Unobserved Contributions and Political Influence: Evidence from the Death of Top Donors

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It has long been observed that there is little money in U.S. politics compared to the stakes. But what if contributions are not fully observable or non-monetary in nature and thus not easily quantifiable? We study this question with a new data set on the top 1000 donors in U.S. congressional races. Since top donors do not randomly support candidates, we propose an identification strategy based on information about top donors' deaths and the observed variations in candidates' performance after these events. The death of a top donor significantly decreases a candidate's chances of being elected in the current and future election cycles. Moreover, it affects the legislative activities of elected candidates. These effects do not depend on top donors' monetary contributions to a candidate but on their prominence and their total contributions during the election campaign.

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I Introduction

It has long been observed that, compared to the stakes, there is little money in U.S. politics (Tullock, 1972; Ansolabehere et al., 2003). For instance, in the last electoral campaign (2021-2022), candidates, parties, and organizations raised and spent roughly 14 billion U.S. dollars. In contrast, the annual spending of the federal government in the same period was about $6 trillion or more, and its consumption and gross investments were over $4 trillion.[1] There is also evidence that, over time, many wealthy donors do not fully exploit federal limits on donations. Studying a sample of top managers of blue-chip corporations in the U.S., Ansolabehere et al. (2003) estimate that the average manager donated about $7,500 to candidates, parties, PACs, and other committees in the 1997-1998 election cycle, far less than the $25,000 allowed under the Federal Elections Campaign Act. This lack of money in U.S. politics has been referred to as the *Tullock paradox*.

Two leading hypotheses have been proposed. The first posits that campaign finance reflects a competitive market for private benefits from public laws and services (Denzau et al., 1986; Baron, 1989; Snyder, 1990; Grier et al., 1994). In such competitive environments, little private benefit can be bought with campaign donations. Political donations are not observed because they provide instrumental value, but because they have personal consumption value for the donors. Giving to politics, therefore, is seen as very much like giving to charities. The second explanation takes the polar opposite view and suggests that some interest groups may not need to make contributions to politicians if they instead or in addition can commit to the threats of funding their opponents (Chamon et al., 2013). In the absence of competition between political donors, these threats may not be observed since they affect the political game only in out-of-equilibrium scenarios. The first explanation leaves little room for individual donors to influence political outcomes with donations, whereas the second depicts a scenario in which donors have most of the bargaining power. In both cases, individual donors provide little or even negative value to a politician.

In this paper, we revisit Tullock paradox, starting from a simple preliminary question. Is it possible that monetary contributions are not fully observable, or that they are non-monetary in nature, so that large individual donors can gain sway over candidates even if their *observable* monetary contributions are relatively small? Donors may have assets other than money to offer, such as social connections, experience, and advice. This is, for instance, the case of donors who can motivate others to provide money, convince influential people to offer their endorsement, provide larger exposure to a candidate in the media or help recruit talented staffers. Donors, moreover, may find ways to conceal their donations,

[1] Sources: US Federal Election Committee: https://www.fec.gov/updates/statistical-summary-of-24-month-campaign-activity-of-the-2021-2022-election-cycle/; Congressional Budget Office: https://www.cbo.gov/; and Federal Reserve Bank of St. Louis: https://fred.stlouisfed.org/series/GCE.

legally or illegally.[2] In this perspective, observed contributions are only the "tip of the iceberg," a signal of the presence of a social connection between a donor and a candidate.

We study this hypothesis by asking three interrelated questions. First, we study whether it is indeed the case that large individual donors can exert influence on candidates even if their observable monetary contributions to each candidate are relatively small (though perhaps large in aggregate). For this purpose, we construct a new dataset set combining data on the universe of candidates participating in U.S. electoral campaigns for the U.S. House of Representatives in 8 election cycles (from 2008 to 2018) with hand-collected information on their donors from biographical sources. We consider the top 1000 donors in U.S. congressional races, as ranked by the size of their total observable political contributions.[3] We do not focus on what they give to each candidate (which, as said, may be unobservable), but on what they accomplish. The challenge in attempting to assess the causal effect of top donors' contributions on candidates' electoral outcomes is that the match between candidates and donors is far from exogenous. To address this issue, we use the death of a top donor as a source of exogenous variation in the support of a candidate's campaign, which serves as our identification strategy. Specifically, we study how the probability of election, the share of received votes, and other electoral and legislative outcomes are affected by the death of a top donor. Interestingly, these events are not rare. In our dataset, we observe 278 deaths, which affect a significant share of candidates for the U.S. Congress - on average, more than 10% per election year for candidates participating in at least two electoral races and almost 30% for candidates with at least one top donor.

The second and third questions concern whether the influence of top donors goes beyond electoral outcomes and the channels through which they exert influence. For the influence of top donors beyond electoral outcomes, we study the influence that big donors have on the long-term legislative activity of the candidates that they patronize. With respect to the question on the channels, three hypotheses seem relevant: Do top donors matter because of the observable (little) money they donate to each individual candidate? Do, instead, top donors exert influence through non-monetary favors that are difficult to quantify (such as connections, access to talent, or advice)? And, finally, are top donors able to influence elections by providing non-observable monetary contributions? We are able to make progress on these difficult questions by combining our data set on

[2]Recently, Sam Bankman-Fried, the disgraced CEO of the cryptocurrency exchange FTX, quickly established himself as one of the largest political donors, personally giving over 40 million dollars to candidates, campaigns and PACs ahead of the 2022 midterm election, including the official maximum of $5,800 to two members of the Senate Agricultural Committee, which is the committee in charge of regulating cryptocurrencies. But, allegedly, official contributions were not all he contributed: in December 2022, federal prosecutors accused him of having violated numerous federal campaign finance laws by giving contributions to campaigns and PACs "in the name of other persons."

[3] Following the definition of the Federal Election Committee, we consider a contribution to be any gift, subscription, loan, advance, or deposit of money or anything of value given to influence a federal election, made by any person directly to any candidate or political action committee. For additional details, see https://www.fec.gov/help-candidates-and-committees/candidate-taking-receipts/types-contributions/.

the death of top donors with novel sources of information, such as detailed data on advertising spending in elections and the textual analysis of the bills cosponsored by the elected candidates in the U.S. Congress. We present three main sets of results corresponding to the three questions outlined above. We begin by showing that, on average, the death of a top donor in the electoral cycle preceding an election decreases a candidate's likelihood of being elected by 3 percentage points. Candidates are affected by the loss of a top donor even when they can rely on other top donors. These results are robust when using vote share as an alternate measure of electoral performance. Specifically, we observe that the death of one top donor decreases the votes received by a candidate by approximately 2 percentage points. To better understand the importance of this effect, note that on average, 18 winning candidates would lose their seats during an election cycle if their votes decreased by 2 percentage points. This would imply a 4.1% change in the composition of the US House of Representatives, which would be sufficient to change the majority in most Congresses. We further show that a donor's death has long-term effects on the career of candidates. Losing a top donor has an impact on candidates – both in terms of their share of votes and election probabilities – that persists across election cycles, having a significant impact on the election probability of the candidates who run in the electoral cycle after the loss.

Our second set of results pertains to the study of the long-term effects of top donors on candidates and their legislative activity in the U.S. Congress. The challenge here is that donors are certainly heterogeneous in the interests they pursue, but we do not observe these interests. We, therefore, cannot directly associate the death of a top donor with the legislative activity of the associated politicians on the specific issues of interest to the donor. A natural conjecture is that without outside influences, politicians can focus on the party agenda or on their preferred pet project; donors, on the other hand, add their heterogeneous concerns to the candidates' specific political agendas. Using a detailed classification of bills by topic, we show that losing a top donor has an impact on the entropy of the distribution of topics in the bills sponsored by the candidates who are elected. In other words, candidates who lose a top donor appear to be less distracted and able to focus on fewer topics. We confirm this conjecture by comparing their voting pattern with the voting pattern of their party, showing that the reduction in entropy is associated with a realignment toward the candidates' own parties: i.e., Congress persons who lose a top donor become more aligned with the median voter of their party.

Our last set of results relates to why top donors are important for candidates. We have three findings. The first is that the impact of a donor's death on a candidate does not depend on the donor's *observed* monetary giving to the candidate. This finding is confirmed by a placebo analysis in which we examine the electoral performance of candidates who do not lose a top donor but still experience a decrease in contributions from small donors similar to those registered when a top donor dies. We find no statistically significant effect on electoral outcomes.

For our second finding on the channels of influence, we study whether donors can provide monetary contributions in an unobservable way. To this goal, we examine the relationship of top donors' deaths to political advertising spending by Political Action Committees (PACs) or other nonprofit organizations (mainly the so-called 527 or 501(c)(4)) on individual candidates. Donors who would like to obfuscate their identity or even maintain complete anonymity can contribute using these "intermediaries".[4] If the top donors affect electoral outcomes by privately contributing in this way, then we should expect that their death does not affect spending in ads directly attributable to the candidate, but that they affect issue advocacy ads funded by superPACs targeted to a candidate associated with the top donor. This is exactly what we find.

The third finding is that the impact of losing a top donor depends on the "prominence" of the donor. To measure the prominence of the top donors, we rank them based on their total contributions during the most recent electoral cycle. Our findings reveal that candidates who lose top donors ranked in the highest quartile experience a greater decline in electoral performance than those who lose a top donor outside this group. We further corroborate our finding by identifying the top donors whose names appeared at least once on the Forbes 400 list at least once in their lives.[5] We show that candidates who lose top donors in Forbes' list experience a larger decrease in their electoral performance compared to other candidates with donors who are not in the list.

All in all, the findings described above suggest that big donors do matter for candidates and that the importance of the donors to a candidate is not directly correlated to the *observable* amount of money they donate to the candidate, but to measures of donors' prominence. They also suggest that politicians obtain significant material benefits from top donors that may play an important role in affecting electoral outcomes, and that affect legislative behavior. Of course, these findings are not in conflict with the other theories described above, since they do not exclude the possibility that donors face competitive pressures and/or derive consumption value from donations; nor that donors can also exert influence also by committing to contingent threats. Our results suggest that we should not interpret the relative paucity of observable money in U.S. politics as evidence against an instrumental theory of political contributions, i.e., that private interests use money to influence elections and legislative activity in a meaningful way. Our results, moreover, open many new issues, such as how to measure non-monetary

[4]Super PACs are prohibited from donating money directly to political candidates but can spend on ads that overtly advocate for or against political candidates. Although they are required to report their donors to the Federal Election Commission, they allow donors to make their connection with candidates less transparent. Nonprofits called 501(c)(4) can spend unlimited amounts on issue advocacy ads without disclosing donors. Issue advocacy ads are ads that satisfy minimal requirements: they cannot explicitly advocate for the victory or defeat of a candidate, but they can be explicitly political and targeted to a specific candidate. In the electoral cycles 2008 to 2018, 501(c)(4) represented about 1/3 of group-sponsored ads (Fowler et al., 2020).

[5]The compilation of this list was started by the journal Forbes in 1982. Every year, it registers the 400 richest people in the US.

contributions, whether unobserved contributions are provided through legal (for instance, PACs) or illegal means, and whether the total value of observed and unobserved contributions matches the value of the private interests at stake.

The remainder of the paper is organized as follows. In Section II, we present the data and the variables adopted in our empirical analysis. In Section III, we provide details about our empirical strategy. In Section IV, we investigate top donors' role in a candidate's campaign. In Section VI, we analyze the mechanisms through which a top donor may influence a candidate's campaign. In Section V, we study the long-term effects of top donors on participation and legislative activities in the U.S. House. Finally, Section VII concludes. In the following subsection, we discuss the related literature.

I.1 Related literature

In this work, we contribute to three distinct but connected strands of literature. First, the literature on the Tullock Paradox, which asks why there is so little money in politics and what motivates donations (Tullock, 1972; Ansolabehere et al., 2003). As mentioned, two explanations have been proposed. The first explanation posits that contributions are low because competitive forces make them ineffective: contributions do not really have an instrumental value for the donors, mainly a consumption value, just as donations to nonprofits.[6] The second explanation is that donors exert real power, but they do not need a lot of money to do it: they can influence politicians by committing to contingent threats.[7] Both theories have their merits and capture different aspects of a complex problem. In our paper, we provide evidence for a third alternative: donations are low because they are unobserved, but still important for candidates. Moreover, we present evidence that top donors provide non-monetary contributions (measured by their "prominence"). Therefore, we show that whether top donors expect a *do ut des* or are just altruistic, they impact elections and legislative activities. Both of the previous explanations predict that the loss of a big donor has little or even negative impact on a politician;[8] we present evidence that the impact is significantly negative. In recent important work, Bertrand et al. (2020) provide evidence that corporate philanthropy is used as a tool of political influence, a finding that supports and complements ours since this channel can be used to obfuscate the source of political contributions.

[6]Important work suggesting that political contributions should be seen as instrumental political investments are presented, among others, by Denzau et al. (1986); Poole et al. (1987); Baron (1989); Snyder (1990); Baron et al. (1991); Stratmann (1991); Grier et al. (1993); Romer et al. (1994); Ansolabehere et al. (1999); Stratmann (2002). The consumption theory of political contributions is proposed by Ansolabehere et al. (2003). Recent work suggests that small donors are more likely than large donors to derive consumption value from donations because they are unlikely to buy policies or access to politicians. (see Bouton et al., 2022, 2024, among others)

[7]The literature on contingent contribution is started by Bernheim et al. (1986) and Grossman et al. (1994). Goldberg et al. (1999) provide an empirical study of this type of models. The observation that contingent threats may contribute to explaining the Tullock Paradox is made by Chamon et al. (2013).

[8]If donors provide little money to politicians, or if they provide little money and big threats, then the loss of the donor is either irrelevant or even a strictly positive factor.

The second literature to which our work is connected is the work attempting to measure the effect of lobbying and political contributions on elections and legislative behavior. The challenge here is to account for the fact that donations are endogenous. The existing studies rely on instrumental variables, fixed effects, regression discontinuity designs, or structural models to identify the causal effect of money on political outcomes.[9] This literature shows that the size and relevance of the effects depend on the context in which they are measured. The effect of *observable* campaign contributions is small on electoral results (Levitt, 1994; Cox, 2022) but large on the federal financial legislation (Stratmann, 2002). The effect of lobbying expenditures on allocating federal earmarks is small for universities (De Figueiredo et al., 2006) when not represented in the House or Senate Appropriations Committee, but large for local governments (Goldstein et al., 2017). At the same time, lobbying expenditures can provide large returns to single firms (Huneeus et al., 2021) but not to an entire industrial sector (Kang, 2016).

Very little empirical work is based on directly observing exogenous (or nearly exogenous) shocks to the demand or supply of political contributions, as we do in our paper. Roberts (1990), and Jayachandran (2006) present event studies to investigate the effects of the death or the unforeseen party switch of influential politicians on the stock market valuations of corporate donors.[10] Ansolabehere et al. (2004) present an event study of the effect of campaign finance regulatory changes that affected corporate donations on the market valuations of contributing firms. Kalla and Brookman (2016) presents quasi-experimental evidence suggesting politicians sell donor access.[11] Avis et al. (2022) exploit a natural experiment to show how looser campaign limits decrease electoral competition.[12] These papers provide very insightful results on the channel through which private interests affect policymakers, and provide insights on the value of political connectedness to donors, but they do not provide evidence on the extent to which private interests are successful in affecting electoral outcomes and/or the politicians' legislative behavior.[13]

[9]Studies that rely on fixed effects to exploit repeated challenges and repeated roll calls include Levitt (1994) and Stratmann (2002). Recent empirical studies relying on instrumental variables are Chappell (1982); Welch (1982); Gerber (1998); and De Figueiredo et al. (2006). Studies based on a structural model are presented by Kang (2016); Huneeus et al. (2021); Goldstein et al. (2017); Cox (2022), among others. For recent surveys, see Ansolabehere et al. (2003); Strattman (2005); De Figueiredo et al. (2014); Bombardini et al. (2020), among others.

