Power and the money, money and the power: A network analysis of donations from American corporate to political leaders.

James Rockey
University of Birmingham

Nadia Zakir
University of Leicester
July 2021, First Version May 2018

Abstract: American corporate and political elites are connected by the donations that the latter receive from the former. Using a novel dataset, this paper analyzes these connections as a social network. This analysis uncovers the changing structure of this network, and thus of the changing nature of money in US politics. In particular, beyond the well understood increase in the scale of donations, we document how donation patterns have become more polarized and more concentrated. We show that the determinants of this network's structure have remained broadly constant over time. Donors connected to the same firms or industries are much more likely to donate to the same candidates than those who are not, during every election we study. Likewise, politicians serving on the same congressional committees have been consistently more likely to receive campaign funds from the same donors. Yet, there has been a transformation in the concentration of donations on a small number of donors and recipients connected with a small number of committees and a small number of industries. This concentration is reflected in substantial increases in the power (centrality) of the most important donors and politicians.

Keywords: Donations, Campaign Contributions, Networks
JEL-Codes: D72, L14

We thank Siddhartha Bandyopadhyay, Sebastian Cortes-Corrales, Mirko Draca, Daniel Ladley, Ben Lockwood, and David Rojo-Arjona for helpful discussions as well as participants at Silvaplana 2018 and the European Public Choice Society (Jerusalem). This research used the ALICE High Performance Computing facility at the University of Leicester. Rockey: j.c.rockey@bham.ac.uk Zakir: nadiazakir.econ@gmail.com

1 Introduction

American corporate and political elites are connected by the donations that the latter receive from the former. Using a novel dataset, this paper analyzes these connections as a social network. This analysis uncovers the changing structure of this network, and thus of the changing nature of money in US politics. In particular, beyond the well understood increase in the scale of donations, we document how donation patterns have become more polarized, more concentrated, and more dependent on the corporate connections and allegiances of the individuals.

Recent US elections have seen a sharp upswing in the contributions made to the political campaigns, $14 billion was spent in the 2020 campaign cycle.[1] Yet, concern about these donations depends on who they go to, from whom, and why. For example, if much more is systematically donated to politicians of one party than another we may worry it is injurious to democracy. Similarly, we may be concerned if donations flow from only a small number of individuals.[2]

More generally, however, we may be concerned if donations are structured or coordinated in such a way to allow a particular group, such as the very rich or those associated with a particular industry, to have a disproportionate influence on policy. This concern is separate to concerns as to the scale or origin of donations. Notably, such structure or coordination is contrary to the assumptions of the canonical models of both lobbying as rent-seeking and lobbying as information provision. The traditional public-choice view of special-interest politics as rent-seeking, following Becker (1983) and Grossman and Helpman (1996) conceptualizes special interest politics as a (free) market. On this basis Becker (1983) was sanguine about the activities of political interest groups, but the same conclusion may not be reached if the structure of the network of politicians and donors conveys some groups and individuals additional power by virtue of their position in it. Similarly, in informational-lobbying models such as Grossman and Helpman (2001) it is possible for lobbying to be Pareto-improving. But, again such results rely on competing lobbyists facing similar costs, which may be far from the case if costs for different groups depend on the network topology.[3]

This paper assembles new evidence with which to evaluate these concerns. We apply network analytic tools to a unique dataset to identify ten stylized facts about the links between corporate elites (those on corporations' boards and in top management positions) and politicians. This data set combines FEC data on personal contributions, as collated by Bonica (2013b, 2014) for candidates competing for the U.S. House and Senate during all election cycles from 1980-2012, with hand-collected data from Bloomberg (2016) and other sources on the composition of all listed firms' boards and senior management since their inception. Thus, donors are linked via the firm(s) they manage or whose boards they sit on.[4] Politicians, are linked by a range of characteristics including the states they represent, the committees on which they serve, and so forth. Finally, and crucially, politicians and donors are then linked by the donations the latter give to the former. We treat these data as a bipartite graph, with politicians and executives as exclusive sets of vertices and donations the edges between them.

The first five stylized facts we identify describe "*the money*", summarizing aggregate trends in the scale and distribution of donations as well as which representatives are most likely to receive donations.

[1] Source: https://www.opensecrets.org/news/2020/10/cost-of-2020-election-14billion-update/ Accessed 15th January 2021.

[2] Indeed, recent evidence suggests that this is the case. For example, Bonica and Rosenthal, 2015b. On the other hand, recent elections have seen the growth in 'mass donations': small donations made online.

[3] These two types of model are not mutually exclusive, and the evidence presented by Bertrand et al. (2014) and Bombardini and Trebbi (2020) is consistent with a role for both explanations.

[4] Thus, this network will itself be complicated as senior management often sit as board members at other firms.

The second five describe "*the power*". They describe the increased role of the biggest donors, trends in the estimated distribution of influence in the network, as well as how factors such as working for the same firm, or representing the same state, etc., explain the network structure of donations.

The Money

The first two stylised facts capture two key aggregate trends in politics:

1. Donations by members of the corporate elite increased 1,000 fold over the period 1978-2012 and the relative importance of these donations also increased from 3% to 30%.

2. Donations go to incumbents and those otherwise likely to win.

We analyze the structure of this network, both considering politicians and donors separately and also together using bipartite graph approaches. A simple analysis of donations by corporate elites can unveil the main features as well as the underlying priorities of these donations. For example, if donations reflect motives like securing access or influence for their firms rather than their personal politics then we might anticipate that they should target their money to candidates who are most likely to win, incumbents or those more powerful. Previous studies have documented some of these features in the context of PACs. To put our analysis in this context, the natural starting point is to examine these features in the case of individual contributions by executives. This allows us to ask what are the common traits or characteristics of both corporate elites and legislators which determine the formation of this network. Specifically, we show that the last 35 years have seen a transition in the nature of political giving:

3. Proximity to power: Dyadic regression analysis suggests that donations by corporate elites are motivated by proximity to power, whether in terms of being the majority party, seniority on key committees, or incumbency.

4. Better connected politicians receive more donations.

5. Ideology relatively unimportant: There is little evidence that the ideology of representatives (or candidates) is an important determinant of receiving donations.

The Power

While aggregate statistics illuminate the increasing scale of "*the money*" and individual-level analyses make plain who gets it, they cannot directly capture "*the power*". The advantage of viewing donations as a network, however, is that the structural properties of the network, as measured by standard network statistics, describe, *inter alia* the distribution of *power*. This is a substantial advantage over other approaches as the extent to which money in politics alters the distribution of power is a fundamental concern and one that is hard to capture by other means. Very loosely, analyzed in this manner, the donation data allows us to better understand the role and influence of those in grey suits in the smoke-filled rooms of popular conception – those who are not as obviously powerful as their position in the network makes them. Using these tools we characterize five stylized facts about "*the power*". The first three describe the distribution of power:

6. The giving of relatively small and comparatively uniform amounts, often to candidates of both parties, has been replaced with the distribution of donations becoming extremely skewed,

dominated by a few 'mega-donors', and giving almost exclusively along party lines. A similar transition has taken place in terms of who receives the donations. Money is now much more targeted on a small number of key politicians.

