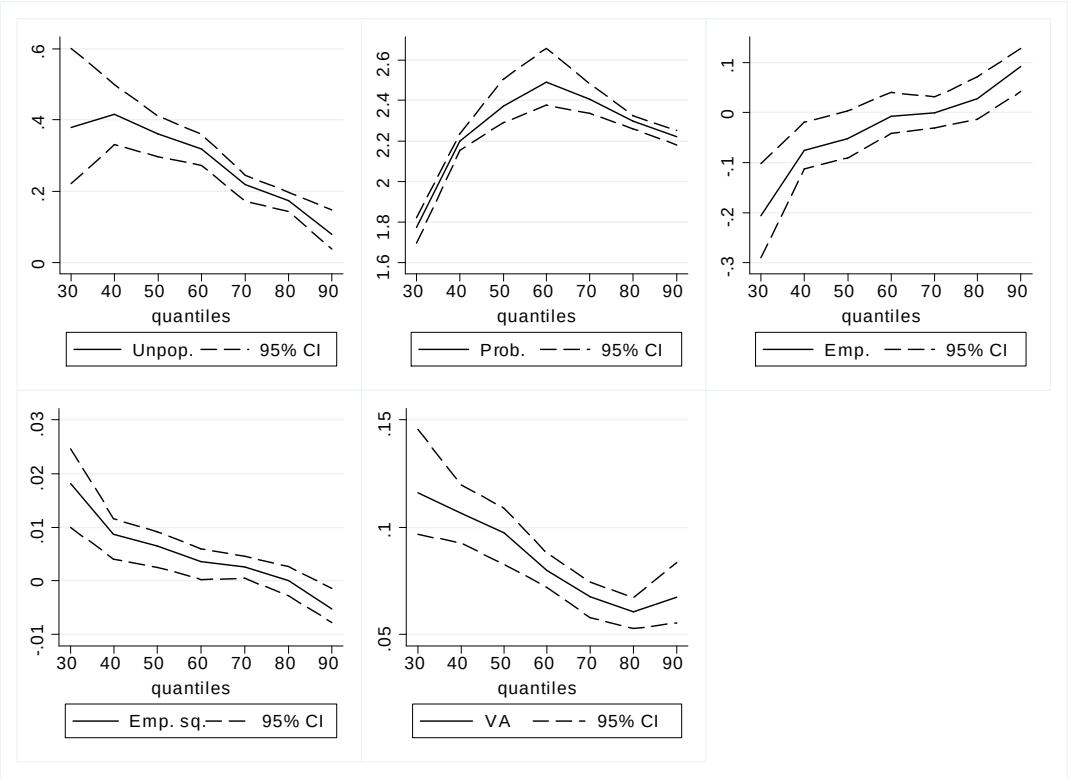

Figure 2: Censored Quantile Regressions (Coefficients and Confidence Intervals)

Although a censored quantile regression approach is a powerful technique to estimate models with censoring and nonadditive heterogeneity, simultaneity problems may still undermine our conclusions. In Table 4, we re-estimate equation (15) using a lagged variable approach, the Harris Poll index and an IV method. We also include the inverse Mills' ratio to account for censoring and selection problems.

Column 1 shows the estimates of a simple fixed effects model in which the unpopularity index of sector k at time t has been replaced with its value at time $t-1$. The coefficient of the lagged variable is positive and statistically significant at 5%. However, more proper tests are needed before drawing any conclusion on a causal relationship between the unpopularity of an IG and its contribution levels. Column 2 of Table 4 reports the estimates of equation (15) when the unpopularity index is measured using the Harris Poll question. In particular, we took the difference between the percentage of respondents that believe sector k does a bad job in serving its customers and the percentage of positive answers. As mentioned above, since the Harris Poll question refers to a precise sectoral dimension - namely, customer satisfaction - the relative answers should be less related to lobbying activities. Even in Column 2, the coefficient on the unpopularity

index is positive and statistically significant. The estimates of a fixed effects model with a possibly endogenous regressor are reported in Column 3 of Table 4.