[10]Roberts (1990) study the impact of the death of Sen. Henry Scoop Jackson on his constituencies and the constituencies of his successor. Jayachandran (2006) studies the unexpected decision of Senator James Jeffords to switch parties, thus ending the Republican control of the U.S. Senate in 2001.

[11]The authors study the responses received from 191 congressional offices to requests to schedule a meeting from a political organization, depending on whether it was revealed in a randomized way past contributions. The authors show that senior policymakers made themselves available 3 to 4 times more often to political donors.

[12]The authors show how limits on campaign spending induced by an electoral reform in Brazil, that set a larger cap of spending for some municipalities compared to others, decreased the chances of richer candidates getting elected by creating a larger pool of candidates that is on average less wealthy.

[13]Also indirectly relevant is the work by Blanes i Vidal et al. (2012) and Bertrand et al. (2014), who assess the effect U.S. Senators' retirements on, respectively, the lobbying revenues of their staff turned lobbyists, and the topics on which they specialize.

We contribute to this literature by proposing a new source of quasi-experimental evidence to assess the effect of contributions (monetary and non-monetary) on electoral outcomes and legislative behavior. The key idea is to use observable contributions to identify an observable link between the donor and the candidate, but then to assess the influence of the top donor by measuring the effect of his/her death on the connected politicians in terms of electoral outcomes, dark money expenditure (as, for example, ads expenditures by 501(c)(4)), and legislative behavior of the candidate.

Finally, a third body of work to which our work is connected is the literature on the importance of social connections with politicians (for work on the United States, see Knight, 2006; Do et al., 2015; Goldman et al., 2009; Brown et al., 2017).[14] To some extent, we can say our analysis explores the mirror image of these results: the benefit to politicians to be linked to top donors. This literature and our work provide evidence of the importance of non-monetary or monetary but unobserved favors between politicians and private interests.

II Data and Definition of Variables

We assemble a comprehensive dataset on the universe of candidates and donors in U.S. electoral campaigns for the U.S. House of Representatives for 6 election cycles (from 2008 to 2018). The data contains information about i) the characteristics and the electoral outcomes of all candidates, not just the winners; ii) the characteristics and the political profile of their districts of election, iii) the legislative activity of elected candidates, and iv) the characteristics of donors who supported them, along with the amount of donations received. In Section II.1, we describe the data sources for i) and iii) and the information extracted from each of them. We describe the data on top donors in Section II.2.[15]

II.1 Candidates in the U.S. Congress

US Federal Election Committee (FEC). We extract data about the electoral results of all candidates in the considered period from the FEC database.[16] Specifically, we consider two variables. The first indicates whether a candidate won the election or not.[17] The second is a unique ID associated with the candidate that we use to merge this data with the DIME data discussed below.

[14] Important work for political system different than the U.S. is done, among others, by Fisman (2001), who studied Indonesia; Khwaja et al. (2005) who study Pakistan; Faccio (2006), who presents evidence for a panel of 47 countries; Ferguson et al. (2008) who studied Nazi Germany; and Baltrunaite (2019) who studied Lithuania

[15] In the Appendix, Table A1 reports descriptive statistics for all the variables presented in these two Sections.

[16] Available at https://www.fec.gov/introduction-campaign-finance/election-and-voting-information/

[17] In a robustness check, we use an alternative measure of the electoral outcome, that is, the percentage of votes obtained by a candidate. Our results are qualitatively unchanged. For additional details, see Section IV.1.

Database on Ideology, Money in Politics, and Elections (DIME).[18] For each candidate during a considered election cycle, we extract data about his/her name, his/her gender, their incumbency status, and the number of times he/she ran for Congress. Moreover, we extract the name of the district of election and information about the political orientation of the district by looking at whether the constituency of the district voted in favor of the presidential nominee of the candidate's party. In addition, we pull data about the total contributions received by each candidate, distinguishing between individual and committee contributions.[19] Next, for each contributor during a considered election cycle, we extract his/her name and State of residence. By looking at the recurrence rate of a donor's last name in the US Census Bureau data, which associates US citizens' last name to a race, we could also predict his/her race.[20]

The DIME data allows us to uniquely match candidates to their donors and provide precise information on the amount donated, distinguishing between money donated to candidates and political committees. While information on donors is also available in the FEC records, DIME provides a unique ID to each donor, allowing us to associate different donations to the same donor.[21] Using this data, we calculate for each donor: i) the total contributions donated to each candidate during an election cycle and ii) the total contributions provided to both candidates and electoral committees.[22] For each election cycle, we rank donors according to their total donations and identify the top 1000 donors. We create two variables: total donations from top and non-top donors received by each candidate who ran for a seat in the US House of Representatives from 2008 to 2018. We also pull from DIME information about candidates in each election cycle: i) his/her party, ii) whether or not he/she is an incumbent, and iii) whether he/she was selected through primary elections.

US Internal Revenue Service (IRS). We use the name of the district in which a candidate ran for office, to create a dummy variable that takes 1 if candidate i from party j ran for office during election cycle t in a district that voted for j's nominee during the most recent presidential elections, and 0 otherwise. We manually associate the name of the district to its zip code, and we merge this

[18] See Bonica (2014) for details about the construction of the data and a description of it. The dataset is available at http://bit.ly/2vYrSuU

[19] In the DIME data, committees include PACs, super PACs, party committees, and leadership PACs.

[20] Specifically, we use the R package "predictrace" to determine the information about race. The software assesses the likelihood that an individual's last name belongs to an ethnic group. The ethnic groups considered are White, Black or African-American, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander. Computation is obtained by looking at the rate of recurrence of a last name in the US Census Bureau data, which associates US citizens' last name to a race. We select the race indicated by the software as the most recurrent race associated with a top donor's last name.

[21] The DIME, on the other hand, contains also information on electoral outcomes. However, we used the source of data (FEC) because there are inconsistencies in the information on electoral outcomes in the DIME for the years after 2014.

[22] To account for differences in donations across years motivated by a different economic context, we normalize contributions using the Consumer Price Index (CPI), which is the most widely used measure of inflation in the United States (US Bureau of Labor Statistics, 2018). It is available at https://fred.stlouisfed.org/series/CPILFESL

data with the information provided by the US Internal Revenue Service (IRS) about the number of taxpayers residing within the area of a zip code during a given year who declared: i) less than 50 thousand dollars (low-income taxpayers); ii) between 50 and 100 thousand dollars (middle-income taxpayers); and iii) over 100 thousand dollars (high-income taxpayers).[23] Then, we calculate the median percentage of low and high-income taxpayers across all districts during a given election cycle. Finally, we create two dummy variables. The first takes 1 if a candidate ran for office during election cycle t in a district with a percentage of low-income taxpayers that are above the national median at time t, and 0 otherwise. The second takes 1 if a candidate ran for office during election cycle t in a district with a percentage of high-income taxpayers that are above the national median at time t, and 0 otherwise. We use these data to identify districts with a large presence of high-income and/or low-income voters (for other districts) in which we expect a larger/lower presence of resident top donors (and thus it may be easier/harder for candidates to replace one of them after his/her death), and where more contributions may be needed to conduct a successful electoral campaign. The first information is used to conduct a robustness check to confirm our identification strategy (see Section IV.1). The second information is used to study how top donors allocate their money (see Figure 2).

Political Advertisement. We construct a proxy of candidates' media exposure during an election cycle to observe changes in the support provided by relevant interest groups after a candidate loses a top donor. For this purpose, we use data from the Wesleyan Media Project, which records information on each political advertisement aired on all broadcast television stations in all media markets in the United States.[24] We retrieve from this data the name of the candidate supported by the advertisement, the expenditures for that advertisement, and the sponsor of the advertisement. Specifically, this last piece of information indicates whether the money was spent by the candidate (either alone or in coordination with the party) or by an interest group. For each candidate, we calculate the amount of money spent for political advertisement in his/her support by each source (the candidate or the interest groups) during each election cycle.[25] Then, we manually match this data with that provided by the DIME, using the name of the candidate.[26] We can complete this process only for election cycles from 2010 to 2018, since Wesleyan Media Project records the candidate's name associated with a political advertisement only from 2010.

[23] Available at https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-statistics-zip-code-data-soi

[24] https://mediaproject.wesleyan.edu/

[25] In the Wesleyan Media Project data, interest groups include Political Action Committees (PACS), super PACS, and other non-profit organizations such as the so-called 501(c)(4) and 527.

[26] Less than 20% of candidates are found to be associated with a public advertisement. Additional information is provided in the Appendix, Table A2.

Legislative Activity and Voting. We construct two different indicators to measure the legislative behavior of elected candidates after the death of a top donor. The first indicator considers the legislator's political agenda. Specifically, using the universe of bills sponsored by each Congress Member in each Congress, we look at the diversity of the sponsored bills in terms of the main topic covered. This is calculated using the Shannon entropy index (Shannon, 1948; Boydstun et al., 2014): i.e., $\sum_{i=1}^{n} -p_i log_2 p_i$, where p_i is the share of bills with main topic i sponsored by a given legislator in a Congress, and n is the total number main topics in the bills sponsored by the legislators in that Congress. A value of this index close to 0 indicates that the legislative activity of the Congress Member is focused on one major topic. A value of this index close to 1 indicates that the sponsored bills cover many different major topics.[27] The second indicator builds on the legislators' voting behavior. It measures the ideological distance of a Congress Member from the median position of his/her party. This is obtained with the formula $|id_i - median(id_p)|$,where id_i is the value of the second dimension of the Nokken-Poole ideology estimate associated to i's party colleagues in the same Congress. The first dimension of the Nokken-Poole index places politicians on the liberal-conservative spectrum for economic policy, where donors are less influential. In contrast, the second dimension captures positions on high-salience civil rights issues, like gun control and abortion, which often divide party coalitions (Nokken et al., 2004).[28] The Nokken-Poole measures are used extensively in studying legislative voting. Values above zero indicate that the voting behavior of the legislator is to be associated with a conservative ideology. Values below zero indicate that the voting behavior of the legislator is to be associated with a liberal ideology. As this variable approaches zero, the legislator is considered a moderate. The legislator is considered an extremist when it is close to one in absolute value.[29]

[27]The major topic of each bill presented in the US House of Representatives is recorded in the Policy Agendas Project (PAP) topic system (www.comparativeagendas.net/us). This system associates the policy content of each bill to one out of 20 major policy areas: Macroeconomics, Civil Rights, Health, Agriculture, Labor, Education, Environment, Energy, Immigration, Transportation, Law and Crime, Social Welfare, Housing, Domestic Commerce, Defense, Technology, Foreign Trade, International Affairs, Government Operations, Public Lands, and Culture. The dataset where this information on topics is associated with the names of the sponsors of each bill can be found at www.congressindata.com. For additional information and a descriptive analysis of the topics Representatives cover in their bills, see Battaglini et al. (2023).

[28]Figure A1 in the appendix visualizes the first and second dimensions of the Nokken-Poole index for members of the 118th Congress (2023–2025), with the x-axis representing the first dimension and the y-axis representing the second. The figure illustrates clear partisan polarization along the first dimension, with Democrats clustering around liberal positions and Republicans around conservative positions. However, no such pattern emerges along the second dimension; Democrats and Republicans are widely distributed across this spectrum, without a clear ideological clustering. For further details on the distinctions between these two dimensions and their ability to capture polarized issues, see Hare et al. (2014).

[29]Data about Congress Members' ideology is provided by the website voteview.com. The dataset associating this information on the ideology of Congress members with the names of the sponsors of each bill can be found at www.congressindata.com.

II.2 Top Donors in the U.S. Congress

We collect demographic characteristics of the top 1,000 donors, ranked by the size of their total observable political contributions,[30] in each election cycle between 2004 and 2018, thus considering a time window 4 years longer than that adopted for the data collection of candidates. In this way, we can register existing relationships between donors and candidates formed before the first electoral competition observed.

Our sample has 3248 unique top donors, representing the top 1000 in at least one election cycle considered. We manually searched for the biographical information for them using over 1000 online sources.[31] By merging our novel data with that of candidates included in the DIME, we provide the first portrait of the top donors in the US Congress. To isolate the effects of donors from a candidate's idiosyncratic characteristics, we will employ individual fixed effects and follow a candidate's career over multiple election cycles. Therefore, candidates who ran for office only once are discarded from our investigation (these are approximately 5,000 candidates, representing 33% of the observations in our sample).[32]

Demographics. Figure 1 shows some demographic information about the top 1000 donors in the electoral campaigns of 2008-2018 Congresses. Top donors are, on average, 65 years old, the majority of them are white males, and most reside in California, New York State, or Texas. In the Appendix, Figure A3 shows that most top donors contributed to more than ten election cycles from 1982 to 2018. Table 1 shows that, on average, their total donations range from \$60,000 to \$380,000, their total donations to candidates range from \$21,000 to \$80,000, and their total donations to committees range from \$43,000 to \$340,000. They typically support an average of 13 to 25 candidates and 8 to 30 committees.[33] Table 2 characterizes top donors by looking at the characteristics of the candidates they support. It shows that top donors typically do not provide exclusive support, as only 585 candidates (out of almost 4,000) are supported by a single top donor. Top donors do not specialize in candidates of a given party: the shares of Republicans and Democrats supported by top donors are equal at 50%. Top donors also tend to sponsor female and male candidates at a similar rate and

[30] The list of political contributions considered is presented in footnote 3.

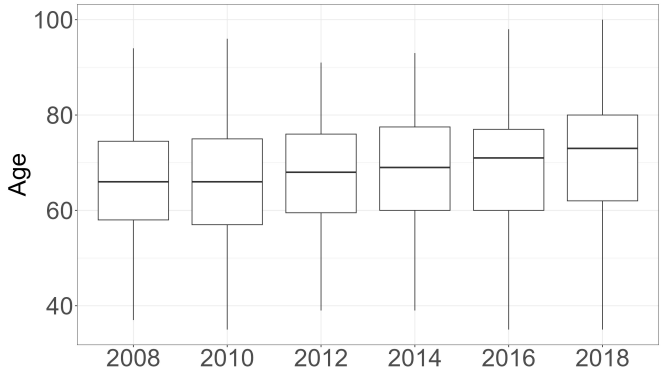
[31] Figure A2 illustrates the main sources used to perform this task.

[32] The unit of observation in our sample is candidate by election cycle.