7. Connections between corporate elites and politicians have become increasingly dominated, as captured by the increasing concavity of the degree distribution of both legislators and donors, by a small number of 'hubs' which mediate much of the funds and influence transmitted by the network.

8. The concentration of *power*, measured as either betweenness centrality or power/eigenvector-centrality has increased rapidly and monotonically over the last 30 years with the relative importance of the the most central increasing by a factor of over 1000.

Finally, in order to understand the drivers of the network's structure, we analyse what observable factors explain the formation of edges. In particular we analyse the importance of corporate concerns: whether donors (politicians) with similar observable characteristics are more likely to make (receive) donations to (from) the same politicians (donors), and how this has changed over time. To do this we employ the unipartite projections of this bipartite network, where one type of node is treated as a connection between the nodes of the second type, to study the common characteristics of nodes in each of the network (donors network, recipients network) separately. We do this by using dyadic regressions where two donors (politicians) have k connections if there are k politicians who they both donated to (if there are k donors from whom they both received donations). The results of this analysis, summarized in the final two stylized facts, reveal the relative importance of say, working in the same sector, compared to living in the same congressional district:

9. Donors working for the same firm, or in the same sector, in the same state or district, are more likely to donate to the same candidates. The importance of these factors has been stable over time.

10. Politicians from the same state are much more likely to have donors in common. This effect is substantially larger than that associated with both politicians being of the same party, or serving on the same committee. All of these effects are found to be more important than that of a similar ideology. The importance of these factors has been stable over time.

The stability of these correlations over the period we study, for both donors and candidates suggests that changes in the structure of the network and equivalently money in politics are not driven by these observed factors. This suggests that changes in the network reflect other, more subtle, changes in the broking of power and money.

The first three of these have been previously documented elsewhere in the literature.[5] The remainder to the best of our knowledge have not.

This paper proceeds as follows. The remainder of this section discusses related literature. Section 2 describes the first two stylized facts concerning the aggregate patterns in the data. Section 3 outlines the evidence for facts 3–5, which describe the competing roles of the desire for influence and ideology. Section 4 rehearses the basics of bipartite graphs and outlines our empirical strategy. Section 5 reports stylized facts 6–8 based on network statistics describing the increased concentration of donations,

[5] See, Bonica (2013a), Bonica and Rosenthal (2015a) for the first two and Berry and Fowler (2018), Fouirnaies (2018), Fouirnaies and Hall (2018), Powell and Grimmer (2016) for the third respectively.

polarization, and the influence of the most central politicians and donors. Section 7 summarizes the determinants and dynamics of the structure of the network in facts 9 and 10. Section 8 briefly concludes. Details of our data are in appendix A. Appendix B collects additional tables and figures.

1.1 Related Literature

This research builds on the literature in three main ways. Firstly, it is most closely related to the recent literature that analyses the political behavior of corporate elites, particularly, to recent work that analyses the motivations for political donations by executives. Secondly, it is related to an emerging literature that also analyses donation data as a network. Finally, it is related to a venerable literature that seeks to understand the amount of money in politics.

1. Political Behavior of Corporate Elites

Much of the literature on donations by firms and corporate elites seeks to understand their motivation. Gordon et al. (2007) argue that increased donations by executives whose pay is more sensitive to corporate performance suggest that donations are better seen as an investment by executives rather than consumption. Similarly, Ovtchinnikov and Pantaleoni (2012) argue that there is a pattern of higher donations to politicians with 'power to affect their economic well-being' by executives. Likewise, Fremeth et al. (2013) argue that the increase in donations by executives promoted to CEO cannot be explained purely by wage increases suggesting 'taste' or consumption-based explanations are insufficient. Richter and Werner (2017) study how personal contributions by CEOs increase to those candidates who refuse to take firm PAC donations, again consistent with an investment-type explanation. Yet, there is little systematic evidence for the effectiveness of these donations. Fowler et al. (2020) show using both a close-election RDD, as well as a within-campaign variation in the probability of winning, the value to a firm of a favored candidate winning. They are able to rule out effects larger than 0.3% of firm value.[6] Consistent with this, Bonica (2016) using data on Fortune 500 Corporations, argues that donations made by Fortune-500 CEOs tend to be more ideological, and less focused on influential legislators, in line with a consumption-based explanation.

This highlights the importance of understanding the patterns of donations by members of the same firm or industry. If donors tend to all give to the same powerful politicians this would be in line with an investment explanation, on the other hand, support for a variety of candidates is more consistent with a consumption explanation. A second branch of the literature focuses on *which* politicians receive donations. Berry and Fowler (2018) use a within-representative design to analyze the relative value of committee membership. Their results suggest that power is concentrated on committee chairs and other committee positions are less important. Fouirnaies (2018) uses a difference-in-difference design to estimate the impact of committee chair positions on representatives value to corporate donors as revealed by the scale of their donations. He further finds that the importance of agenda setters such as committee chairs has increased at recent elections, and that they have been the prime beneficiaries of relaxations in restrictions on campaign finance. Fouirnaies and Hall (2018) provide evidence that corporate donations are sophisticated – targeting representatives who have procedural power as well as agenda setting power. Powell and Grimmer (2016) use committee exile— the involuntary removal of committee members due to electoral losses— to identify the impact of committee membership on campaign donations and find that exile is associated with a substantial reduction in donations which

[6] Akey (2015) had previously found evidence for a positive effect, but Fowler et al. (2020) show that the findings of Akey (2015) are sensitive to the choice of specification employed.

now flow to new committee members. Kalla and Broockman (2014) provide perhaps the most direct evidence, of which we are aware, of the mechanism through which donors benefit from donations. They show donations lead to improved access to politicians. They conducted a field-experiment in which they tried to arrange meetings between active donors and congressional offices. In cases where it was revealed that the donor was an active donor, a meeting was as much as four times more likely to be agreed. The normative implications of these findings are complicated by the findings of Esterling (2007) who provides evidence that donors target committee members with greater analytical capability. This in turn encourages committee members to develop this capability and ask more analytical questions.

Bertrand et al. (2020) provide evidence that a substantial fraction (6.3%) of large US corporations' charitable spending is politically motivated, an amount equivalent to 2.5 times total PAC activity. Schnakenberg and Turner (2021), extending prior work such as Austen-Smith (1995) and Felli and Merlo (2007), consider another motivation for corporate donations. They study a game in which corporate donations affect election outcomes both directly as well as serving as a source of information, showing that donations by ideologically extreme donors to moderate candidates may benefit such donors by acting as a credible signal.