The first-stage F-test shows that our instrument is strongly associated with the Gallup index. In line with the existing literature on equal opportunities and corporate reputation, we found a negative relationship between the percentage of women in professional roles and the unpopularity index (see Appendix C). Second-stage estimates confirm Proposition 2 on the relationship between the IGs' unpopularity and contribution levels. Note that, once we control for reverse causality, the marginal impact of the unpopularity index becomes higher. That is, the effect of unpopularity on contributions becomes even more important when we take into account the simultaneity bias. In Appendix C, we also perform two additional tests, constructing robust confidence intervals for our IV estimates.

Table 4: Lagged unpopularity, Harris index and IV-FE

	Lagged	Harris	IV-FE (II stage)
Constant	-45.758***	128.911***	
	(2.720)	(28.173)	
Unpopularity	0.212**	0.125***	1.747***
	(0.100)	(0.012)	(0.450)
Probability	11.328***	10.724***	11.800***
	(0.164)	(0.189)	(0.098)
Employment	-0.700	-66.384***	3.107***
	(0.923)	(10.643)	(0.848)
Employment sq.	0.150***	3.274***	-0.113***
	(0.043)	(0.433)	(0.044)
Value Added	0.039	-3.041***	0.121**
	(0.131)	(1.066)	(0.052)
Year 2002		0.597	1.142***
		(0.324)	(0.154)
Year 2004	-0.113	-1.869**	2.071***
	(0.090)	(0.801)	(0.068)
Mills' ratio	9.222***	7.789***	8.696***
	(0.171)	(0.162)	(0.083)
F(2, 30363)			773.12***
Observations	17,667	7,705	30,389
R-squared	0.35	0.58	0.57
Standard errors in parentheses.			
Significant at *10% ;**5%; **1%			

The latest exercise deals with both simultaneity and censoring. Since a censored quantile regression model with instrumental variables performs well when errors are normal and homoskedastic, and it outperforms Tobit estimates in case of heteroskedasticity, we also estimate a censored quantile regression model with IV. In this way, we can test whether our results change with the level of contribution. This allows us to control for the presence of heteroskedasticity and nonlinear effects. Again, the empirical evidence confirms the existence of a positive relationship between

electoral contributions and the unpopularity index (Figure 3). In addition, once we control for endogeneity problems, the coefficient of the unpopularity index tends to be smaller and constant across quantiles. From Figures 2 and 3, we can infer two distinct facts. First, a pooled regression approach tends to produce smaller coefficients for g_{kt} because we do not take into account time-invariant heterogeneity. Second, time-variant heterogeneity affects mainly those sectors that contribute less to electoral campaigns.