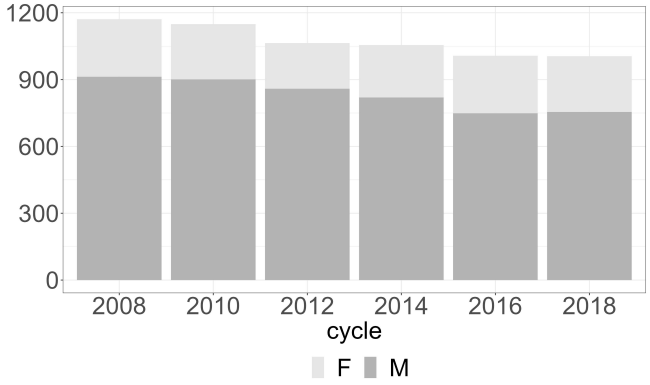
[33] The large variation in the amount of contributions to political committees is due to the landmark decision of the US Supreme Court in Citizens United v. Federal Election Commission, 558 U.S., commonly referred to as "Citizens United". Before this decision, rules governing political contributions imposed limits per donor and restrictions on corporate giving. After 2010, these rules were upended, and individual donors and corporations can donate unlimited contributions to "super PACs", are outside groups and a new form of PACs. They differ from traditional PACs because they are not bound by spending limits on what they can collect or spend. If super PACs don't give money directly to candidates, they can spend money on independently produced ads and other communications that promote or attack specific candidates. Additional details on Citizens United are provided by Klumpp et al. (2016). Notably, our results remain roughly the same when assessing the role of top donors before and after Citizens United.

Figure 1.
Top Donors
- Demographic Characteristics -

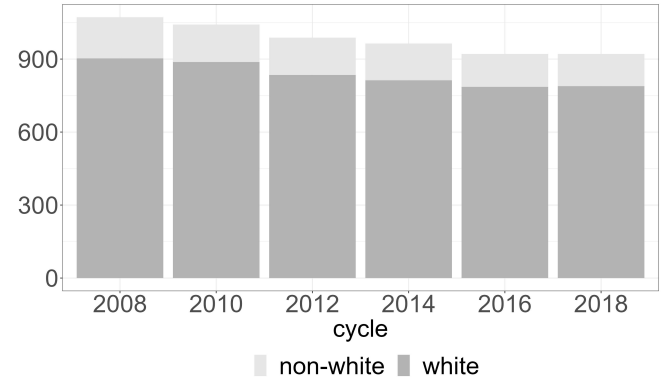
(a) Distribution of Top Donors' Age by Election Cycle



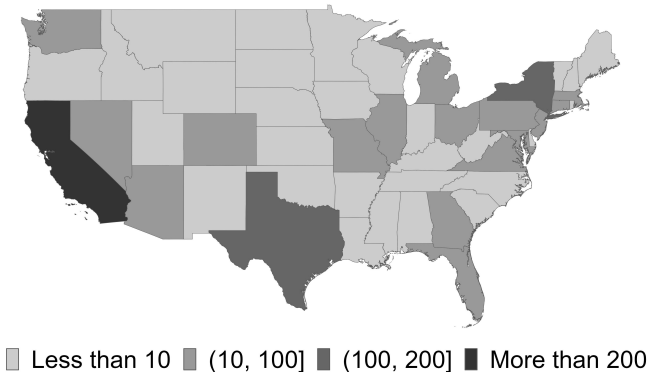
(b) Number of Female and Male Top Donors by Election Cycle



(c) Number of White and non-White Top Donors by Election Cycle



(d) Average Number of Top Donors in one Election Cycle by State of Residence



Note: Figure (a) shows the box plot of the top donor's age in each cycle. Data about age is available for 22% of top donors. Figure (b) shows the gender distribution of the top donors in each cycle. Data about gender is available for 99% of top donors. Figure (c) shows the race distribution of top donors in each cycle. The race information is retrieved using the R package "predictrace". Data was retrieved for 90% of top donors. See footnote 20 of the paper for additional details on the procedure to extract the donor's race. Figure (d) shows the average number of top donors by State of residence in one cycle. The State of residence of the top donor is the State declared by the donor to the Federal Election Committee (FEC) and registered in the DIME. Within the same cycle, the State of the top donor may change. We use the State from which the top donor made most of his/her donations. Data about the State of residence is available for 99% of top donors. For visualization purposes, Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands are excluded from the map. In each of them, the *Average Number of Top Donors in one Election Cycle by State of Residence* is less than 10.

Table 1
Top Donors
- Characteristics of Contributions -

Election Cycle	2008	2010	2012
Amount of Donations	59,790.36 (87,345.21)	74,106.74 (180,414.44)	214,366.41 (1,524,325.24)
Amount of Donations to Candidates	21,072.79 (16,865.99)	28,561.54 (23,068.83)	28,674.78 (25,087.43)
- of the same party	19,592.18 (16,099.86)	26,777.33 (22,245.04)	27,003.37 (24,371.84)
- of a different party	1,435.08 (3,881.44)	1,806.34 (5,033.88)	1,512.99 (5,113.78)
Candidates Supported	13.25 (10.78)	14.98 (12.75)	14.52 (12.52)
- of the same party	10.72 (8.67)	12.42 (10.46)	11.24 (9.88)
- a different party	0.79 (1.98)	0.88 (2.20)	0.70 (1.91)
Amount of Donations to PACs	43,531.38 (85,226.46)	52,362.63 (185,006.64)	204,570.29 (1,595,055.55)
PACs supported	8.31 (11.44)	8.74 (12.89)	11.19 (23.63)
Election Cycle	2014	2016	2018
Amount of Donations	189,935.72 (1,511,158.36)	488,771.66 (2,459,653.46)	381,784.72 (2,424,149.20)
Amount of Donations to Candidates	40,380.65 (40,047.99)	50,367.81 (67,252.38)	79,026.24 (104,996.02)
- of the same party	38,691.33 (39,195.34)	48,501.09 (66,192.22)	76,710.73 (103,382.97)
- of a different party	1,884.95 (6,070.18)	2,039.90 (7,973.05)	3,060.45 (15,638.22)
Candidates Supported	15.42 (14.59)	19.28 (18.82)	24.62 (27.49)
- of the same party	13.49 (13.04)	15.85 (16.35)	20.70 (24.10)
- a different party	0.76 (2.29)	0.80 (2.57)	0.88 (2.91)
Amount of Donations to PACs	174,279.91 (1,616,696.21)	477,435.09 (2,534,261.13)	336,511.38 (2,510,690.56)
PACs supported	12.15 (29.00)	20.95 (64.45)	28.71 (238.39)

Note: Average (and standard deviation) of top donors' contributions in each election cycle. The ideology of a donor is inferred from his/her donations. Specifically, a donor is defined to be a Republican/Democrat if more than 50% of the candidates that he/she supported were Republicans/Democrats.

Table 2
Top donors:
- Characteristics of Supported Candidates -

	All	% Republicans	% Democrats
Num. Candidates with $n > 1$ top donors	3222	50.5(50.01)	49.35(50.00)
Num. Candidates with $n = 1$ top donors	585	49.06(50.03)	49.06(50.03)
% Women	52.61(49.95)	55.98(49.7)	64.5(47.88)
% Not incumbent	22.08(41.48)	32.27(46.76)	32.19(46.73)
% Ran only once	18.53(38.86)	24.58(43.07)	27.86(44.84)
% Ran primary	48.83(49.99)	62.25(48.48)	62.16(48.51)
% District in favor of candidate's party presidential nominee	75.12(43.24)	76.4(42.48)	73.93(43.92)
% Candidates supported by donors of a different party	38.9(48.76)	28.5(45.16)	49.89(50.01)

Note: Average (and standard deviation) of characteristics of candidates. The party of a donor is defined as the party with a share of supported candidates higher than 50%.

those with or without party support (as proxied by having run for primaries). On the other hand, they tend to sponsor candidates supported by their constituency (as proxied by having a constituency in favor of the candidate's party presidential nominee) and more experienced candidates (as measured by being an incumbent and having run more than once). Interestingly, top donors do not seem to support only candidates of their political inclination but rather appear to have an open approach to political donations (donors support almost 40% of candidates with an ideology different from their own).[34] Looking at all electoral races in our observed period (2,610, i.e., 435 in each election cycle), Table 3 shows that 90% of the races feature at least one candidate supported by a top donor.[35] On average, 43% of candidates in a given race are supported by top donors. More than 87% of candidates supported by top donors win the elections. This percentage is roughly 73% for tight races, indicating that the support of top donors is effective.

To identify the profile of the candidate supported by a top donor, we run a regression model where the (log) amount of donations received by a candidate from a top donor in election cycle t is regressed against several candidate's characteristics. The results of this exercise are reported in Figure 2, where the estimated coefficient of correlation associated with a candidate's characteristic and the relative confidence interval at the 95% level are indicated respectively with a dot and a bar. We find that top donors' contributions are larger when candidates

[34]The ideology of a donor is inferred from his/her donations. Specifically, a donor is defined to be a Republican/Democrat if more than 50% of the candidates that he/she supported were Republicans/Democrats.

[35]In the Appendix, Figure A4 shows the average number of candidates supported by at least one top donor in each State. The majority of candidates are located in California, Florida, and Texas.

Table 3
Top Donors:
- Characteristics of Races -

	All Races
% races with a least a candidate supported by a top donor	93.76(24.20)
% races with a least a candidate supported by a top donor from a different State	86.07(34.63)
% candidates supported by a top donor in a race	43.76(24.65)
% elected candidates supported by top donors	87.96(32.56)

Note: Average (and standard deviation) of characteristics of races with at least one candidate supported by top donor. The State of residence of the top donor is the State declared by the donor to the Federal Election Committee (FEC) and registered in the DIME. Within the same cycle, the State of the top donor may change. We use the State from which the top donor made most of his/her donations.

are more likely to be elected: i.e., they are the incumbent, run for office multiple times, or run in a district that voted in favor of their party's presidential nominee. Moreover, the contributions of a donor are larger when directed to Republicans and those who run in a district with a percentage of high-income taxpayers above the national median.

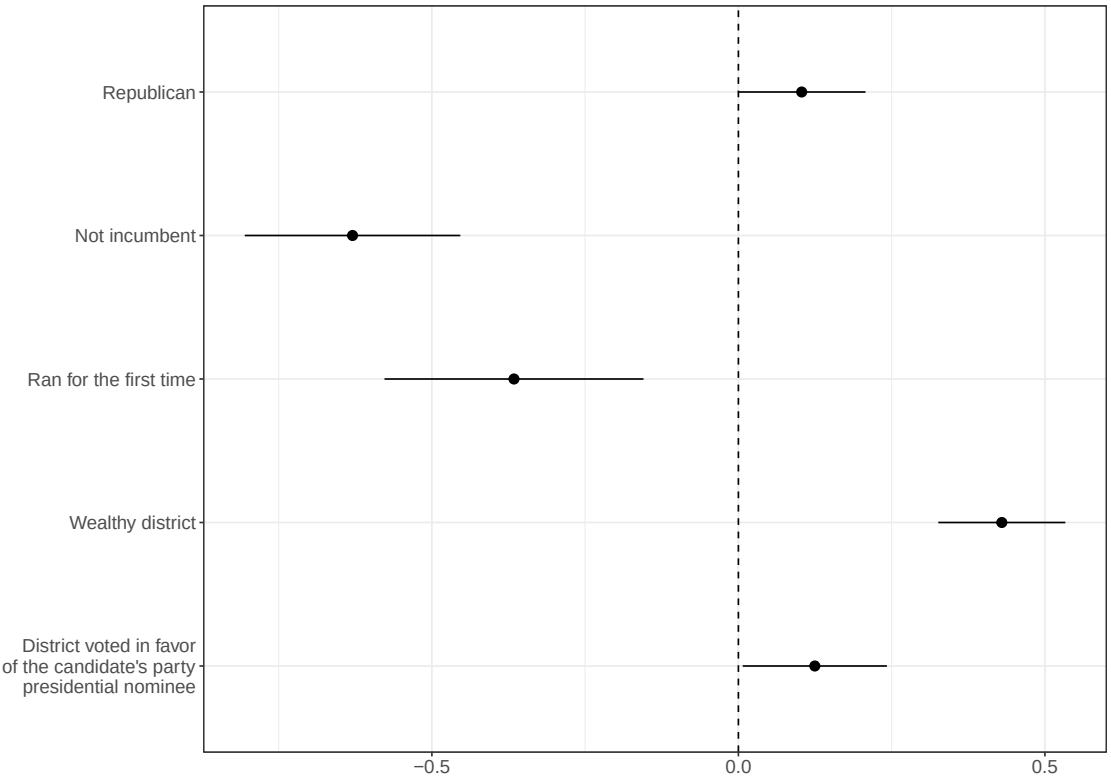
Forbes 400. We obtain a proxy of the influence of each dead donor on the political arena by looking at the Forbes 400 list of the richest men/women in the U.S. This list has been published every year since 1982. For each candidate, we calculate the number of dead top donors who have ever appeared (or have a person with the same last name who has ever appeared) on this list since its first publication. In our data, 27% of dead donors had their name appearing on the Forbes 400 list. Their death affected 35% of the candidates who lost at least one top donor.

III Empirical Strategy

A key challenge in the empirical analysis of the importance of campaign contributions for electoral outcomes is that donors do not randomly support candidates. Likely, they choose them based on their characteristics, and some of these characteristics may be correlated with the candidates' prospects of an election. This is supported by the picture in Figure 3. In Figure 3, we compare the percentage of votes received by candidates who are or are not supported by top donors. Candidates funded by top donors outperform the other candidates. Therefore, attributing differences in a candidate's electoral success solely to the support received from top donors is empirically problematic.

We address this identification problem by investigating the extent to which the electoral performance of a politician is determined by the sudden death of a top

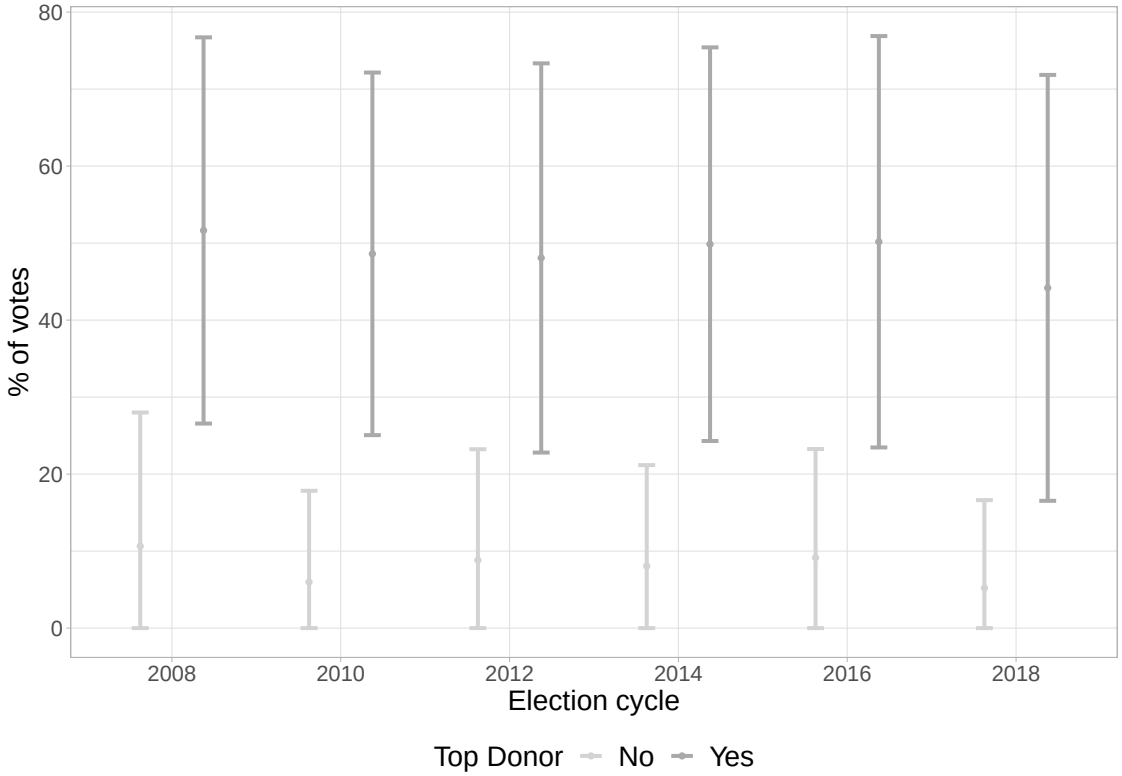
Figure 2.
Top Donors
- Profile of Supported Candidates -



Note: The x-axis registers the estimated coefficient of correlation (indicated with a dot) and the relative confidence interval at the 95% level (indicated with a bar) of a candidate's characteristic with the (log) total amount of donations received from a top donor at election cycle *t*. The y-axis indicates the characteristics considered. These are: whether the candidate is *Republican*; whether the candidate is *Not Incumbent*; *Ran for office for the first time*; *Ran in a wealthy district* (i.e., where the percentage of high-income taxpayers in the district is above the national median); Ran in a *District* that *voted in favor of the candidate's party presidential nominee*. The sample considered only includes candidates who received at least one donation from a top donor (4,129 observations).

donor rather than by her/his support. The idea behind this approach is that the unexpected death of a top donor can be considered an exogenous shock that presumably impacts a candidate's campaign. The date of death is retrieved from the biographical information. We create two variables. The first is a dummy variable registering whether or not candidate i in election cycle t suffered from the loss of at least one top donor who supported him/her in election cycle t or

Figure 3.
Percentage of Votes for Candidates with and without Top Donors



Note: Dots and bars indicate the average and standard deviation of the percentage of votes obtained by candidates in a given election cycle, respectively. Light color denotes candidates without top donors, and dark color denotes candidates with top donors.

previously (the time window considered is between 2004 and 2018). We refer to this variable as *dead donor*$_{i,t}$. The second is a continuous variable that counts the number of dead top donors supporting candidate i in election cycle t or previously. We refer to this variable as # *dead donor*$_{i,t}$.