2. Network Approaches to Campaign Finance

This paper also builds on a recent literature that uses network analyses to analyze political donations.[7]

The theoretical analysis of Groll and Prummer (2016) provides a useful lens through which to interpret the results in this paper. They study the optimal strategies of two competing lobbyists facing a network of heterogeneous politicians. They find: a) *Contra* Becker (1983) that lobbyists do not in general cancel each other out; b) That when similar politicians are more connected in the network, i.e. there is greater homophily, then the returns to lobbying key politicians increase.

In an early study Dreiling and Darves (2011) use a dyadic approach to study the determinants of several forms of political unity between firms in trade-policy lobbying. They find that political unity is more common amongst similar firms.[8] While Box-Steffensmeier et al. (2013) focus on interest groups lobbying of the U.S. Supreme Court, their paper is closely related to this one in that we similarly analyze the network's structure to better understand how power is distributed within it. This paper is also related to that of Nyhan and Montgomery (2015), who analyze the network of congressional election candidates and campaign consultants as a bipartite graph to provide evidence of the importance of campaign consultants for the diffusion of campaign strategies. The paper of Koger and Victor (2009) is also related in that they use network analysis to understand the relationships between lobbyists and politicians. However, their analysis is complicated by the fact that there are important non-pecuniary aspects to lobbyists relationships with politicians, as documented by Blanes-i-Vidal et al. (2012).

Two recent studies have analyzed networks amongst legislators. Box-Steffensmeier et al. (2020) analyze electoral collaboration networks between members of Congress, as reflected by the sharing of lists of donors. They find that collaboration is most likely between those from the same party, state, or

[7] This review is necessarily selective. Comprehensive discussions of the prior literature can be found in Heaney and Strickland (2016), Patty and Penn (2016), Ringe et al. (2016).

[8] Other earlier work analyzed the geographical distribution of donations to infer the importance of social-networks for political donations. Gimpel et al. (2006) analyze the geography of campaign contributions, finding that these are very different to electoral geography. Even controlling for observables such as wealth, they find that higher levels of donations in a given city-block to one party are associated with a higher level of donations to the other. They conclude that this reflects the importance of social-networks among donors for driving political participation. Cho (2003) likewise finds evidence using spatial regression techniques of an important role of social networks in determining political donations amongst Asian Americans.

committee.[9] Garro (2020) uses the deaths of other congressional representatives from the same state to document the importance of connections to other politicians for congresspeople to be effective in the drafting and sponsoring of legislation.

3. The Amount of Money in Politics

This paper contributes to the literature that seeks to understand the amount of money in politics. Recent research has also noted the relationship between increasing disparities in wealth and campaign contributions (Bonica and Rosenthal, 2015b). Perhaps this just reflects reality catching up with theory. After all, previously Tullock (1972) famously puzzled why *there is so little money in US politics*, given small observed amounts of corporate cash in elections and the huge expected returns.[10] Yet, whether any of this should be cause for concern depends on the motivations and the consequences of such donations. If they give as a form of consumption (Gordon et al., 2007), then one may be less concerned than if they give in order to obtain and manipulate legislation to their advantage. This indicates the need to pay attention to the structure of contributions within the corporate sector as well. The possible inequalities and concentration of campaign contributions within the corporate sector can further accelerate already increasing economic disparities. Grumbach and Alexander (2020) highlight another area of inequality. They provide evidence that Black and Latino Americans are under-represented amongst donors. They provide causal evidence that ethnoracial minority donations increase when there is a minority candidate and this implies that under-representation amongst donors in part reflects a lack of minority candidates. Gulzar et al. (2021) provide further evidence of the importance of the structure of donations. Employing a RD design that exploits variation in contribution limits across Colombian municipalities they provide evidence of a causal relationship between contribution limits and the quality of public contracts. Interestingly, their results suggest that this is because contribution limits lessen the influence of the largest donors.

2 Aggregate Trends

Stylised Fact 1. *Donations by members of the corporate elite, in real terms, increased 320 fold over the period 1980-2012 and increased as a share of individual donations from* 2% *to* 30%*.*

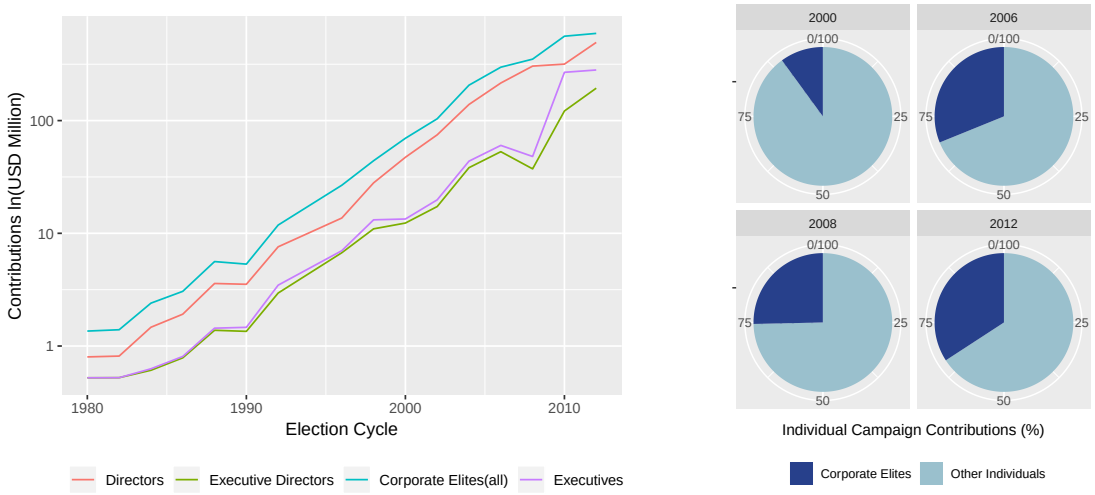
Figure 1a plots total (nominal) donations by corporate elites over the period 1980-2012. The y-axis is a $\log_{10}$ scale, denominated in $millions, such that the slope of the line is consistent with a ten fold increase in donations every ten years. Thus by 2012 corporate donations which amounted to a little over $1million in 1980 were close to $1 billion. In real terms this is an increase from $1 million 1980 Dollars to $320 million.

Figure 1b shows the increasing importance of donations from those connected to listed firms over recent election cycles. Indeed, by the 2012 election cycle corporate elite contributions account for the majority of the value of donations despite being a very small share of the overall population. This provides initial evidence for a key message of this paper – which is that the role of business elites in US politics has been increasing apace in recent years.