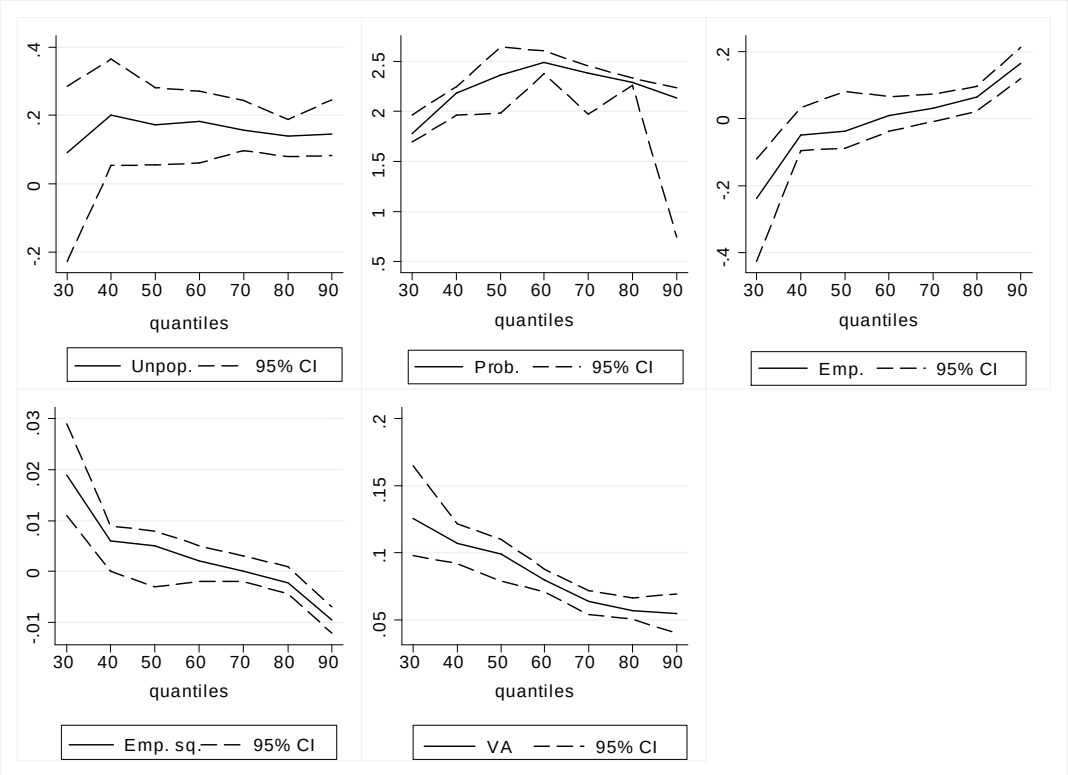

Figure 3: Censored Quantile IV (Coefficients and Confidence Intervals)

6 Conclusion

Starting from the main stylized facts on campaign financing by business interest groups, we proposed and tested a theoretical model in which campaign contributions depend on interest group popularity. According to our model, variations in the money spent on political campaigns by a given industry depend on that industry's reputation. More specifically, the electoral contributions from a given industry are always decreasing in its popularity. The intuition behind this result is rather straightforward: the amount of contributions that a lobby is willing to pay, must at least recover the popularity lost by a candidate in supporting its positions, and since contributions from industries that are perceived less favorably by citizens are less effective in influencing voters, interest groups that represent these business interests will tend to spend more (less) when they experience a negative (positive) popularity shock. Using data based on U.S. House elections, econometric analysis confirms the theoretical results.

Industry level popularity therefore plays an important role in determining political participation through campaign contributions. This seems to suggest that voters make use of the information relative to how politicians are financing their campaigns when casting their vote. Thus maintaining a good reputation, may be a valid way for an industry to successfully contain its political costs. An open issue for future research involves gathering a better understanding on how competition for policy favors within industries interacts with the industry's popularity, to determine campaign contributions. Moreover, it may be interesting to explore whether campaign advertising affects voter preferences over time.

Appendix

A. Proofs

Proof of Proposition 1. In what follows we denote $\mathbf{p}_j^*$ as the K dimensional equilibrium vector of policies, $\mathbf{p}_j^{-k*}$ as the vector of equilibrium policies excluding contributions from group k, $\mathbf{p}_j^{-k}$ as the (out of equilibrium) vector of polices if group k were to refrain from contributing, $\mathbf{C}_j^{-k*} = \sum_{n\neq k} C_{j,n}^*$ as the equilibrium contributions excluding those from group k and $\mathbf{C}_j^{-k} = \sum_{n\neq k} C_{j,n}$, as total (out of equilibrium) contributions if interest group k were to refrain from contributing. Also, $\sum_n d_v(g_n + p_{j,n}^*)$, $\sum_{n\neq k} d_v(g_n + p_{j,n}^*)$ and $\sum_{n\neq k} d_v(g_n + p_{j,n})$ denote the corresponding voter loss functions for $\mathbf{p}_j^*$, $\mathbf{p}_j^{-k*}$ and $\mathbf{p}_j^{-k}$ respectively.

Participation constraints (9) imply that the IG must offer the candidates with which it interacts, a level of contributions that would guarantee at least the same electoral probability that the candidate would obtain, by refusing the $IG's$ offer keeping constant the offers of the other interest groups. Considering equilibrium contributions and policies the participation constraint for each candidate j, for which $\theta_{j,k} = 1$ can be rewritten in the following way:

$$h(C_{j,k}^* + \sum\nolimits_{n\neq k} C_{j,n}^*) - h\left(\sum\nolimits_{n\neq k} C_{j,n}\right) \geq \sum\nolimits_n d_v(g_n + p_{j,n}^*) - \sum\nolimits_{n\neq k} d_v(g_b + p_{j,n}), \qquad \text{(A1)}$$