In our dataset, we observe the death of 278 top donors. On average, 44 top donors die during each election cycle (min. 21, max. 67). Figure A5 shows that a significant share of candidates for the U.S. Congress in the electoral cycles from 2008 to 2018 experienced the loss of a top donor. On average, this share is 11% for the candidates participating in at least two electoral races and 9% overall.[36] The

[36]The share rises to 28% for the candidates with a top donor.

total number of candidates participating in at least two electoral races affected by the loss of a top donor is 1067 - roughly 180 candidates in each election cycle (standard deviation 30). Among those 1067 candidates who lost a top donor, more than 26% are affected by the death of more than one top donor.

The battery of balance tests in Table 4 examines whether the death of a top donor is related to a candidate's characteristics. We consider the candidate's party affiliation, gender, incumbency status, seniority, district in favor of the candidate's party presidential nominee, whether the candidate ran his/her last election, and whether the candidate ran in primaries. For elected candidates, we also consider their ideology, measured by the Nokken-Poole period-specific DW-NOMINATE score. We run separate regressions with each of these as alternate dependent variables and the key variable capturing the death of a top donor as the independent variable.[37] As shown in Table 4, none of the estimated correlations significantly differ from zero.

In Figure 4, we compare the electoral performance of candidates who will suffer from the loss of a top donor in the next election cycle, and those who will not suffer from it. Figure 4 has the same structure as Figure 3. It shows that the percentage of votes received by the two groups of candidates is not statistically different, suggesting that donors who will eventually die during a political campaign did not choose to support weak candidates or candidates with different (unobserved) characteristics correlated with their electoral performance. Taken together, these findings thus indicate the existence of pseudo-random variation in the death of a top donor. Our strategy is further supported by an important feature of the market for political donations that we observe in our data. The number of supported candidates by a top donor is the same during the election cycle before his/her death and the election cycle of his/her death.[38] This suggests that the number of supported candidates is constant over time, or in any case, is chosen at the beginning of the election cycle.[39] It follows that candidates are unlikely to be able to mitigate the impact of the loss of a top donor by replacing him/her with a new top donor, nor take preventive actions against the potential loss of a top donor when there are expectations that he/she could die in the short

[37] In the model specification, we include variables controlling for the higher likelihood of having a top donor, and thus mechanically correlated with the probability of losing a top donor. These variables are: a dummy variable registering whether or not the candidate was a Congress member in the previous election cycle, a dummy variable recording whether or not the candidate is running for the first time and a variable counting the number of times a candidate won the elections. In order to sort out time and geographical contextual effects, we also include cycle and district-fixed effects.

[38] During these two election cycles, a donor supports an average of 6 candidates (with a standard deviation of 7.8).

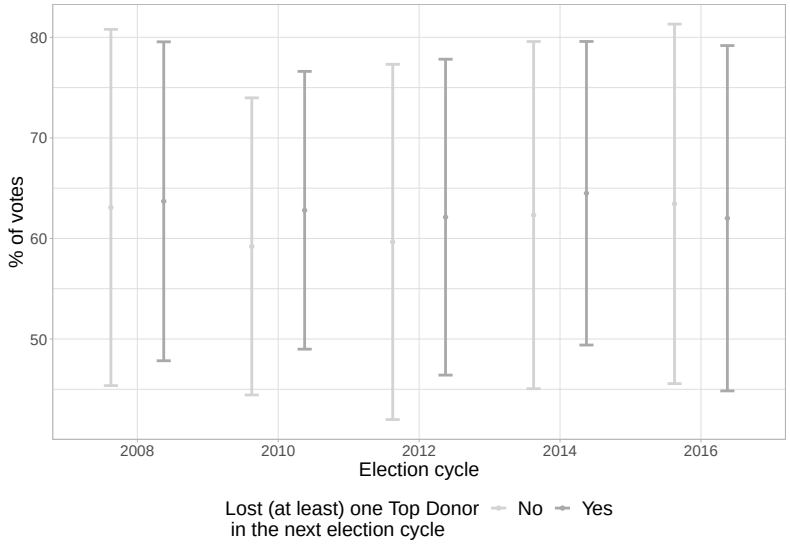
[39] Two concurrent reasons may explain this. On the one hand, a candidate may have a short time to cultivate a relationship with new important donors and obtain their support while he/she is actively working on the electoral campaign. On the other hand, it is plausible to expect that when the election campaign has started, top donors have already decided on the pool of politicians to support, and they may not be available to help other candidates.

Table 4
Balance Tests

	All Candidates			
	Republican	Female	Not Incumbent	Seniority
Candidate lost at least one top donor	0.0002	-0.0135	-0.0036	0.0109
	(0.0001)	(0.0149)	(0.0387)	(0.0090)
	All Candidates		Elected Candidates	
	Last Election Cycle	Ran Primaries	DW Ideology	
			I Dimension	II Dimension
Candidate lost at least one top donor	0.0367	-0.0271	-0.0017	0.0118
	(0.0232)	(0.0255)	(0.0405)	(0.0564)

Note: This table reports parameter estimates and standard errors (in parentheses) for separate regressions of candidate's characteristics on a dummy variable, which takes the value 1 if the candidate lost at least one top donor in a given election cycle and 0 otherwise. All model specifications include variables controlling for a higher likelihood of having a top donor, and thus mechanically correlated with the probability of losing a top donor. These variables are a dummy variable registering whether or not the candidate was a Congress member in the previous election cycle, a dummy variable recording whether or not the candidate is running for the first time, and a variable counting the number of times a candidate won the elections. They also include fixed effects for the district and election cycle.

Figure 4.
Percentage of Votes for Candidates Who Will or Will not Suffer from the Loss of a Top Donor in the Next Election Cycle



Note: Dots and bars indicate the average and standard deviation of the percentage of votes obtained by candidates in a given election cycle, respectively. Light color denotes candidates who will not suffer from the loss of a top donor in the next election cycle, and dark color denotes candidates who will suffer from the loss of a top donor in the next election cycle.

run.[40] However, we observe also a small, and yet statistically significant difference, in the number of contributions received by candidates before and after the loss of a top donor. This suggests that the death of a top donor affects the amount of money contributed to the candidate in the electoral cycle in which his/her death occurs.[41]

Corroborating the evidence that replacing a dead donor is not an easy task in the market for political donations, Appendix Figure A6 shows that top donors tend to be loyal to their candidates and contribute repeatedly to a candidate's electoral campaign for his/her career. In 37% of the cases, a donor contributes to 20% to 40% of the electoral cycles in which a candidate participates. In 24% of the cases, a donor contributes to 40% to 60% of the electoral cycles in which a candidate participates. In 18% of the cases, a donor contributes to more than 60% of the electoral cycles in which a candidate participates. This is suggestive evidence that candidates and donors maintain a strong bond over the years, and it may require a large effort for a candidate to establish a new relationship.

IV Empirical Model and Baseline Results

We begin our investigation by examining the impact of a top donor on the success of a candidate's electoral campaign. We conduct our analysis by assessing the extent to which a change in the probability of winning the election between two subsequent election cycles is affected by the death of a top donor. We use the following regression model:

$$win\ election_{it} = \beta_0 + \beta_1 \#\ dead\ donor_{it} + \beta_2 X_{it} + \upsilon_i + \zeta_t + \epsilon_{it} \quad (1)$$

where a dummy variable taking value 1 if candidate i wins a seat in the US House of Representatives during election cycle t, $win\ election_{it}$, is a function of the number of dead top donors during that election cycle, $\#\ dead\ donor_{it}$, and other determinants of a candidate's electoral performance, X_{it}. The set X_{it} includes whether or not the candidate i) is male, ii) is incumbent, iii) was selected through primary elections,[42] iv) run in a district that voted in favor of his/her party presidential nominee and v) the total contributions received (from top donors and non-top donors) during his/her electoral campaign.[43] The model

[40] In the Appendix, Table A3 shows that controlling for the share of high-income taxpayers in the electoral district – as a measure of the availability of other possible top donors – does not change the results qualitatively (see also Section IV.1). Observe, moreover, that we would not observe an impact of the loss of a top donor if candidates could mitigate the anticipated effect of death by finding any other donor.

[41] In the election cycle of his/her death, the contributions of a donor drop approximately by 4,000$ compared to the contributions given in the previous election cycle.

[42] Not all candidates are selected through primary elections: e.g., non-party and write-in candidates.

[43] While observable contributions may not perfectly measure the support a candidate receives from donors, there are significant differences in the amounts candidates receive (see Table 1). These differences are likely to affect a candidate's chances of being elected. By incorporating total (observable) contribu-

includes candidate and election cycle fixed effects (υ_i and ζ_t, respectively) and a random error term ϵ_{it}. The inclusion of individual fixed effects controls for the effects of time-invariant characteristics of candidates that maybe correlated with their electoral performance.[44] At the same time, election cycle fixed effects to control for contextual elements of the electoral campaign that may affect election results. This model allows us to compare the electoral performance of a candidate when a given share of his/her top donors die, and that candidate's performance when a different share of top donors die, and isolate the direct top donor effects on electoral outcomes.

Table 5 shows the estimation results. In column 1, we estimate the model 1, which includes all traditional drivers of electoral success captured by the set X_{it}, and electoral cycle fixed effects. As expected, our findings indicate that incumbency status plays a significant role in electoral success. The estimated impact on a candidate's chances of election is substantial, suggesting that non-incumbent candidates face lower odds of winning. This supports the notion that challengers generally struggle more than incumbents to increase their visibility and communicate their message effectively. Additionally, we observe that candidates tend to perform better electorally when they are male and when they are selected through primaries. However, only the advantage associated with being male has a statistically significant effect on the likelihood of winning. As expected, our findings indicate that incumbency status plays a significant role in electoral success. The estimated impact on a candidate's chances of election is substantial, suggesting that non-incumbent candidates face lower odds of winning. This supports the notion that challengers generally struggle more than incumbents to increase their visibility and communicate their message effectively. Additionally, we observe that candidates tend to perform better electorally when they are male and when they are selected through primaries. However, only the advantage associated with being male has a statistically significant effect on the likelihood of winning. [45] We also find that the chances of a candidate being elected to improve when he/she belongs to the party supported by the majority of the district's constituency during the last presidential elections, indicating that the electorate votes in a consistent way during Congress and presidential elections. Finally, total contributions from both top and non-top donors are associated with a positive and statistically significant effect on a candidate's electoral success.

tions into the specification of model (1), we examine whether the loss of a donor has an impact beyond the contributions received from others. Although the death of a donor has no statistically significant effect on contributions from other donors (results available upon request), these findings do not address the possibility that donors may be providing other forms of support (see Section VI).

[44] A requirement for the inclusion of candidate fixed effects in the model specification is that the same candidate must be followed over multiple election cycles. It follows that candidates who ran for office only once are discarded from our analysis. If candidate fixed effects are excluded from Eq. (1) and estimation is conducted using the universe of candidates, our results are qualitatively unchanged. Results are available upon request.

[45] Selection through primaries, however, has a statistically significant effect on the percentage of votes obtained by the candidate (see Table A3 of the Appendix).

Table 5
Main Results
- Top Donors and Election Results -

Dep. Variable	Win election (1 = Yes, 0 = No) (1)	Win election (1 = Yes, 0 = No) (2)	Win election (1 = Yes, 0 = No) (3)	Win election (1 = Yes, 0 = No) (4)	Win election (1 = Yes, 0 = No) (5)	Win election (1 = Yes, 0 = No) (6)
Number of dead top donors in current election cycle		-0.0181***	-0.0349***			
		(0.0070)	(0.0089)			
- Candidate has many donors				-0.0239**		
				(0.0098)		
- Candidate has only one donor				-0.1150***		
				(0.0230)		
At least one top donor died in current election cycle (1 = Yes)					-0.0396**	
					(0.0172)	
Number of dead top donors in previous election cycle						-0.0407***
						(0.0137)
Candidate is male (1 = Yes)	0.0149**	0.0144*				
	(0.0075)	(0.0075)				
Candidate is not incumbent (1 = Yes)	-0.5307***	-0.5400***	-0.0297	-0.0271	-0.0292	-0.0297
	(0.0134)	(0.0141)	(0.0247)	(0.0249)	(0.0247)	(0.0249)
Candidate ran primaries (1 = Yes)	0.0009	0.0020	0.0102	0.0085	0.0088	-0.0128
	(0.0086)	(0.0086)	(0.0211)	(0.0210)	(0.0211)	(0.0212)
District voted in favor of the candidate's party presidential nominee	0.2148***	0.2139***	0.1914***	0.1901***	0.1937***	0.1922***
	(0.0097)	(0.0097)	(0.0236)	(0.0236)	(0.0237)	(0.0242)
Total contributions (constant $)	0.0215***	0.0218***	0.0524***	0.0468***	0.0522***	0.0473***
	(0.0010)	(0.0010)	(0.0068)	(0.0069)	(0.0068)	(0.0076)
Election Cycle Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Candidate Fixed Effects	No	No	Yes	Yes	Yes	Yes
Dependent Variable: average value	0.2419	0.2419	0.2341	0.2341	0.2341	0.2289
Num. Obs.	9630	9630	9962	9962	9962	8535

Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. For a precise definition of the variables, see Section II of the paper, and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level.