[9] Aldrich et al. (2017) study another aspect of collaboration: The use of intra-party campaign contributions via the use of Leadership PACs, suggesting that leaders' trade-off between ideological homogeneity and electability depends on whether the party is the majority.

[10] Answers to Tullock's question include those of Ansolabehere et al. (2003, 2004). More recently, Bonica (2016) and Li (2018) have emphasised the important role of ideological heterogeneity as a source of moderation amongst both corporate leaders and the staff respectively.

Figure 1: The Growth in Corporate Elites' Campaign Contributions



(a) Individual contributions from corporate elites

(b) Donations from corporate elites compared to other individuals' contributions

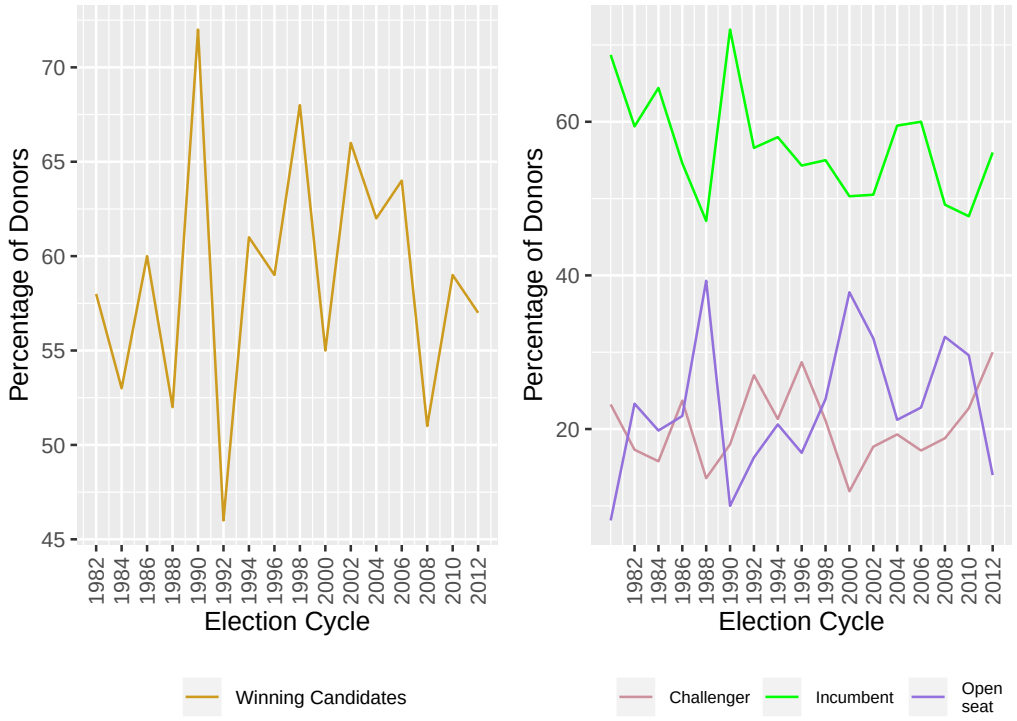
Notes: Data are in nominal dollars. Includes donations to Presidential campaigns and (Super) PACs.

Stylised Fact 2. *Donations go to incumbents (increasingly).*

The left-hand panel of Figure 2 plots the percentage of corporate elite donors (henceforth, CED) who gave to the candidates that subsequently won in each election cycle. This has consistently been well over 55% in most of the election cycles suggesting donations from directors and executives go disproportionately to the candidates that are most likely to win. Why there was such a precipitous decline in 1992 is not immediately clear, but might reflect the impact of redistricting following the 1990 census although there is no such pattern in 2002. More subtly, it could reflect increased aggregate uncertainty about likely election outcomes in presidential election years where there is no incumbent president, as large declines are also observed in 1988, 2000, and 2008.

The right-hand panel of Figure 2 tells a similar story. This plots the percentage of CED who made contributions to incumbents, challengers and candidates contesting open seats in each of the election cycles from 1980-2012. The percentage of CED who gave to incumbents has consistently been far higher than the other two categories. The comparison with open seats is particularly interesting as while not donating to challengers likely to lose is easy to rationalise, candidates in open-seats should be expected to win 50% of the time. Thus, the relatively small number of donors might suggest that CED target their donations at those who have already served at least one term.

Figure 2: Picking Winners and Incumbents



Notes: Includes donations to Presidential campaigns and (Super) PACs.

3 Influence versus Ideology: Patterns in Donations

We now dig deeper into who is most likely to donate to whom. In particular we ask whether donation patterns are consistent with donors being motivated by ideology or influence. To do this we regress the total donations received by each candidate in each election cycle on a vector of explanatory variables that capture influence/power, connections, and ideology.

We are interested in knowing not only the incidence of such donations but also how the amount of money received varies with the member's characteristics. Thus our dependent variable is the total amount of donations received by a member of Congress from all corporate elites in a given election-cycle.[11] We test the relation between total donations received by each member of Congress from corporate elites and their above mentioned characteristics in a multivariate regression framework. Specifically, the model we estimate is of the following form:

$$\begin{aligned}\log D_i^t = & \underbrace{\sum_k \beta_k Committee_{ki}^t + \sum_l \gamma_l Position_{li}^t + \phi Majority_{it} + \psi Seniority_{it} +}_{\text{Power}} \\ & \underbrace{\delta Party\ Connections_{it} + \tau Non\text{-}Party\ Connections_{it} +}_{\text{Connections}} \\ & \underbrace{\sum_m \omega_m Ideology_{mi}^t}_{\text{Beliefs}} + \eta_i + \varepsilon_{ij}^t \end{aligned} \tag{1}$$

Where D_i^t is the amount of contributions received by legislator i in period t, such that the dependent

[11] The distribution of total donations received is shown in figure B1 in the appendix.

variable is the (log of) contributions. The variables *Committee* and *Position* consist of 19 House and Senate committees and six categories of important positions in Congress respectively. η_i is a random effect.[12] The error term, ε_{ij}^t, is clustered by recipient. Our model thus has much in common with those of Berry and Fowler (2018), Powell and Grimmer (2016) in that the coefficients estimated are within-estimates, describing the effect of a change in committee-membership, or other positions, on campaign contribution receipts.[13] Unlike those papers which seek to recover causal effects by including individual fixed-effects as part of a difference-in-differences design, our approach is descriptive and our preferred specification is a random-effects model in which we can also identify the correlation between donations and legislators' ideologies and connections which tend to only vary slowly over time. The results of this regression analysis imply the following stylized facts.

Stylised Fact 3. *Powerful representatives receive more donations.*

A Congressperson's power comes from their ability to influence legislation; and this ability can result in deriving campaign contributions, votes etc., from the relevant interest groups or voters. The extent to which these powers are distributed among the members depends on the relevance of committee they are on, their committee and party positions, experience etc., we investigate each of these indicators of power and their relationship with money from corporate elites. Given the initial evidence of a large amount of donations from corporate elites to the members of Congress (see Figure 1a), we expect that if contributions are used to influence the legislative process these large amounts may target committees and legislators who shape the agenda.