Now in order to maximize her chances of being elected, each candidate will accept offers from each IG with which it interacts (i.e., those for which $\theta_{j,n} = 1$) only if $hC_{j,n} \geq d_v(g_n + p_{j,n})$, so that when interest group k does not contribute, candidate j will optimally set $p_{j,k} = -g_k$ and will set $p_{j,n} = p_{j,n}^*$ for every $n \neq k$. This implies that for every IG, out of equilibrium beliefs on contributions and policies are well defined so that $\pi_1^{-k} = \pi_1^{-k}(\mathbf{C}_1^{-k}, \mathbf{C}_2^{-k}) = \pi_1^{-k}(\mathbf{C}_1^{-k*}, \mathbf{C}_2^{-k*})$. Therefore, solving for C_j^{k*} (A1) easily simplifies to:

$$C_j^{k*} \geq d_v(g_k + p_{j.k}^*)/h, \qquad \text{(A2)}$$

where $d_v(g_k + p_{j.k}^*)/h$ is interest group $k's$ minimum cost function of enacting policy $p_{j,k}^*$.

From the FOCs of the maximization problem of each k, each group k induces both parties to adopt a policy $p_{j,k}^*$ that satisfies the following condition:

$$\pi_j^{-k} = \frac{-d_v'(g_k + p_{j.k}^*)/h}{d_{IG}'(r_k - p_{j,k}^*)}, \forall j \in \{1, 2\}, \qquad \text{(A3)}$$

where $d'_v(\cdot)$ and $d'_{IG}(\cdot)$ are respectively the derivatives of these expressions with respect to $p^*_{j,k}$. This implies that independently of whether electoral motives apply, for any probability π_j^{-k} that interest group k takes as given, influence motives always hold. Since $d_v(\cdot)$ and $d_{IG}(\cdot)$ are respectively strictly increasing and convex in $(g_k + p^*_{j,k})$, and strictly increasing and strictly convex in $(r_k - p^*_{j,k})$, we obtain that $p^*_{j,k}$ is a weakly decreasing function of g_k but that $\left|\partial p^*_{j,k}/\partial g_k\right| < 1$, so that $(g_k + p^*_{j,k})$ is strictly increasing in g_k. It also follows naturally that $p^*_{j,k}$ is strictly increasing in π_j^{-k}. ■

Proof of Proposition 2. Considering electoral motives, these apply whenever the marginal return of providing a given candidate j with more funds than those are strictly necessary to induce her to adopt a given policy, is greater then the cost. In other words, when the following inequality is satisfied:

$$h'(\mathbf{C}^\circ_j)[d_{IG}(r_k - p^*_{-j,k}) - d_{IG}(r_k - p^*_{j,k})] > 1, \tag{A4}$$

where $\mathbf{C}^\circ_j = \sum_k d_v(g_k + p^*_{j.k})/h$ is the minimum level of contributions that is necessary to induce candidate j to adopt the equilibrium policy vector $\mathbf{p}^*_j$. Those interest groups for which this inequality holds will be willing to give additional contributions until the marginal benefit, given by the left hand side of (A4) is greater than marginal cost of contributions, which is equal to one.

The first thing to notice is that electoral motives never apply when $p^*_{1,k} = p^*_{2,k}$ since the left hand side of (A4) is always zero in these cases. Therefore considering the case in which policies differ, and assuming without loss of generality that $p^*_{1,k} > p^*_{2,k}$, it follows that only $j = 1$ can receive contributions for electoral motives, because the left hand side of (A4) is always negative for $j = 2$.

The second thing to observe is that if the marginal benefit of enhancing one candidate's chances of being elected differ for any two distinct interest groups $k, l \in \mathcal{K}$ with $k \neq l$, it follows that $[d_{IG}(r_k - p^*_{-j,k}) - d_{IG}(r_k - p^*_{j,k})] \neq [d_{IG}(r_l - p^*_{-j,l}) - d_{IG}(r_l - p^*_{j,l})]$. Therefore, since $\mathbf{C}^\circ_j$ is the same for all IGs, at most one IG will finance the preferred candidate for electoral motives. Thus, for at least $K - 1$ IGs, (A2) holds with equality, which implies that $C^*_{j,k}$ is strictly increasing in g_k for at least $K - 1$ interest groups.