In column (2), we enhance our model by adding the variable $\#dead\ donor_{i,t}$, which reflects the number of top donors a candidate loses during an electoral cycle. As discussed in Section 3, candidates can indeed experience the loss of multiple key donors within a single cycle. The estimated effect of this variable is negative and statistically significant, indicating that the loss of a top donor negatively affects a candidate's electoral performance. Specifically, each donor lost reduces a candidate's chances of being elected by 1.8 percentage points.

In column (3), we extend the model specification by incorporating candidate fixed effects.[46] Our findings on the influence of donors on electoral performance remain qualitatively unchanged. However, two notable patterns emerge. First, with candidate fixed effects included, the estimated impact of incumbency is no longer statistically significant. One possible explanation is that incumbency may be correlated with time-invariant candidate traits, such as charisma, which could simultaneously affect both incumbency status and electoral success. Second, after accounting for charisma and other intrinsic candidate characteristics, the estimated effect of a donor's death becomes more pronounced. On average, the death of a top donor now results in a decrease by 3.4 percentage points in the likelihood of being elected.[47]

In column (4), we delve deeper into the substantial impact of losing a donor on electoral competition by separately estimating the effect of a donor's death on candidates who are supported by multiple donors versus those backed by only one donor. The results show that the impact of a top donor's death is less severe for candidates who can depend on other donors. In contrast, for candidates who relied exclusively on that donor, the negative effect is nearly five times greater.

We then examine whether a candidate's decline in electoral performance is due to the total number of donors lost or simply the loss of at least one top donor. In our sample, 67% of those who lost a top donor lost only one during an election cycle. In column (5), we examine the extensive margin effect of losing a top donor byreplacing the variable $\#dead\ donor_{i,t}$ with the dummy variable $dead\ donor_{i,t}$, which indicates whether a candidate experienced the loss of at least one top donor. The estimated effect is negative and statistically significant, confirming that the death of a top donor negatively affects a candidate's electoral performance. Specifically, our estimation shows that losing a top donor decreases the likelihood of being elected by 3.9 percentage points. Comparing this result with that from column (3) reveals a similar magnitude for both effects, suggesting that the impact of losing a top donor is linear.

In column (6), we investigate whether the loss of a top donor has a persistent

[46]Including candidate fixed effects prevents us from estimating the direct impact of a candidate's gender on electoral outcomes, requiring the exclusion of the variable "Candidate is male (1=Yes)" from the model. This adjustment allows us to add 332 observations (corresponding to 229 candidates) that were previously omitted due to missing gender information. Importantly, our results remain qualitatively unchanged if these observations are excluded from the sample.

[47]As one would expect, the effect of the loss of a top donor is attenuated when the candidate's opponents rely on the support of a top donor, or when opponents lost a top donor as well. Results are available upon request.

effect across election cycles. To do this, we use a lagged version of the target variable, where we count the number of top donors who died during the previous election cycle, i.e., # *dead donor*$_{i,t-1}$.[48] The estimated effect is negative and statistically significant, suggesting that the loss of a top donor has long-term effects, and the votes lost during a campaign are then difficult to recover in future election cycles.

IV.1 Robustness Analysis

In the Appendix, we present three robustness checks to validate our results. In the first exercise, we test the robustness of our results to how we measure electoral performance. To this purpose, in Table A3 of the Appendix, columns (1) to (6), we estimate the same model specifications presented in Table 5, columns (1) to (6), using as dependent variable the percentage of votes obtained by a candidate during a given election cycle. All our results are qualitatively confirmed, confirming that the death of a top donor harms the electoral performance of a candidate. This exercise also provides an important insight into the impact of the loss of a donor on the electoral performance of a candidate. The death of one top donor decreases the votes received by a candidate by approximately 2 percentage points. On average, 18 winning candidates would lose their seats during an election cycle if their votes would decrease by 2 percentage points .[49]

The second exercise is presented in column 5 of Table A3 of the Appendix. We augment equation (1) by including three additional controls. The first is a dummy variable that takes a value of 1 if the candidate is supported by other top donors who are still alive during the electoral campaign and 0 otherwise. This variable is used to control for the support a candidate can still rely on after the death of a top donor. The second is a dummy variable that takes a value of 1 if the district in which the candidate is seeking election is composed of a constituency with a high income relative to the national median, and 0 otherwise. This variable indicates that a candidate is running in a district where it is more likely to find other top donors. Complementing this case, we also include a dummy variable that takes a value of 1 if the district in which the candidate is seeking election is composed of a constituency with low-income relative to the national median and 0 otherwise. Reassuringly, even after the inclusion of these variables in our model specification, all of our previous findings remain qualitatively unchanged. We interpret this result as additional evidence that candidates cannot easily replace top donors, and that the presence of top donors significantly affects the electoral performance of a candidate beyond the candidate's ability to rely on other donors.

[48] The inclusion of a lagged variable in the model specification has the effect of decreasing the sample size by c.a. 17%.

[49] This would imply a 4.1% change in the composition of the US House of Representatives. If we quantify the effect of a loss of approximately 2 percentage points of votes by only considering politicians who suffered from the death of a top donor, then we find that, on average, 5 winning candidates would lose their seat during an election cycle. This would change 1.2% of the composition of the House of Representatives.

The third exercise is presented in Table A4 of the Appendix. Here, we test the robustness of our results using a larger time window, using data on the two election cycles preceding the first year considered in our main analysis, i.e., election cycles in 2004 and 2006.[50] Also, in this case, all our results are qualitatively unchanged.

V Long-term effects: legislative behavior

Can we use our data on top donors' deaths to show that not only top donors to affect the outcome of elections, but they also have long-term effects on the legislative process?

A challenge for testing this hypothesis is that we do not observe the top donors' goals and interests, so we can't directly associate the death of a top donor with changes in a politician's activity in the legislative issues that are of interest to the associated top donors. Nevertheless, we can advance two natural conjectures to test if a top donor's death affects the legislative activity of the candidates s/he donates to. The first is that legislators are induced by donors to intervene on a spectrum of topics fitting their idiosyncratic interests, which may depend on the business the top donors operate or issues associated with their local community; the second is that legislators who lose top donors have fewer distractions and are freer to focus on the topics they or their party care about. If this conjecture is correct, we should also observe that legislators who lose donors should be able to focus more exclusively on issues that reflect their preferences. We should observe that legislators are more attuned to their parties' policies since they have fewer "external distractions".

To test these conjectures, we track the sponsorship activity and the voting behavior of candidates supported by top donors during two mandates, i.e., Congress t and Congress $t+1$. We then study the impact of the loss of a top donor during Congress t (i.e., while the electoral campaign for Congress $t+1$ was running) on legislative activities in Congress at $t+1$. A measure of how "distracted" a legislator is by a donor's agenda is the entropy (Shannon, 1948; Boydstun et al., 2014) of topics of the bills sponsored by the legislator: low entropy means that the legislator focuses on fewer issues; higher entropy means that s/he spreads his/her activity on more topics. In addition, we measure the extent to which the legislator can focus on topics s/he cares about by measuring the difference in voting behavior with respect to his/her party colleagues.[51]

To study these effects and test the two conjectures, we use the following model:

[50] For this exercise, we have a smaller number of dead donors for the years from 2004 to 2008 because we cannot observe relationships formed between donors and candidates before 2004 (i.e., the first year considered in our data collection). To better understand this issue, consider the following example. Individual i at time $t < 2004$ was a top donor, donated to candidate j, and died in 2004. If i was not a top donor at $t = 2004$ and/or did not donate to j at $t = 2004$, our data would not register that i lost this top donor in 2004.

[51] We exclude legislators who hold party leadership positions or committee chairs, as their roles involve competing obligations that typically result in sponsoring fewer bills (Volden and Wiseman, 2009) and being less likely to change their votes (Rothenberg and Sanders, 2002).

$$\triangle y_{i,t+1} = \beta_1 \# \textit{ dead donor}_{it} + X_{it} + \upsilon_i + \zeta_t + \epsilon_{it}.$$

Here, the term $\triangle y_{i,t+1} = y_{i,t+1} - y_t$ registers alternatively the change in the entropy of topics of the bills sponsored by i from t to $t+1$; or the change in the ideological distance of i from the party's median position from t to $t+1$. The term $\#$ *dead donor*$_{it}$ is a variable counting the number of lost top donors by candidate i during Congress t (i.e., during the electoral campaign for Congress t+1), and zero otherwise. The term $X_{i,t}$ includes all those factors that may contribute to a change in the legislator's behavior, including the total contributions received for his/her electoral campaign.[52] The terms υ_i and ζ_t indicates respectively Congress members and Congress fixed effects. Finally, ϵ_{it} denotes an idiosyncratic term.

The results of our analysis are presented in Table 6. Column 1 shows that losing a top donor has a negative and statistically significant impact on the entropy of the topics legislators discuss in their bills: Congress members focus on a significantly smaller number of topics in their political agenda after losing a top donor. Specifically, entropy reduces by 0.06 points. The effect is about 12% of a standard deviation of the entropy of bills sponsored by Congress Members during a mandate. This result is consistent with the conjecture that losing a top donor is associated with fewer legislative distractions and more focus on a core of legislative topics.

Column 2 shows that losing a top donor has a positive and statistically significant impact in reducing the ideological distance of the legislators from their party colleagues: i.e., legislators tend to vote more in line with their party after their donor dies. Specifically, the ideological distance from the party's position was reduced by 0.02 points. The effect is about 12% of a standard deviation of the ideology of Congress Members in a single Congress. This evidence suggests that legislators accommodate issues pressed by a donor into their political agenda. However, when the donor dies, they return to focus on the topics that are more relevant to them or to others that matter to them (e.g., their constituency, their state delegation, or their party), and they are more inclined to follow the party lines in their voting behavior.

VI Investigating the mechanisms

There are three main reasons why the death of a top donor may be such a big loss for a candidate's electoral performance.

The first, referred to as *hypothesis 1*, is that losing a top donor damages a candidate's campaign because it reduces the deceased donor's official (and observed) campaign contributions. By losing one of them, a candidate is cut off from a significant inflow of money on which he/she may rely for his/her electoral cam-

[52] The other factors are: whether or not the legislator belongs to the majority, whether or not the legislator belongs to the party of the President, and the number of living donors who supported him/her during the last campaign.

Table 6
Elected Candidates with at least one Top Donor
- Legislative Activity -

Dep. Variable	Change from Congress t to $t+1$ in Entropy of Topics in Sponsored Bills (1)	Change from Congress t to $t+1$ in Ideological Distance from Party's Median Position (2)
Number of dead top donors in election cycle t+1	-0.0653***	-0.0237***
	(0.0169)	(0.0085)
Total contributions (constant $) in election cycle t+1	-0.0493	-0.0040
	(0.0347)	(0.0206)
Additional Controls	Yes	Yes
Congress Member Fixed Effects	Yes	Yes
Congress Fixed Effects	Yes	Yes
Num. Obs	1,025	1,025

Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The sample includes all Congress Members who were elected at time t and $t+1$ and had a top donor during election cycle t. The period considered is from 2007 to 2019. Congress members who belong to the party leadership or who are chair of a committee are excluded from the sample. Additional controls include a dummy variable registering whether or not a candidate belongs to the majority party, a dummy variable registering whether or not a candidate belongs to the party of the President, and a variable counting the number of live donors of the candidate. "Total contributions (constant $)" is log-transformed. For a precise definition of the variables, see Section II of the paper and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

paign, such as to react to advertisements by the opponent rapidly. If *hypothesis 1* is correct, then we expect that a candidate's performance should be impacted by the decrease in contributions subsequent to the death of a top donor.

The second is that top donors provide monetary resources that are (at least in part) untraceable. The main way through which contributions can be made to be anonymous is through 501(c)(4) non-profit organizations. Yet, donors can make it harder to trace a link between them and the candidate also by using "intermediaries": i.e., providing their support through super PACs rather than sponsoring directly a candidate.[53] While contributions through super PACs are obfuscated (because they are not directly linked to a specific donor), they can be linked to a candidate. We, therefore, test this hypothesis by studying the effect of the donor's death on "issue advocacy" ads funded by super PACs on the politicians patronized by the deceased donor. If *hypothesis 2* is correct, then we

[53]The connection between the donor and the candidate is even harder to identify when the former donates to super PACs which pool donations from different sources and raise funds for multiple purposes.

should find evidence that the death of a top donor does not affect spending in ads directly attributable to the candidate, but it affects issue advocacy ads funded by super PACs targeted to a candidate associated with the top donor.

The third is that the importance of top donors depends on the fact that they provide utilities other than mere money, such as expertise, mentoring, and most importantly, connections, which in turn may indirectly provide money. For example, a big donor may organize an event that allows the candidate to attract other funding sources. If *hypothesis 3* is correct, we should observe that those who suffered the most from the death of a top donor are the candidates who lost a "prominent" donor: i.e., someone who can provide with factors othen than money that can determine the outcome of a political campaign (e.g., the endorsment of other important donors, influential people, or exposure in the media).

We discuss these three hypotheses in the following three subsections.

VI.1 Hypothesis 1: Observable money is all that matters.

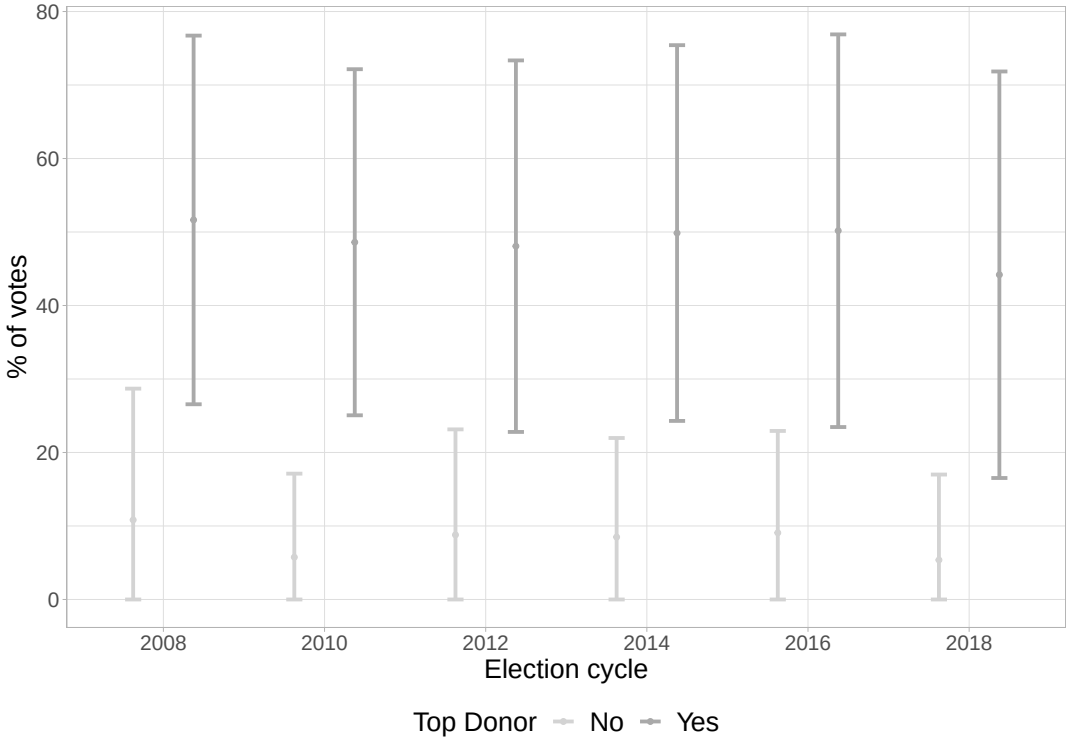
We start investigating this hypothesis with Figure 5, which has the same structure as Figure 3. Here, we compare the electoral performance of candidates with and without a top donor who received similar contributions. The percentage of votes received by candidates who can rely on the support of a top donor largely outruns those who cannot, suggesting that their electoral performance is not explained by the money received from top donors.