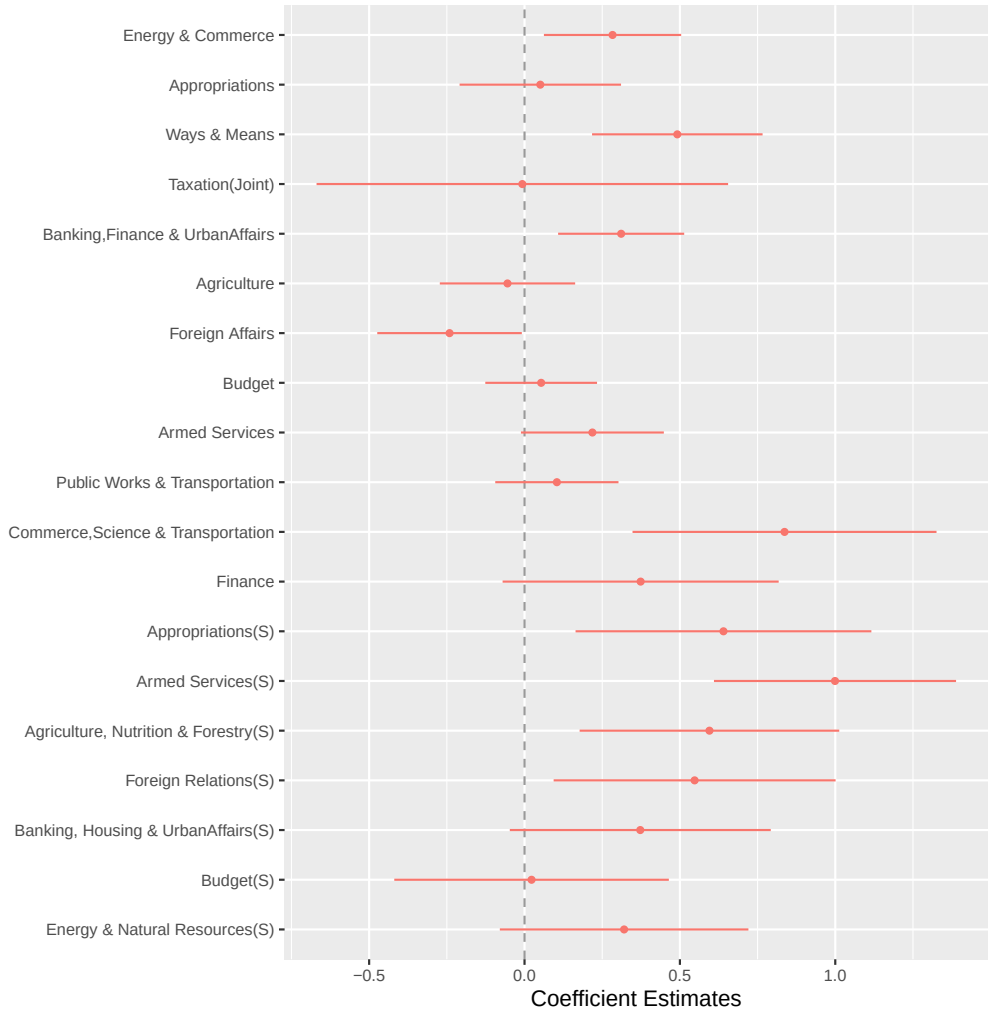
Our results suggest that being a member of an important committee seems to play a significant role in receiving money from corporate elites. Figure 3 shows such results where the dependent variable is log of total contributions received by a member of Congress from corporate elites. First, looking at the Figure 3 below, we see that Senate committees are associated with more donations than those in the House. It shows that Armed Services (Senate), Agriculture, Nutrition & Forestry (Senate), Commerce Science and Transportation and Appropriations (Senate) are associated with the largest coefficients. Being a member of these committees significantly affects the total amount of contributions received from the elites in corporate sector. For example, becoming a member of Senate committee on Appropriations increases the average contributions from corporate elites by 89.6%. The coefficients on other committees mentioned above are even larger. Table B2 reports all these coefficients of committee membership in columns 1 to 4. The committee variable with the greatest effect on contribution changes is Armed Services. We also find some evidence of increased contributions for Ways and Means, Banking, Housing & Urban Affairs (Senate) and Foreign Relations.

Figure 4 shows the relationship between legislators' position or seniority in the Congress and the amount of money they receive from corporate elites. The coefficient plot shows that a higher position of the member is even more important to corporate elites than mere membership. The coefficients on Majority Leader, House Speaker, Committee Chairman and Ranking Majority member are large and precisely estimated. They thus show that being in such senior positions is associated with a significant increase in a member's campaign contribution receipts. The coefficient in the case of Majority Leader is even higher than the Committee Chairman; this may well reflect the important change in the balance of power resulting from the institutional reforms enacted in 1994, which transferred a considerable amount of power from committees and committee chairs to the House leadership. By contrast, being

[12] We report results alternatively pooling across congresspeople or fixed effects in Tables B2 to B4.

[13] The approach of Fouirnaies (2018), Fouirnaies and Hall (2018) is also related but they analyze state legislative committees.