Notice also, that in order for there to be less than $K - 1$ IGs that finance candidates only for influence motives (i.e., more than one for which electoral motives apply), there must exist at least two distinct interest groups $k, l \in \mathcal{K}$ with $k \neq l$ such that $r_k > r_l$, for which $[d_{IG}(r_k - p^*_{-j,k}) - d_{IG}(r_k - p^*_{j,k})] = [d_{IG}(r_l - p^*_{-j,l}) - d_{IG}(r_l - p^*_{j,l})]$. By (A3) this can occur only for a specific value

of $(g_l - g_k)$, and this value must be strictly positive implying that k must be more popular than l. ■

Corollary 3 *(i) The only candidate that may receive contributions for electoral motives is the ex-ante advantaged candidate. (ii) Contributions from every interest group $k \in \mathcal{K}$ are always weakly increasing in the ex-ante electoral advantage, b.*

Proof. Now denoting $z \in \mathcal{K}$ as the only IG that may be willing to finance candidates for electoral motives, since:

1) By Proposition 2 it follows that at least $K-1$ interest groups finance candidates only for influence motives

and

2) Given that out of equilibrium policies are well defined, (i.e. $p_{j,k} = p^*_{j,k}$ for any $k \in \mathcal{K}$)

it follows that $\pi_1^{-z} = 1/2 + b$. Thus, by Proposition 1 it follows that $p^*_{1,z} > p^*_{2,z}$ so that the only candidate that may receive contributions for electoral motives is $j = 1$, that has an ex-ante advantage (i.e. $b > 0$), which proves (i). Moreover, (i) and (1) imply that for all the $K-1$ IGs for which electoral motives do not apply, it must be that $\pi_1^{-k} \geq 1/2 + b$. Therefore, contributions are always weakly increasing in b, which proves (ii). ■

B. Unpopularity Index

We start from the following question taken from the Gallup Polls: "For each of the following business sectors in the United States, please say whether your overall view of it is Very positive, Somewhat positive, Neutral, Somewhat negative, or Very negative". We calculate the net percentage of positive answers for each sector:

$$NP_{kt} = \%\text{very positive}_t + w(\%\text{positive}_t - \%\text{negative}_t) - \%\text{very negative}_t. \tag{B1}$$

where $w = 1/2$. In order to test for robustness, we allowed for different weights, w, to be assigned to the positive and negative replies. Varying w from 1/2 to 1 reduces the relative impact of the more extreme responses. However, our estimates do not change substantially when we modify the value of w, confirming the robustness of our findings. Results are available upon request.

By respectively denoting maximum and minimum values of NP_{kt} with $\overline{NP}_t$ and $\underline{NP}_t$, we obtain our unpopularity index as follows:

$$g_{kt} = \left(1 - \frac{NP_{kt} - \underline{NP}_t}{(\overline{NP}_t - \underline{NP}_t)}\right) \cdot 100, \tag{B2}$$

where $g_{kt} \in [0, 100]$.

C. First-Stage Estimates and Weak Instrument Tests

In this appendix, we provide the first-stage estimates of the fixed-effects IV estimator reported in Column 3 of Table 5. Following Finlay and Magnusson (2009), we also perform the Anderson-Rubin (AR) test and the traditional Wald test to confirm the reliability of our estimates. We estimated the second-stage coefficient of the unpopularity index and its robust confidence interval (see Figure C1).

Table C1: First-stage IV estimates

Probability	-0.005
	(0.008)
Employment	-1.899***
	(0.033)
Employment sq.	0.100***
	(0.001)
Value Added	-0.052***
	(0.004)
Year 2002	0.324***
	(0.004)
Year 2004	0.086***
	(0.006)
Mills	-0.005
	(0.007)
Women/Men (professionals)	-1.703***
	(0.061)
Weak-instruments robust tests	
F-test (2, 30364)	773.12***
AR [$\chi^2(2)$]	7.98***
Wald [$\chi^2(1)$]	8.03***
Standard errors in parentheses.	
Significant at *10%; **5%; ***1%.	