We further test this hypothesis in two ways. First, we calculate the amount of lost donations by a candidate because of the death of one or more top donors during a campaign contribution, $Loss_{i,t}$. This is done by summing the difference between the contributions offered by top donors to the candidate in the election cycle previous to their death, and that provided in the election cycle when they died.[54] Second, we estimate equation (1) but using an expanded model specification, where the variable counting the number of dead top donors during an election cycle is interacted with the amount of money lost from their death: i.e. $\#\ dead\ donor_{it} * Loss_{i,t}$.

The results of this exercise are presented in Table 7, column 1. The evidence is against *hypothesis 1*. While the death of a top donor has a negative and statistically significant impact on a candidate's electoral performance, the estimated coefficient of the interaction term is not statistically significant and close to zero in magnitude. This implies that the loss of a leading donor adversely

[54] Loss from a single top donor is calculated with the formula: $Loss_{i,t} = \frac{Y_{ijt} - Y_{i,t-1}}{\#\ dead\ donor_{it-1}}$, where $Y_{i,t}$ and $Y_{i,t-1}$ indicate the amount of money (in constant dollars) collected by i in election cycle t and $t-1$. Since the construction of this variable requires the use of lagged data, its use in the model specification has the effect of decreasing the sample size by c.a. 17% (see also footnote 48).

Figure 5.
Percentage of Votes for Candidates with and without Top Donors Who Received Similar Contributions



Note: Dots and bars indicate the average and standard deviation of the percentage of votes obtained by candidates in a given election cycle, respectively. Light color denotes candidates without top donors, and dark color denotes candidates with top donors. Candidates with similar contributions are selected as follows. In each election cycle, we calculate the average and standard deviation of contributions received by a candidate with a top donor. We denote these two values, respectively, with x and y. Then, we select the candidates without a top donor whose contributions are within the interval x-y and x+y in each given cycle.

Table 7
Further Evidence
- Top Donors, Campaign Contributions, and Election Results -

Dep. Variable	Win election (1 = Yes, 0 = No) (1)	Win election (1 = Yes, 0 = No) (2)
Number of dead top donors in current election cycle	-0.0367***	-0.0415***
	(0.0114)	(0.0123)
* Direct contributions lost from dead top donors (constant $)	0.0009	
	(0.0013)	
Placebo		-0.0026
		(0.0162)
Total contributions lost from dead top donors (constant $)	0.0024	
	(0.0028)	
Candidate is not incumbent (1 = Yes)	-0.0337	-0.0349
	(0.0252)	(0.0262)
Candidate ran primaries (1 = Yes)	-0.0170	-0.0181
	(0.0216)	(0.0218)
District voted in favor of the candidate's party presidential nominee	0.1898***	0.1913***
	(0.0242)	(0.0242)
Total contributions (constant $)	0.0437***	0.0475***
	(0.0076)	(0.0078)
Election Cycle Fixed Effects	Yes	Yes
Candidate Fixed Effects	Yes	Yes
Dependent Variable: Average Value:	0.2289	0.2289
Num. Obs.	8,535	8,535

Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. For a precise definition of the variables, see Section II of the paper and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

affects a candidate's electoral prospects regardless of the monetary loss incurred.[55]

We further explore *hypothesis 1* by analyzing the electoral performance of candidates who experienced a decline in contributions comparable to those who lost a top donor, but as a result of receiving reduced support from multiple donors. If *hypothesis 1* is correct, then we should find evidence that these candidates have a worse performance due to decreased contributions. This exercise is conducted in three steps. First, we calculate the median value and the standard deviation of the variable $Loss_{i,t}$ in each election cycle. We denote these values as $MED\ Loss_t$ and $SD\ Loss_t$, respectively. Second, we select those candidates who did not lose a top donor but suffered from a loss in contributions in a range between $MED\ Loss_t - SD\ Loss_t$ and $MED\ Loss_t + SD\ Loss_t$.[56] Third, we create a dummy variable that takes 1 when a candidate did not suffer from the death of a top donor and lost an amount of money in the considered range, and 0 otherwise We estimate an average reduction of 0.0672% in the contributions received by a candidate suffering from the loss of one or more top donors (minimum 0.0002%, maximum 0.6651%, with a standard deviation of 0.1235). Candidates who are not affected by the loss of a top donor and register a similar decrease in contributions are not uncommon. On average, these are 12.36% during an election cycle, with a large dispersion over the years: i.e., a standard deviation of 32.90. We refer to this variable as $Placebo_{i,t}$. Fourth, we estimate equation (1) but using an augmented model specification that includes the variable $Placebo_{i,t}$.

The results of this exercise are presented in Table 7, column 2. Again, the evidence goes against *hypothesis 1*. In fact, the death of a top donor has a negative and statistically significant impact on a candidate's electoral performance. On the contrary, the variable $Placebo_{i,t}$ does not appear to be correlated to a candidate's performance. In other words, the evidence suggests that those who experience the death of a top donor suffer from a worse electoral performance. On the contrary, a decrease in the contributions similar to that suffered by candidates who lost a top donor, but as a result of smaller support from many donors, is not associated with a substantial change in electoral performance. This evidence suggests that the funds received from a top donor do not *per se* significantly influence a candidate's campaign.[57]

Taken together, the findings obtained seem to be against *hypothesis 1* and suggest that the role played by donors during an electoral campaign does not

[55] Results are qualitatively unchanged when modeling the variable $Loss_{i,t}$ using a quadratic polynomial or a spline. In the model specification using the quadratic polynomial, the variable $Loss_{i,t}$ was demeaned to avoid collinearity problems between the linear and the quadratic term. In the model specification using the spline, we follow the standard literature (see, e.g., Ahlberg et al., 1967) and we place knots where we expect the impact of the variable $Loss_{i,t}$ on the probability of election to change more significantly, i.e., when the variable switches from zero to its minimum positive value and when taking values above the median.

[56] We compute the loss in contributions suffered from these candidates following the same approach used for candidates who lost a top donor, presented in footnote 54.

[57] In Section VI.3, we will use the total contributions made by a top donor as an indicator of their prominence and demonstrate that this is, in fact, a key predictor of a candidate's electoral success, regardless of the amount donated to the specific candidate.

directly depend on the money donated to a single candidate.

VI.2 Hypothesis 2: Stealth contributions through PACs

If a top donor uses super PACs to conceal his/her contributions, then we should observe that his/her death causes a reduction in support by PAcs funded by the major donor, directed toward candidates endorsed by that donor. To test this hypothesis, we estimate equation (1) using two different outcome variables: the amount of money spent by a. candidate i and by b. interest groups to broadcast political advertisements in favor of i.[58] If Hypothesis 3 is correct, meaning that top donors use super PACs to contribute to a candidate's campaign, we should observe that the loss of a top donor has no impact on the money spent for political advertisements by a candidate, but it has a negative effect on the money spent by interest groups.[59]

The results of this investigation are presented in Table 8. Consistent with our expectations, column 1 shows the death of a top donor has no statistically significant impact on the expenditures for political advertisements sponsored by the candidate. On the contrary, column 2 provides evidence that the loss of a top donor has a negative and statistically significant impact on the amount of money spent by interest groups. Specifically, it decreases the percentage of expenditures for political ads in the district destined to the candidate by 4.17 percentage points, which corresponds to an average loss of 60,825$ (35% of the expenditures in his/her favor).[60]

While it is natural to look for the effects of the death of a top donor on the candidate that he supported when alive, we cannot exclude that the donor also supported other politicians incognito. This is especially plausible if the top donor had a marked public ideological position (as measured by the party of the majority of the supported candidates) and thus could be embarrassed if seen as supporting across the aisle. In order to test this hypothesis, for each candidate i who lost a top donor, we identify the set of similar candidates who did not experience the loss of a top donor: i.e., all candidates who are running in the same State of i, from the same party, and with similar ideology with all donors alive.[61] Then we

[58]Summary statistics are provided in Table A2 of the Appendix.

[59]Observe that expenses from the candidate and from super PACs cannot be coordinated. The US Federal Election Committee clearly indicates that super PACs are created "for the purpose of financing independent expenditures" (https://www.fec.gov/press/resources-journalists/political-action-committees-pacs/). According to the Code of Federal Regulations, independent expenditure "cannot be made in concert or cooperation with or at the request or suggestion of ... (a) candidate, the candidate's authorized committee, or their agents, or a political party committee or its agents".

[60]The quantification of this effect is obtained with a simple back-to-the-envelope exercise. In our data, the average total expenses recorded from interest groups in a district is 1,458,625$, of which approximately 11.71% are destined to a candidate: i.e., 170,805$ on average per candidate. As the estimates show, when a donor dies, the percentage of expenditures for the candidate decreases by 4.17 percentage points, hence shrinking from 11.71 to $11.71 - 4.17 = 7.54\%$. In monetary terms, this corresponds to a decrease in donations from 170,805$ to 109,980$. The average loss for a candidate is then $170,805 - 109,980 = 60,825$\$. It thus follows that the loss of 60,825$ corresponds to a decrease of $60,825/170,805 = 35\%$ of the expenditures received.

[61]The measure of ideology adopted to match candidates is the CF-score registered in the DIME

Table 8
Further Evidence
- Top Donors, and Ads Expenditures -

Dep. Variable	% Expenditures for Political Ads in the District for the Candidate			
Ads sponsored by	Candidate	Interest groups		
	(1)	(2)	(3)	(4)
Number of dead top donors in current election cycle	0.7285	-4.1711***	-4.6337***	
	(1.6675)	(1.4734)	(1.5527)	
- of the same party				-4.5453***
				(1.7113)
- of a different party				0.1451
				(10.2660)
Completely Unobserved			-1.2023	
			(0.7855)	
Candidate is not incumbent (1 = Yes)	-21.4686***	4.4713	4.3546	4.3945
	(4.2769)	(4.5078)	(4.4618)	(4.5099)
Candidate ran primaries (1 = Yes)	-0.8488	-9.8074	-10.0900	-9.7432
	(24.4795)	(9.6833)	(9.6944)	(9.6736)
District voted in favor of the candidate's party presidential nominee	6.7313	0.5045	0.3202	0.6985
	(5.3783)	(4.3826)	(4.4129)	(4.4112)
Total contributions (constant $)	-0.4678	-1.1958	-1.3333	-1.1563
	(2.4676)	(1.8149)	(1.8846)	(1.7845)
Election Cycle Fixed Effects	Yes	Yes	Yes	Yes
Candidate Fixed Effects	Yes	Yes	Yes	Yes
Dependent Variable: average value	49.45	11.71	11.71	11.71
Num. Obs.	1,180	1,180	1,180	1,180

Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. For a precise definition of the variable *Completely Unobserved*, see Section VI.2. For all the other variables, see Section II of the paper and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

create a new variable, *Completely Unobserved*, which assigns the number of dead top donors in the current election cycle of candidate i at time t to each candidate j similar to i; and that assigns zero to i. We augment our model specification (1) with the variable *Completely Unobserved* and report the corresponding estimation results in column 3. Interestingly, while our results are all confirmed, we

(Bonica, 2014). CF-score measures a candidate's ideology during an election cycle as a function of the ideology of his/her contributors in that cycle. For candidates affiliated to the same party during the same cycle, we compute the tertile distribution of their CF-Score. We assume two candidates to have a similar ideology if they are associated with the same tertile.

do not find evidence that politicians similar to those who lost a top donor suffer from the death of this.

We further investigate the possibility that donors support other politicians incognito, especially when the donor has a marked public ideological position and could be embarrassed if seen to support across the aisle. To this purpose, we estimate equation (1) by splitting our main variable of interest, i.e., the *Number of dead top donors in current election cycle*, in two different variables. The first counts the number of dead top donors lost by a candidate in the current election cycle who are from his/her own party. The second counts the number of dead top donors lost by a candidate in the current election cycle who are from a different party.[62] Results are reported in column 4. The evidence does not align with the idea that donors support other politicians incognito when they are from a different party. In fact, only the loss of a top donor from the same party has a statistically significant effect on the amount of money spent by interest groups for political ads supporting a candidate endorsed by that donor. This is in line with the fact that the majority of contributions (in terms of amount) are targeted to politicians of the same ideology (see Table 1).

VI.3 Hypothesis 3: Prominent donors.

The third hypothesis, which we refer to as *hypothesis 3*, is that the importance of top donors depends on factors other than their money, such as their ability to connect a candidate with a relevant social circles that can determine the outcome of a political campaign: e.g., other important donors who can provide him/her with more money, influential people who can offer their endorsement or a larger exposure in the media or experts who can help the candidate conduct a more effective campaign. If this is the case, then money is an imprecise measure of the support that top donors provide to a candidate.

We test *hypothesis 3* by estimating the effect of losing a top donor for two different categories of donors: those whose total contributions fall within the highest quartile and those whose total contributions are below this threshold.[63] In this way, we can assess whether less or more prominent donors (as signalled by their total contributions) play a different role in the carrier of candidates. Formally, this exercise is conducted by replacing the variable $\#\ dead\ donor_{i,t}$ in Eq. (1) with two separate variables that count the number of lost donors in each of these two categories. Results are reported in Table 9, column 1. The estimated effect of both variables is negative and statistically significant, but the former is almost 4 times larger than the second, indicating that the loss in terms of electoral performance due to the death of a top donor is higher if the donor is the most influential in the market for contributions. Taken together with our results on the

[62] The party of a donor is defined as the party with a share of supported candidates higher than 50%.
[63] Contributions are observed in the last year in which the donor supported a candidate.

Table 9
Further Evidence
- Top Donors, Donors' Influence, and Election Results -

Dep. Variable	Win election (1 = Yes, 0 = No) (1)	Win election (1 = Yes, 0 = No) (3)
Number of dead top donors in current election cycle		
- With total contributions in the highest quartile	-0.1110***	
	(0.0176)	
- With total contributions below the highest quartile	-0.0289***	
	(0.0085)	
- Who were listed on Forbes 400		-0.0441***
		(0.0168)
- Who were not listed on Forbes 400		-0.0296***
		(0.0114)
Candidate is not incumbent (1 = Yes)	-0.0284	-0.0297
	(0.0243)	(0.0246)
Candidate ran primaries (1 = Yes)	-0.0034	0.0108
	(0.0194)	(0.0210)
The district voted in favor of the candidate's party presidential nominee	0.1898***	0.1918***
	(0.0231)	(0.0235)
Total contributions (constant $)	0.0567***	0.0525***
	(0.0068)	(0.0068)
Election Cycle Fixed Effects	Yes	Yes
Candidate Fixed Effects	Yes	Yes
Dependent Variable: average value	0.2341	0.2341
Num. Obs.	9,962	9,962

Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. For a precise definition of the variables, see Section II of the paper and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

role of direct donations (*hypothesis 1*, Section VI.1), this suggests that powerful donors are the most important to candidates, regardless of the amount of money that they donate to them.

We provide additional evidence by using a second proxy of donors' influence, measured by their presence on the Forbes 400 list (see Section II). Also in this case, we split the variable # *dead donor*$_{it}$ into two terms. The first registers the number of dead donors of a candidate who were listed on Forbes 400. The second

records the opposite case, that is, the number of dead donors of a candidate who were not listed on the Forbes 400. Results are reported in Table 9, column 3. Although both estimated effects are negative and statistically significant, they are not statistically different from each other. However, the former is larger, in line with the previous evidence suggesting that candidates who suffered the most from the top donors' loss are those who were supported by very prominent donors, as posited by *Hypothesis 3*.