Figure 3: Membership of Important Committees



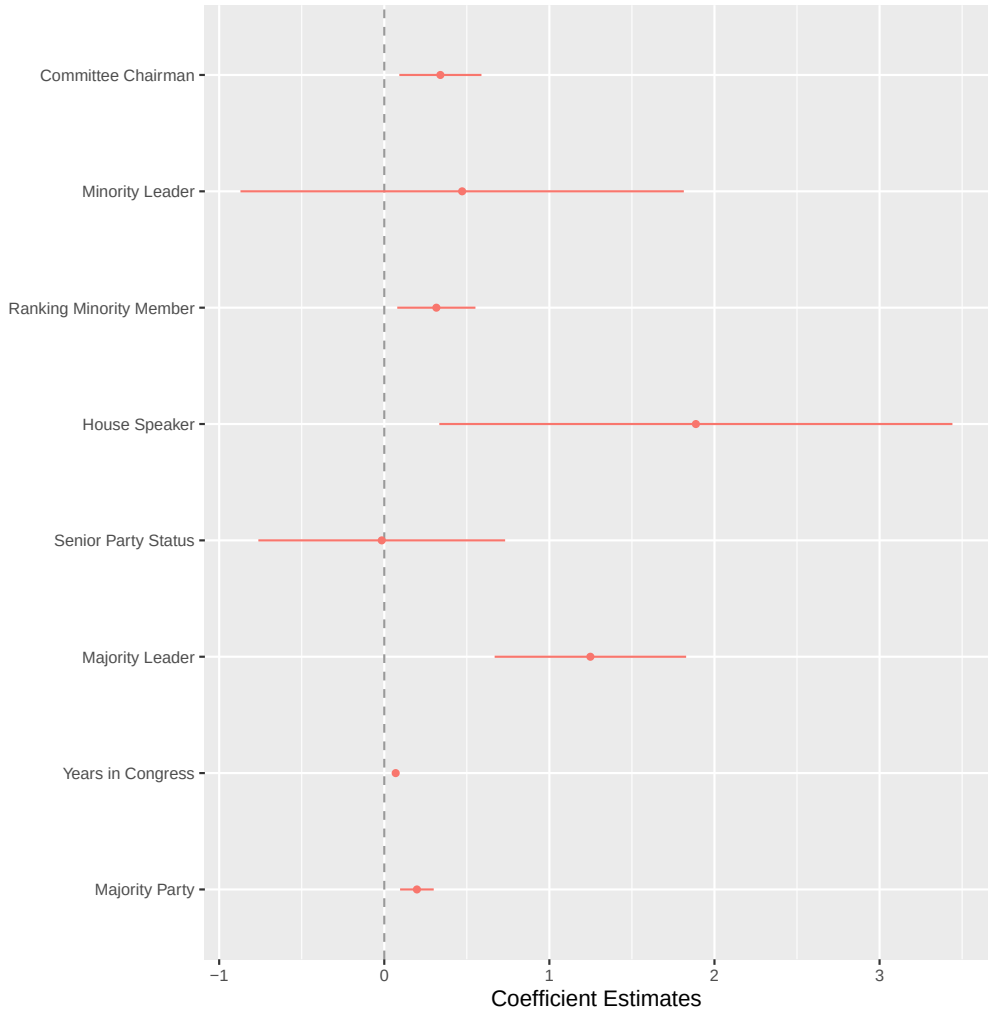
Notes: The dependent variable is the amount donated to a given legislator at a particular election. Excludes donations to and from Presidential campaigns and (Super) PACs. Circles depict OLS estimates of (1), the lines either side represent 95% confidence intervals based on standard-errors clustered by legislator. Other estimated coefficients are plotted in Figures 4 and 5. Estimates also include legislator random-effects.

a Minority Leader or a senior party status (SPS) appears to have no effect on contributions from directors and executives.

Another indicator of power used in our analysis is being a member of majority party. Contribution money by any strategic donor is generally expected to change in response to a shift in partisan control of the chamber; whereas ideological individual contributions are expected to show the opposite. Our results show (see Figure 4) that the coefficient on this variable is quite large and highly significant, suggesting that corporate elites are more likely to give larger amounts of money to the member who is affiliated with the party in power. We find that if a members' party comes into power, it leads to around 22% increase in contributions to their campaign by corporate elites. The coefficient on the seniority variable (years served in Congress) seems relatively small but is highly significant; for a one additional year served in Congress, the average contributions from corporate elites increases by only 2%.

These patterns suggest that not only legislators committee membership but also their higher position on the committee and in the chamber matters for how corporate elites allocate money among

Figure 4: Seniority



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them. The largest effect, perhaps unsurprisingly, is of the higher positions. Specifically, the positions which imply extra agenda power and greater influence in the earlier stages of legislative process; and thus make legislators more appealing to the corporate elites.

Stylised Fact 4. *More connected politicians receive more donations.*

Battaglini et al. (2018) present a theory of competitive vote-buying which predicts that campaign contributions are increasing in the legislators centralities. We try to empirically test the significance of connections for the contributions made by corporate elites. To do this we employ two variables here. First, the number of legislators to whom a member of Congress has made personal donations. Second is the amount of non-party independent expenditures made for a member's campaign. The variables used have limited scope as they cannot show the full extent of a member's connections, however they can very well give us a lower bound of such a relationship. Figure 5 shows the effects of both the Party and Non-Party connections to be significant and with the expected sign. The coefficient on party connection is relatively small (showing a 0.2% increase in contributions), however it is highly significant and thus suggests that members who have more connections within the chamber are more likely to

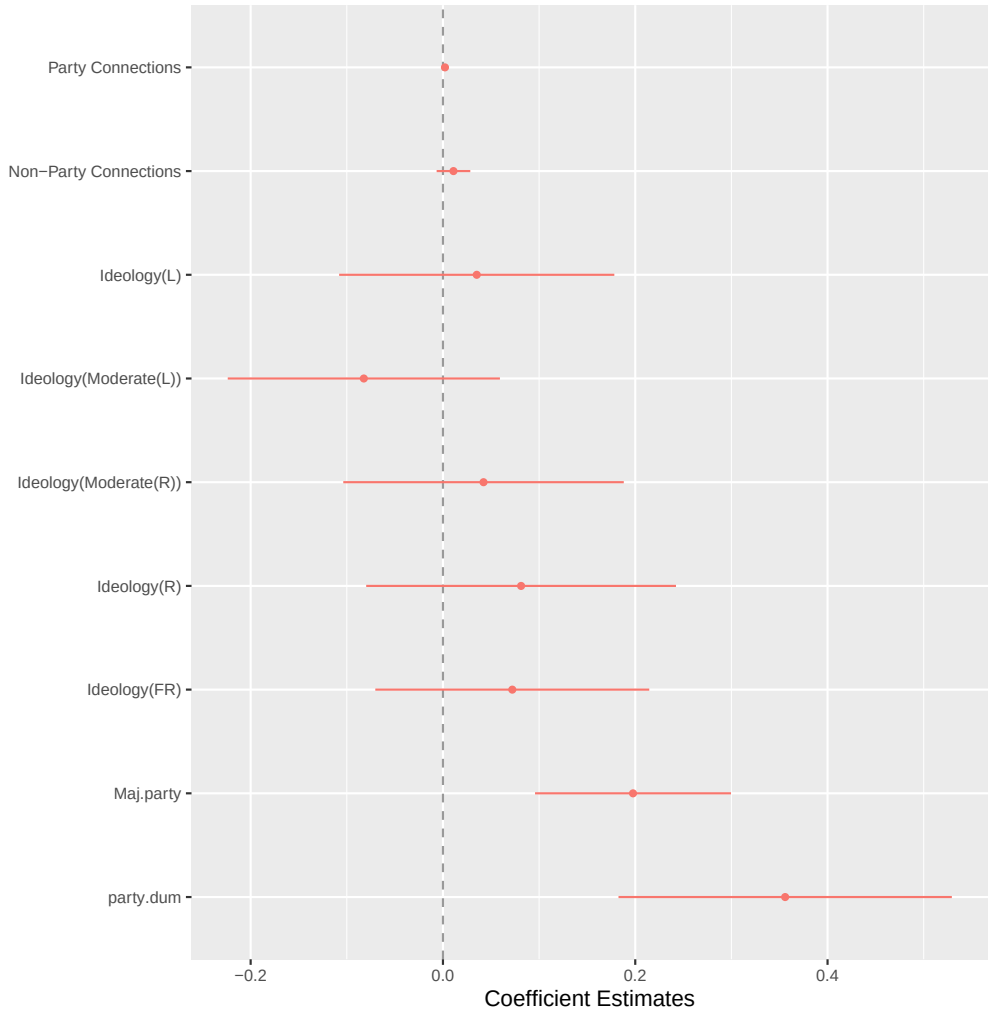
receive increased amount of money from corporate elites. The coefficients on non-party connections are larger but not significant at the 95 percent level.