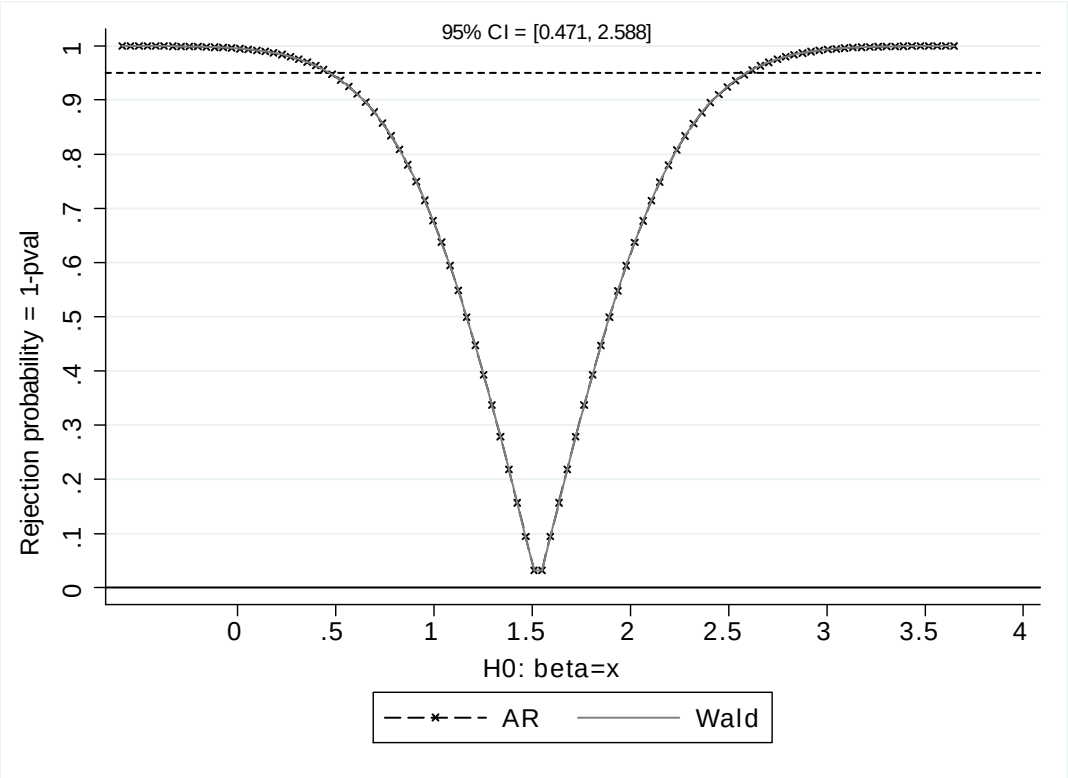

Figure C1: Weak Instrument Tests for professionals

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Technical Appendix D: Censored Quantile Regressions (Not Intended for Publication)

Table D1: Censored Quantile Regression

	30	40	50	60	70	80	90
				Unpopularity			
Coef	0.405	0.427	0.382	0.331	0.226	0.174	0.086
lower*	0.158	0.307	0.294	0.241	0.186	0.147	0.049
upper*	0.553	0.518	0.456	0.383	0.264	0.216	0.140
				Probability			
Coef	1.804	2.203	2.393	2.502	2.411	2.291	2.215
lower*	1.733	2.166	2.306	2.413	2.378	2.264	2.182
upper*	1.896	2.255	2.544	2.661	2.466	2.329	2.250
				Employment			
Coef	-0.230	-0.087	-0.054	-0.002	0.005	0.029	0.100
lower*	-0.373	-0.128	-0.101	-0.046	-0.021	-0.006	0.068
upper*	-0.162	-0.036	-0.016	0.051	0.041	0.076	0.128
				Employment sq.			
Coef	0.020	0.009	0.007	0.003	0.002	0.000	-0.006
lower*	0.014	0.006	0.005	0.000	0.000	-0.003	-0.007
upper*	0.029	0.012	0.010	0.006	0.004	0.003	-0.003
				Value Added			
Coef	0.119	0.107	0.097	0.078	0.065	0.060	0.065
lower*	0.098	0.095	0.088	0.073	0.054	0.052	0.052
upper*	0.152	0.120	0.107	0.084	0.072	0.071	0.083
				Time			
Coef	0.291	0.157	0.136	0.141	0.141	0.164	0.229
lower*	0.227	0.134	0.114	0.120	0.118	0.141	0.201
upper*	0.370	0.183	0.169	0.166	0.161	0.191	0.262
				Constant			
Coef	-585.554	-316.958	-275.209	-284.810	-284.192	-329.350	-457.235
lower*	-743.224	-370.847	-341.310	-335.796	-325.004	-383.939	-524.116
upper*	-456.612	-271.336	-232.431	-243.315	-238.444	-283.333	-402.167

*Upper and lower bounds of the 95% confidence interval.