VII Conclusions

In this paper, we revisit a classical question in political economy, the so-called *Tullock Paradox*: that is, the fact that we observe little money in U.S. politics relative to the size of the stakes. The question is not really just about money but about influence. Is it the case that there is too little money that private interests can sway public policy, or to use Tullock's more colorful expression, too little money to "purchase politicians"?

The premise of our analysis is simple: is it possible that we observe little money because an important component of political contributions is either non-monetary (such as advice, connections, experience) or unobserved? In this work, we provide evidence in support of this hypothesis. Moreover, we offer a first investigation of the mechanisms through which influence is exerted by top donors outside of observable channels, and we provide evidence of the effects of this influence on the elected candidates' legislative activities in the U.S. Congress.

Specifically, we present three sets of results. First, we establish that top donors (as identified by the top 1000 donors in terms of total contributions in the electoral cycles from 2008 to 2018) are important to an individual candidate to be elected, even if their contribution to the candidate is individually small. We establish this fact using a new, original data set on the top 1000 donors in U.S. congressional races. Since top donors do not randomly support candidates, we base our identification strategy on information about top donors' deaths and the observed variations in candidates' performance after these events. We show that the death of a top donor decreases a candidate's chances of being elected both in the current and in the future election cycles by about 3 percentage points.

The second set of results concerns the long-term effects of top donors on legislative behavior in the U.S. Congress of elected candidates. Here we show that losing a top donor has two effects on a U.S. Congress member. First, it reduces the Shannon entropy index of the topics of bills sponsored by Congress members. This implies that the legislator is less distracted by the issues of interest from the top donors, and s/he is freer to pursue policies s/he finds appealing. Second, and consistently, we find that the death of a top donor induces a reduction of the ideological distance between the Congress person and the median Congress person in his/her own party (as measured by the Nokken-Poole ideology index). Taken together, these results provide compelling evidence that it is restrictive to measure top donors' influence donors relying exclusively on observable monetary

contributions.

The third set of results explores how large donors influence candidates. We find that the impact of a donor's death on a candidate's performance is not linked to the donor's direct financial contributions. This leads us to investigate whether large donors make stealth contributions through PACs, which can conceal donor identities behind certain ads. Our analysis shows that a top donor's death leads to a decline in PAC-funded ads supporting the candidate, while no such decline is observed for ads funded directly by the candidate, where funding sources are transparent. To assess whether top donors provide non-monetary advantages, we examine the influence of donor "prominence" on candidate success. Using various measures of prominence, we consistently find that the death of a top donor affects a candidate's election prospects depending on the donor's prominence, independent of the actual financial contributions received by the candidate.

Naturally, these results do not imply that the amount of money in U.S. politics is equal to the stakes (i.e., the size of the U.S. economy), which are indeed enormous. There are many reasons why this should not be the case, from explicit legal limits to vote trading and lobbying, to the inability of many legitimate public interests to organize and collect the money that would be necessary to buy their way into Congress, to the fact that influential donors may exert clout by committing to contingent threats. Our results, moreover, do not conflict with the theory that sees contributions as consumption goods since it is probable that political contributions are simultaneously consumption goods and have an instrumental value. Our findings suggest that the observable monetary contributions should be considered as only the proverbial "tip of the iceberg": the gap between the "stakes" and the amount of resources devoted to promoting electoral candidates and influencing their policies may be much smaller than what is observed.

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Online Appendix for Unobserved Contributions and Political Influence: Evidence from the Death of Top Donors

In this document we present results omitted in the article "Unobserved Contributions and Political Influence: Evidence from the Death of Top Donors."

Table A1 Data Descriptives

Variable	Definition	Mean	St. Dev.
Sample: Candidates running for office in the U.S. House of Representatives. Election cycles: 2008 - 2018			
Win election (1 = Yes, 0 = No)	Dummy variable. It takes the value one if candidate i won the electoral race at election cycle t, and zero otherwise.	0.23	0.42
% of votes	Continuous variable. It counts the percentage of votes received by candidate i at election cycle t.	24.12	27.97
At least one top donors died in current election cycle (1 = Yes)	Dummy variable. It takes the value one if candidate i lost at least one top donor at election cycle t, and zero otherwise.	0.11	0.31
Number of dead top donors in current election cycle	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t.	0.17	0.61
- With total contributions in the highest quartile	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t who belonged to the top 25% distribution of total contributions in the year of their last donation.	0.05	0.31
- With total contributions below the highest quartile	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t who belonged to the bottom 75% distribution of total contributions in the year of their last donation.	0.11	0.59
- Who were listed on Forbes 400	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t whose last name ever appeared on the Forbes 400 list.	0.05	0.55
- Who were not listed on Forbes 400	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t whose last name never appeared on the Forbes 400 list.	0.11	0.45
Number of dead top donors in previous election cycle	Continuous variable. It counts the number of top donors lost by candidate i at election cycle *t-1*.	0.11	0.48
Total contributions lost from dead top donors (constant $)	Continous variable. The estimated loss of contributions of candidate i at election cycle t after the death of one or more top donors at t. Loss from a single top donor is calculated with the formula: $Loss_{i,t} = \frac{Y_{ijt} - Y_{i,t-1}}{\#\ dead\ donor_{it-1}}$, where $Y_{i,t}$ and $Y_{i,t-1}$ indicate the amount of money (in constant dollars) collected by i in election cycle t and $t-1$. The variable is expressed in constant dollars, and it is transformed using an inverse hyperbolic sine function.	-0.06	2.47
Placebo	Dummy variable. It takes the value one if candidate i at election cycle t suffered from a loss in contributions in a range between $MED\ Loss_t - SD\ Loss_t$ and $MED\ Loss_t + SD\ Loss_t$, and zero otherwise. $MED\ Loss_t$, and $SD\ Loss_t$ measure respectively the median value and the standard deviation of the variable *Total contributions lost from dead top donors (constant $)* for the candidates running at election cycle t.	0.05	0.27
Candidate is male (1 = Yes)	Dummy variable. It takes the value one if candidate i is male, and zero otherwise.	0.83	0.37
Candidate is not incumbent (1 = Yes)	Dummy variable. It takes the value one if candidate i was not the Incumbent at election cycle t, and zero otherwise.	0.76	0.43
Candidate ran primaries (1 = Yes)	Dummy variable. It takes the value one if candidate i was selected through primary elections at election cycle t, and zero otherwise.	0.69	0.46
District voted in favor of the candidate's party presidential nominee	Dummy variable. It takes the value one if candidate i at election cycle t runs in a district which voted in favor of his/her party presidential nominee, and zero otherwise.	0.32	0.47
Total contributions (constant $)	Continuous variable. It counts the contributions received from both top and non-top donors by candidate i at election cycle t. The variable is expressed in constant dollars, and it is log-transformed.	4.42	3.74
Num. Obs.		9,962	9,962

Table A1 Data Descriptives, continued

Variable Definition		Mean	St. Dev.
Sample: Candidates running for office in the U.S. House of Representatives who appeared in political advertisements. Election cycles: 2012 - 2018			
(Log) Expenditures for Political Ads (constant $)...			
Ads sponsored by Candidate	Continuous variable. It is the percentage of money collected and spent in the district by candidate i, or by his/her party in coordination with him/her, to broadcast political advertisements at election cycle t.	49.45	34.71
Ads sponsored by Interest Groups	Continuous variable. It is the percentage of money collected and spent in the district by interest groups in support of candidate i to broadcast political advertisements during the election cycle t.	11.71	27.74
Number of dead top donors in current election cycle	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t.	0.32	0.85
- of the same party	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t who supported, for the most part, candidates belonging to i's party.	0.30	0.82
- of a different party	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t who supported, for the most part, candidates not belonging to i's party.	0.02	0.16
Completely Unobserved	Continuous variable. To each candidate j running for election at election cycle t with party x in State y, who did not lose a top donor, it assigns a number equal to the number of top donors lost by candidate i running for election cycle t with party x in State y, if j and i have the same ideology. The measure of ideology adopted to match candidates is the CF-score registered in the DIME (Bonica, 2014). It assigns zero otherwise.	0.50	1.37
Num. Obs.		1,180	1,180
Sample: Candidates elected in the U.S. House of Representatives. Congressional cycles: 2008 - 2016			
Entropy of Topics in Sponsored Bills	Continuous variable. It registers the change in the entropy of topics in bills sponsored by legislator i from Congress t to $t+1$. This is calculated using the Shannon entropy index (Shannon, 1948): i.e., $\sum_{i=1}^{n} p_i log_2 p_i$, where p_i is the share of bills with main topic i sponsored by a given legislator in a Congress, and n is the total number main topics in the bills sponsored by the legislator in that Congress.	0.48	0.41
Ideological Distance from Party's Median Position	Continuous variable. It registers the change in the distance from the party's median position by legislator i from Congress t to $t+1$. This is obtained with the formula $\|id_i - median(id_p)\|$,where id_i is the second dimension of the Nokken-Poole ideology estimate associated with Congress Member i in a given Congress, and id_p is the median value of the second dimension of the Nokken-Poole ideology estimate associated to i's party colleagues in the same Congress (Nokken et al., 2004).	0.01	0.17
Number of dead top donors in current election cycle	Continuous variable. It counts the number of top donors lost by candidate i at election cycle t.	0.60	0.95
Num. Obs.		1,025	1,025

Note: The sample considered in each panel only includes candidates who ran for office at least twice.

Table A2
Top Donors and Candidates
- Support from Political Ads -

Panel A: % of Candidates Supported at least by one Political Ad					
		2012	2014	2016	2018
All		19.81	17.23	15.17	17.11
	With at least one top donor	84.44	90.37	81.97	89.20
	Without top donors	15.56	9.63	18.03	10.80
Panel B: Average Expenditures (in thousands) for Political Ads in Support to a Candidate (St. Dev.)					
		2012	2014	2016	2018
All		128.20	120.59	99.60	136.17
		(449.78)	(502.84)	(416.36)	(580.38)
	With at least one top donor	320.34	288.34	259.29	368.60
		(673.51)	(749.94)	(647.47)	(914.50)
	Without top donors	5.71	1.99	3.53	2.51
		(61.84)	(19.29)	(33.39)	(32.76)

Note: In each election cycle, we calculate the percentage of candidates who were supported at least by one political ad (Panel A), and the average (and st. dev.) expenditures for political ads in support to a candidate (Panel B). All ads are considered, i.e., those sponsored by a candidate, a party, or an interest group.

Table A3
Additional Evidence
- Top Donors, Percentage of Votes and Election Results -

Dep. Variable	% of votes	% of votes	% of votes	% of votes	% of votes	% of votes	% of votes	Win election (1 = Yes, 0 = No)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of dead top donors in current election cycle		-2.0478***	-2.1100***				-1.9012***	-0.0308***
		(0.4277)	(0.4858)				(0.4421)	(0.0083)
- Candidate has many donors				-1.4772***				
				(0.5381)				
- Candidate has only one donor				-6.7260***				
				(1.5137)				
At least one top donors died in current election cycle (1 = Yes)					-2.5163***			
					(0.9313)			
Number of dead top donors in previous election cycle						-2.5253***		
						(0.7647)		
Candidate is male (1 = Yes)	-1.1929**	-1.2504**						
	(0.5612)	(0.5563)						
Candidate is not incumbent (1 = Yes)	-20.7490***	-21.8014***	-4.9929***	-4.8428***	-4.9758***	-4.2856***	-4.9366***	-0.0284
	(0.7940)	(0.8263)	(1.1289)	(1.1465)	(1.1269)	(1.2126)	(1.1056)	(0.0244)
Candidate ran primaries (1 = Yes)	3.2550***	3.3716***	2.6824**	2.5848**	2.6004**	1.1585	1.4744	-0.0115
	(0.5779)	(0.5731)	(1.2114)	(1.2054)	(1.2115)	(1.2699)	(1.2252)	(0.0195)
District voted in favor of the candidate's party presidential nominee	7.0341***	6.9248***	11.0883***	11.0159***	11.2282***	11.7912***	10.8981***	0.1883***
	(0.5638)	(0.5619)	(1.3612)	(1.3619)	(1.3707)	(1.4177)	(1.3254)	(0.0230)
Total contributions (constant $)	3.6210***	3.6555***	6.3658***	6.0441***	6.3544***	5.9932***	6.8691***	0.0618***
	(0.0556)	(0.0562)	(0.4024)	(0.4146)	(0.4009)	(0.4309)	(0.4135)	(0.0069)
% of low-income taxpayers in the district is above the national median (1 = Yes)							1.5943	0.0510*
							(1.7118)	(0.0305)
% of high-income taxpayers in the district is above the national median (1 = Yes)							2.7216	0.0374
							(1.7571)	(0.0288)
Election Cycle Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Candidate Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Dependent Variable: Average Value:	24.1226	24.1226	24.1226	24.1226	24.1226	23.5910	24.1226	0.2341
Num. Obs.	9,630	9,630	9,962	9,962	9,962	8,535	9,962	9,962

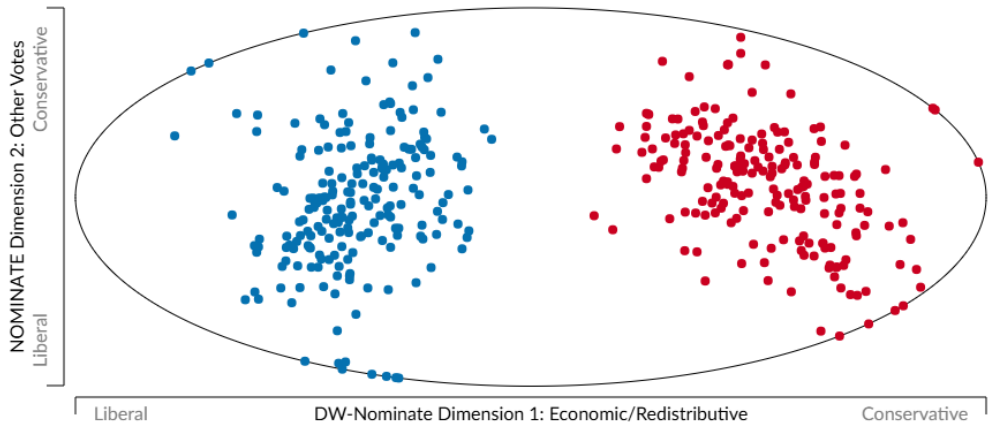
Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. For a precise definition of the variables, see Section II of the paper and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels.