Stylised Fact 5. *Ideology does not predict donations.*

Lastly, we consider if the money from corporate elites flows towards a group of members having certain ideological position. If corporate elites give contributions to support a certain ideology then we should expect certain ideological groups to receive disproportionately more money than other groups. Given that moderates of both parties may have more in common with each other than they do with the more extreme wings of their parties, we not only consider members as Republicans and Democrats but divide them in six groups. This incorporates the ideological variation within the Republican and Democratic parties as well. We consider how left or right the member is on the ideological spectrum and how this matters for receiving money from corporate elites. The coefficients on each of the independent variables, relating to ideology, measures the change in contribution patterns relative to the reference ideology group i.e., the far left group. Figure 5 shows that Ideology is relatively unimportant in this case as none of the groups has a significant influence on the dependent variable.

All of the results discussed above are robust, tables B2 to B4 given in appendix B.1 present the regression results of the pooled, random effect and fixed effect models from column 1 onward respectively, standard errors are always clustered at individual legislator level. Thus, our findings suggest that legislators' position on a committee or in Congress, membership of some of the important committees, seniority and connections respectively are the primary characteristic that are associated with receiving money from corporate elites, more than their ideology. We argue that considering all of the above expected motives of contributions is the natural starting point to understand the role of corporate elites in money in politics.

Figure 5: Connections and Ideology



Notes: The dependent variable is the amount donated to a given legislator at a particular election. Excludes donations to and from Presidential campaigns and (Super) PACs. Circles depict OLS estimates of (1), the lines either side represent 95% confidence intervals based on standard-errors clustered by legislator. Other estimated coefficients are plotted in Figures 3 and 4. Estimates also include legislator random-effects.

4 Bipartite Networks

To understand *the power* the remainder of this paper characterizes the network structure of individual contributions by members of the corporate elite to congresspeople. To do so we treat the donation data as a weighted bipartite graph. This reflects that we have two exclusive sets of vertices (candidates and donors), and that the value of donations is an important feature of our data. For clarity and specificity this section briefly rehearses the key notation and concepts, following closely Borgatti (2012).[14]

A network graph may be represented by the ordered pair $G = (V, E)$, where $V(G)$ is termed as the vertex set (or nodes) and $E(G)$ is the edge set (or links). A graph $G(V, E)$ is bipartite if we can partition all nodes into two sets, in our case, C (candidates) and D (donors). No individual is both a candidate and a donor, so the sets are disjoint, i.e. $C \cap D = \varnothing$, and exhaustive $C \cup D = V$. Donors do not make donations to other donors, and candidates do not make donations to other candidates and thus there are no edges within C or within D.[15] Let $D = \{d_1, d_2, ..., d_N\}$ represent the vertex

[14] More thorough introductions are provided by Jackson (2008) and Newman (2010).

[15] In reality, there will be some exceptions to these assumptions. For example, candidates may sometimes make donations

sets of donors (directors and executives) who give money to candidates running for Congress and $C = \{c_1, c_2, ..., c_M\}$ represents the vertex sets of these candidates, where M is the number of unique candidates in C and N is the number of unique donors in D.

The set of edges is $E = \{(c, d) : c \in C, d \in D\}$, where $E \subseteq C \times D$ is the set of campaign contributions linking candidates and donors. Under these restrictions on C, D and E, the above sets represent a bipartite graph $G = (C \cup D, E)$ where vertices from set C and D are connected by an edge iff $(c_i, d_j) \in E$, where $1 \leq i \leq M$ and $1 \leq j \leq N$. Finally, $\mathbf{X}$ is the resulting incidence matrix which is a bipartite donor-by-candidate matrix in which the rows correspond to donors while the columns correspond to candidates. Elements take a positive value if there is a donation from donor i to candidate j. That is, the donor-candidate incidence matrix is defined element-wise as:

$$x_{ij} = \begin{cases} 1 \text{ if an edge exists from vertex i to vertex j} \\ 0 \text{ Otherwise} \end{cases}$$

It will sometimes be important to take into account differences in the amount donated, and in this case G is a weighted bipartite graph in which the edge weights represent the strength of a connection, that is the amount contributed by a given donor to a given candidate. Likewise vertex weights will reflect the total amount contributed (received) in a given election cycle by a particular donor (candidate).

4.1 Unimodal Analysis

For our regression analysis, we aim to identify the common traits that determine the formation of donation network between corporate elites and legislators. To do this we utilize the well known dyadic approach in the network analysis. This involves the unimodal analysis of the bipartite data described above in which we analyze each mode, i.e. the corporate elite donors vertex set D or the candidates vertex set C, of our bipartite network separately.

A projection onto the vertex set C results in a one-mode network where node c is connected to c' given $c \in C$ and $c' \in C$ only if there exists a pair of edges $(c, d) \in E$ and $(c', d) \in E$ such that c and c' share a common neighbor $d \in D$, in the bipartite graph G. Thus, the C-projection of our donor-candidate bipartite network is the donors network $G_D = (A, E)$, where two vertices of set A are linked together if they have at least one candidate in common. Our one-mode projections are constructed allowing for both different numbers of common neighbors and differences in the amounts donated. In weighted projections, the weight of an edge in the projected network represents the number of common neighbors that a pair of nodes c and c' share from the opposite vertex set D in G and the weight of the underlying edges. The sum of the weights of all links of c is called the node strength S of c, which is given by

$$S_c = \sum_{c'=1}^{M} w_{cc'}$$

where $w_{cc\prime}$ is the weight of the link connecting nodes c and $c\prime$. The node degree represents the number of neighbors the node has while the node strength represents the number of total interactions of such node.