Table D2: Censored Quantile Regression with IV

	30	40	50	60	70	80	90
				Unpopularity			
Coef	0.091	0.201	0.172	0.182	0.157	0.140	0.145
lower*	-0.227	0.054	0.055	0.061	0.097	0.079	0.082
upper*	0.286	0.365	0.282	0.271	0.243	0.188	0.245
				Probability			
Coef	1.774	2.185	2.364	2.488	2.381	2.292	2.129
lower*	1.693	1.959	1.980	2.378	1.969	2.261	0.748
upper*	1.962	2.249	2.643	2.604	2.455	2.335	2.235
				Employment			
Coef	-0.237	-0.049	-0.037	0.009	0.031	0.064	0.165
lower*	-0.425	-0.095	-0.088	-0.038	-0.009	0.022	0.120
upper*	-0.120	0.032	0.082	0.065	0.073	0.097	0.214
				Employment sq.			
Coef	0.019	0.006	0.005	0.002	0.000	-0.002	-0.009
lower*	0.011	0.000	-0.003	-0.002	-0.002	-0.004	-0.012
upper*	0.029	0.009	0.008	0.005	0.003	0.001	-0.007
				Value Added			
Coef	0.126	0.107	0.099	0.080	0.064	0.057	0.055
lower*	0.098	0.092	0.079	0.071	0.054	0.051	0.040
upper*	0.165	0.122	0.110	0.088	0.072	0.066	0.070
				Time			
Coef	0.347	0.182	0.143	0.150	0.151	0.165	0.224
lower*	0.244	0.150	-0.026	0.136	0.128	0.140	0.069
upper*	0.416	0.248	0.179	0.178	0.213	0.177	0.259
				Constant			
Coef	-697.263	-367.716	-288.081	-303.014	-304.162	-331.727	-447.171
lower*	-835.578	-498.154	-361.026	-358.379	-426.391	-355.376	-518.760
upper*	-491.449	-304.794	52.146	-274.023	-258.245	-280.460	-131.504

*Upper and lower bounds of the 95% confidence interval.

Technical Appendix E: Regressions with a re-defined unpopularity index (Not Intended for Pubblication)

In Table E1, we provide a sample of the main regressions illustrated in the paper by using different weights for the construction of the unpopularity index. In particular, instead of using $w = 1/2$, we now use $w = 1$ (see Appendix B). Other results are available upon request.

Table E1: Linear regression (unpopularity re-defined)

	Linear		Linear		IV-FE
	(all obs.)		(uncens. obs)		(II stage)
Constant	-0.106	-5.674***	7.825***	6.555***	
	(0.097)	(0.569)	(0.127)	(0.319)	
Unpopularity	0.477***	0.339***	0.198***	0.163***	2.087***
	(0.097)	(0.099)	(0.050)	(0.051)	(0.603)
Probability	1.631***	1.631***	0.292***	0.293***	11.829***
	(0.015)	(0.015)	(0.028)	(0.028)	(0.111)
Employment		1.022***		0.238***	3.326***
		(0.126)		(0.064)	(1.013)
Employment sq.					-0.124**
					(0.052)
Value Added		0.107**		0.011	0.036
		(0.052)		(0.023)	(0.048)
Year 2002	0.940***	0.950***	0.095***	0.101***	1.350***
	(0.059)	(0.064)	(0.025)	(0.028)	(0.114)
Year 2004	0.994***	0.826***	0.301***	0.270***	2.462***
	(0.057)	(0.069)	(0.025)	(0.032)	(0.126)
Mills					8.721***
					(0.091)
Observations	33,035	33,035	19,237	19,237	30,389
R-squared	0.426	0.428	0.214	0.215	0.566

Robust standard errors in parentheses. Significant at *10%; **5%; ***1%.