Table A4
Additional Evidence
- Top Donors and Election Results Considering a Larger Time Window -

Dep. Variable	Win election (1 = Yes, 0 = No) (1)	Win election (1 = Yes, 0 = No) (2)	Win election (1 = Yes, 0 = No) (3)	Win election (1 = Yes, 0 = No) (4)	Win election (1 = Yes, 0 = No) (5)	Win election (1 = Yes, 0 = No) (6)
Number of dead top donors in current election cycle		-0.0204***	-0.0366***			
		(0.0067)	(0.0081)			
- Candidate has many donors				-0.0256***		
				(0.0086)		
- Candidate has only one donor				-0.1181***		
				(0.0228)		
At least one top donors died in current election cycle (1 = Yes)					-0.0467***	
					(0.0157)	
Number of dead top donors in previous election cycle						-0.0329**
						(0.0129)
Candidate is male (1 = Yes)	0.0103	0.0098				
	(0.0067)	(0.0068)				
Candidate is not incumbent (1 = Yes)	-0.5667***	-0.5751***	-0.0398*	-0.0372*	-0.0388*	-0.0158
	(0.0119)	(0.0124)	(0.0221)	(0.0222)	(0.0221)	(0.0237)
Candidate ran primaries (1 = Yes)	-0.0065	-0.0040	-0.0020	-0.0035	-0.0035	0.0033
	(0.0085)	(0.0084)	(0.0195)	(0.0194)	(0.0195)	(0.0199)
District voted in favor of the candidate's party presidential nominee	0.1913***	0.1903***	0.1765***	0.1751***	0.1791***	0.1783***
	(0.0085)	(0.0086)	(0.0207)	(0.0207)	(0.0207)	(0.0214)
Total contributions (constant $)	0.0201***	0.0204***	0.0480***	0.0441***	0.0474***	0.0471***
	(0.0009)	(0.0009)	(0.0054)	(0.0054)	(0.0054)	(0.0057)
Election Cycle Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Candidate Fixed Effects	No	No	Yes	Yes	Yes	Yes
Dependent Variable: average value	0.2433	0.2433	0.2352	0.2352	0.2352	0.2334
Num. Obs.	11,984	11,984	12,403	12,403	12,403	11,218

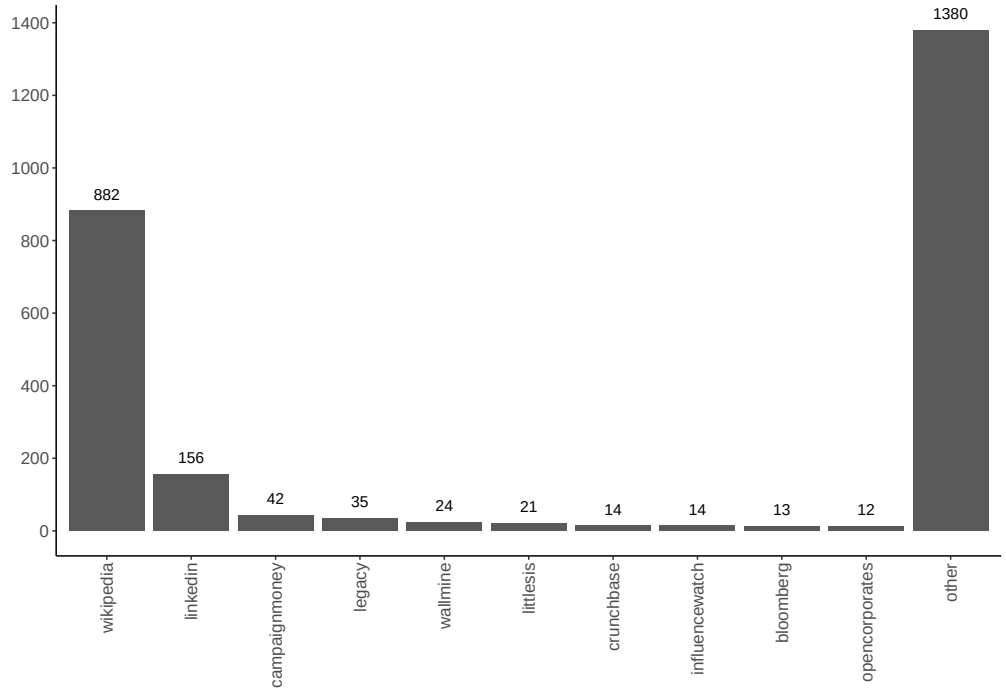
Note: OLS estimated coefficients (and robust standard errors) are reported. Robust standard errors are adjusted for clustering at the candidate level. The variable "Total contributions (constant $)" is log-transformed. The time window considered is between 2004 and 2018. For a precise definition of the variables, see Section II of the paper, and Table A1 of the Appendix. *, **, *** indicate statistical significance at the 10, 5 and 1 percent level.

Figure A1.
Ideology of US House Representatives (118th Congress)
- First and Second Dimension of the Nokken Poole Index -



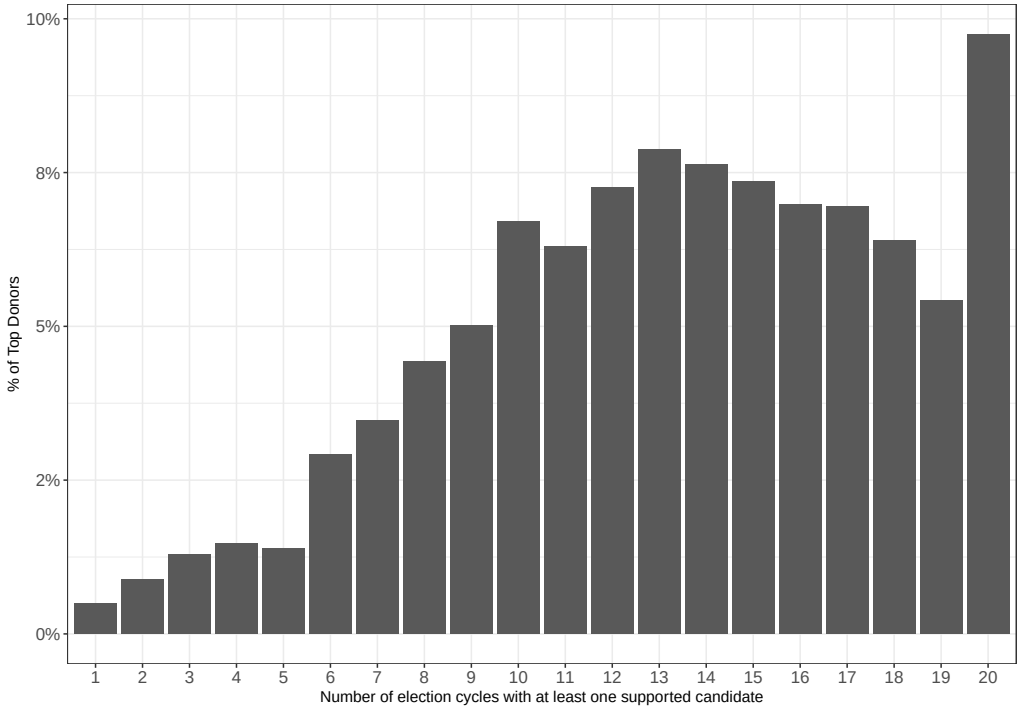
Note: The x-axis reports the first dimension of the Nokken-Poole index, which situates Representatives along the liberal-conservative spectrum on economic policy. The y-axis records the second dimension of the Nokken-Poole index, which reflect the positions Representatives on high-salience, cross-cutting civil rights issues, such as gun control and abortion rights. Data refers to the 118th Congress (2023-2025). Source: https://voteview.com/congress/house.

Figure A2.
Biographical Information about Top Donors
- Data Sources -



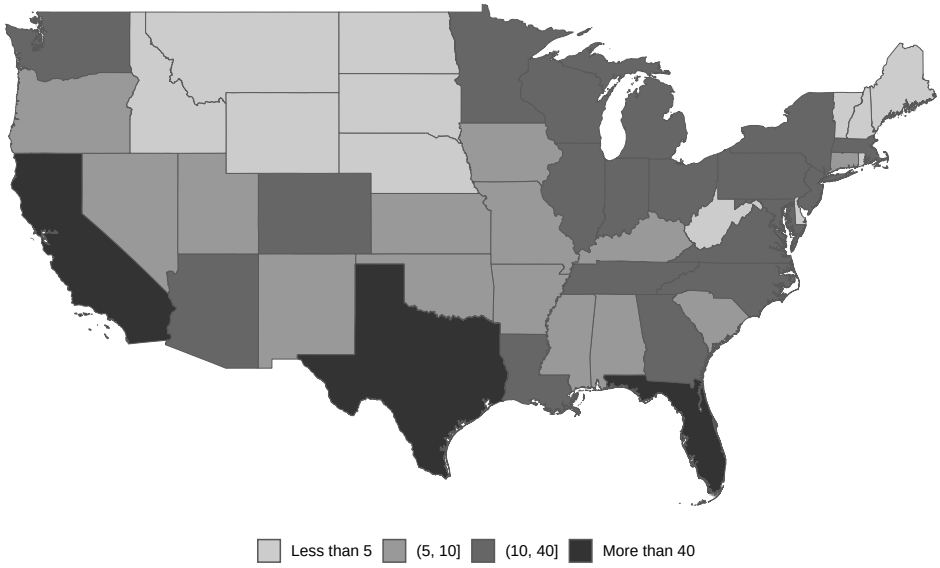
Note: The x-axis reports the online sources used to retrieve top donors' biographical information. The y-axis reports the number of times the source was used. Sources are not mutually exclusive: multiple sources may be used to retrieve information about a donor. The top 10 sources used to retrieve information are indicated. The other sources are included in the category "other". These are 1,073 websites (among the most recurrent, "Forbes", "The New York Times", and the "The Los Angeles Times").

Figure A3.
Top Donors
- Election Cycles with at least 1 Supported Candidate -



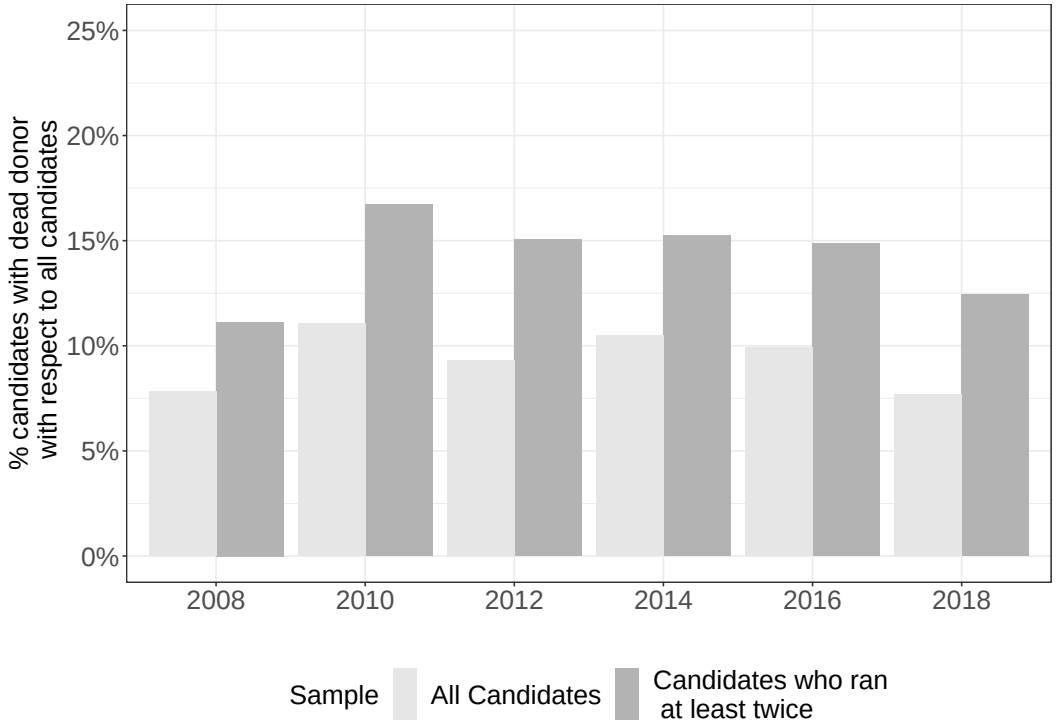
Note: The x-axis reports the number of election cycles in which a top donor supported at least one candidate. The y-axis reports the percentage of top donors (between 2008 and 2018) who supported at least one candidate for a given number of election cycles (between 1982 and 2018).

Figure A4.
Top Donors
- Average Number of Candidates supported in one Election Cycle by State -



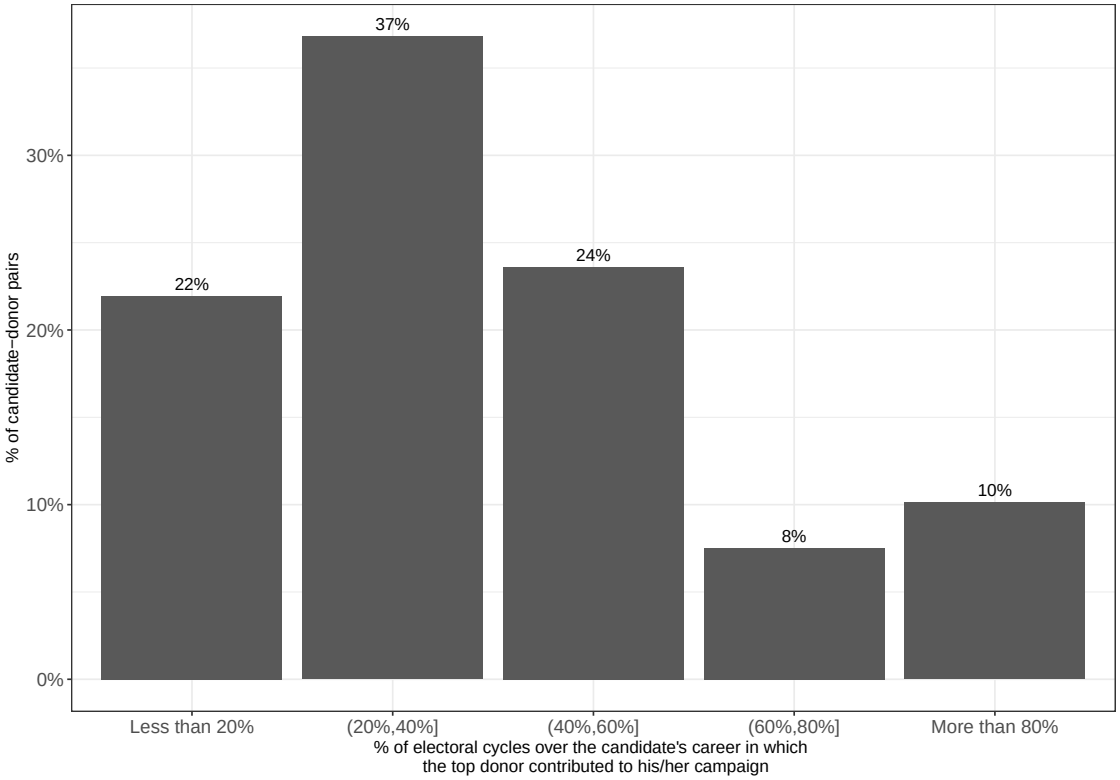
Note: The figure shows the average number of candidates supported by at least one top donor by State in one cycle. For visualization purposes, Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands are excluded from the map. In each of these States, the *Average Number of Candidates supported by a Top Donor in one Election Cycle* is less than 5.

Figure A5.
Candidates Affected by the Death of a Top Donor



Note: For each election cycle considered (x axis), it is reported the percentage of candidates who lost a top donor (y axis). Bars in light grey indicate the percentage of those who lost a top donor among all candidates. Bars in dark grey indicate the percentage of those who lost a top donor among the candidates who ran at least two electoral races.

Figure A6.
Top Donors
- Loyalty to Candidates -



Note: The x-axis registers the percentage of cycles over a candidate's career in which the top donor contributed to the candidate's campaign. The y-axis indicates the percentage of candidate-donor pairs for which that value is observed.