Let $N(c_i)$ denote the neighborhood of the node (c_i) i.e., those vertices directly connected by an

to other candidates. But these, and other exceptions, constitute a vanishingly small fraction of the total and we ignore them here for simplicity.

edge to (c_i). Then the matrix representation of an unweighted C-projection is a 1-mode matrix $\mathbf{Y}$ such that:

$$y_{ij}^{C} = \begin{cases} 1 & \text{if } N(c_i) \cap N(c_j) \neq \varnothing \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

Thus $y_{ij} = 1$ implies donor i has at least one common recipient with donor j. We will construct this matrix as a valued matrix such that y_{ij} gives the number of common recipients that donors i and j share together. Thus it can be equivalently defined as:

$$y_{ij}^{C} = \sum_{k=1}^{M} x_{ik}x_{jk} \text{ or } \mathbf{Y^C} = \mathbf{XX'}$$

In this C-projection of the bipartite donation network, two corporate elites are linked if they donate to the same congressperson. Applying this framework to our data, we have created a $N \times N$ matrix of all the individual donors from corporate sector, where N is the total number of donors identified in each election cycle. For example, we had matched 31,688 individual corporate donors in 2012 Election cycle. After using the start and end dates of their employment, 14,848 individuals were identified as serving during the specific period when donation were made for this election cycle. Thus, we create a $14,848 \times 14,848$ matrix of the corporate elites in our data and recording the number of common congressional candidates each pair of donors had in common.

Similarly, the D-projection of our donor-candidate bipartite network is the candidates network $G_C = (B, E)$, where two vertices of the vertex set B are linked together if they have at least one donor in common. Thus:

$$y_{ij}^{D} = \sum_{k=1}^{N} x_{ik}x_{jk} \text{ or } \mathbf{Y^D} = \mathbf{X'X}$$

Employing this definition we have repeated the above analysis and created a $M \times M$ matrix of all the members of Congress in the data and calculated the number of common donors between each candidate dyad weighting again by the amounts donated. Table B1 provides some summary statistics on these data where the outcome variable is the number of common donors.

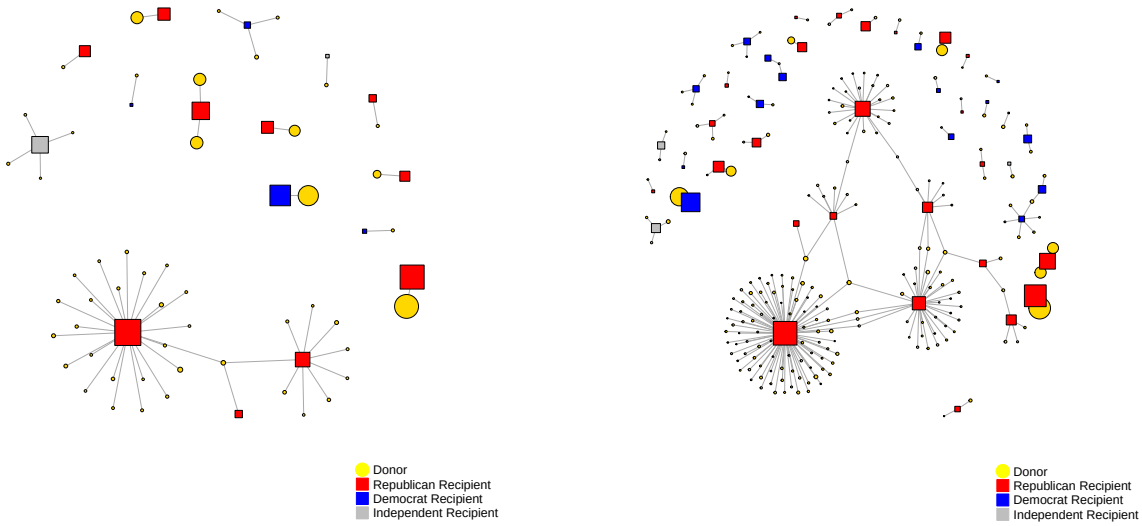
5 The Campaign-Contribution Network

This section presents a series of network visualisations to highlight the increasing importance of the largest donors and their polarization. In section 6 we then present several network centrality measures. Section 7 then studies the multivariate regression analysis to identify the common traits that may explain the formation of this network using the unimodal technique explained in section 4.1.

Stylised Fact 6. *Top donors account for a large and increasing share of the total and are increasingly partisan.*

We begin by visualizing the links between donors and candidates to reveal the structure of the network and then study how the network of donors and recipients has changed. To visualize the differences in scale of donations larger donors are depicted as larger circles, and similarly recipients by larger squares. We use this approach in Figures 6 and 7 to analyze the distribution of these donations. For clarity, we plot only subsets of the largest donors and only their donations to the largest recipients of their donations. Figure 6 shows the extent of unequal distribution of campaign contributions within the corporate elites. Here we see that the 15 largest donors (0.05% of total donors) make 22% of

Figure 6: The Concentration of Corporate Donations (2012)



(a) Top 50 donors

(b) Top 200 donors

Notes: This bipartite graph displays the concentration of corporate donations in the 2012 election-cycle. Donors are represented by (yellow) circles and recipients by squares indicating party affiliation. For clarity, only a subset of the network is plotted. Figure 6a includes only the 50 largest donors and their donations to the 16 recipients between whom accounted 22% *of the value of all donations. Donations to these recipients are not plotted, nor are donations from the donors to other recipients. Figure 6b expands this to show the largest 200 donors and the 44 recipients contributing* 28% *to 44 recipients. All calculations exclude presidential campaigns and donations to (super) PACs.*

all donations. The recipients of these donations are equally skewed, they flow to only 19 (0.01%) candidates in 2012 election cycle. Looking at Figure 6 we can see that even amongst the largest donors and recipients a few donors and recipients stand out which depicts the extent of concentration of campaign contributions among a small number of elites.

Figure 7 plots the 50% of all corporate donations that are made by the top 0.01% of corporate donors in 2012. For comparison it plots the same half of total donations for which 0.47% of donors were responsible in the 2010 election-cycle. One can see that dense clustering of recipients around a few donors is much more pronounced in 2012 than in 2010, while there was variation in the nodes' degree the range was much lower.

Figure B2 in the Appendix shows this trend overtime, again focusing on a subset of donors for clarity. This time it focuses on those responsible for 25% of total donations. The distribution of campaign contributions have always been unequal however there has been a decline from the relatively large number of competing donors in 1994 to the small number in 2012.

Recent research also shows the relationship between wealth disparities and campaign contributions (Bonica and Rosenthal, 2015a). Following the logic of Bonica and Rosenthal (2015a) the analysis here indicates that structure of contributions by those within the corporate sector, and within the set of the wealthy, also merits attention. The concentration of campaign contributions within the corporate sector may further accelerate already increasing economic disparities. That is, rather than the relatively competitive market Becker envisaged there is instead evidence of something akin to an oligopoly. We find that the observed huge rise in the total campaign contributions from the corporate

elites is actually coming from a small proportion of wealthiest donors, the top 0.05% of the corporate donors.

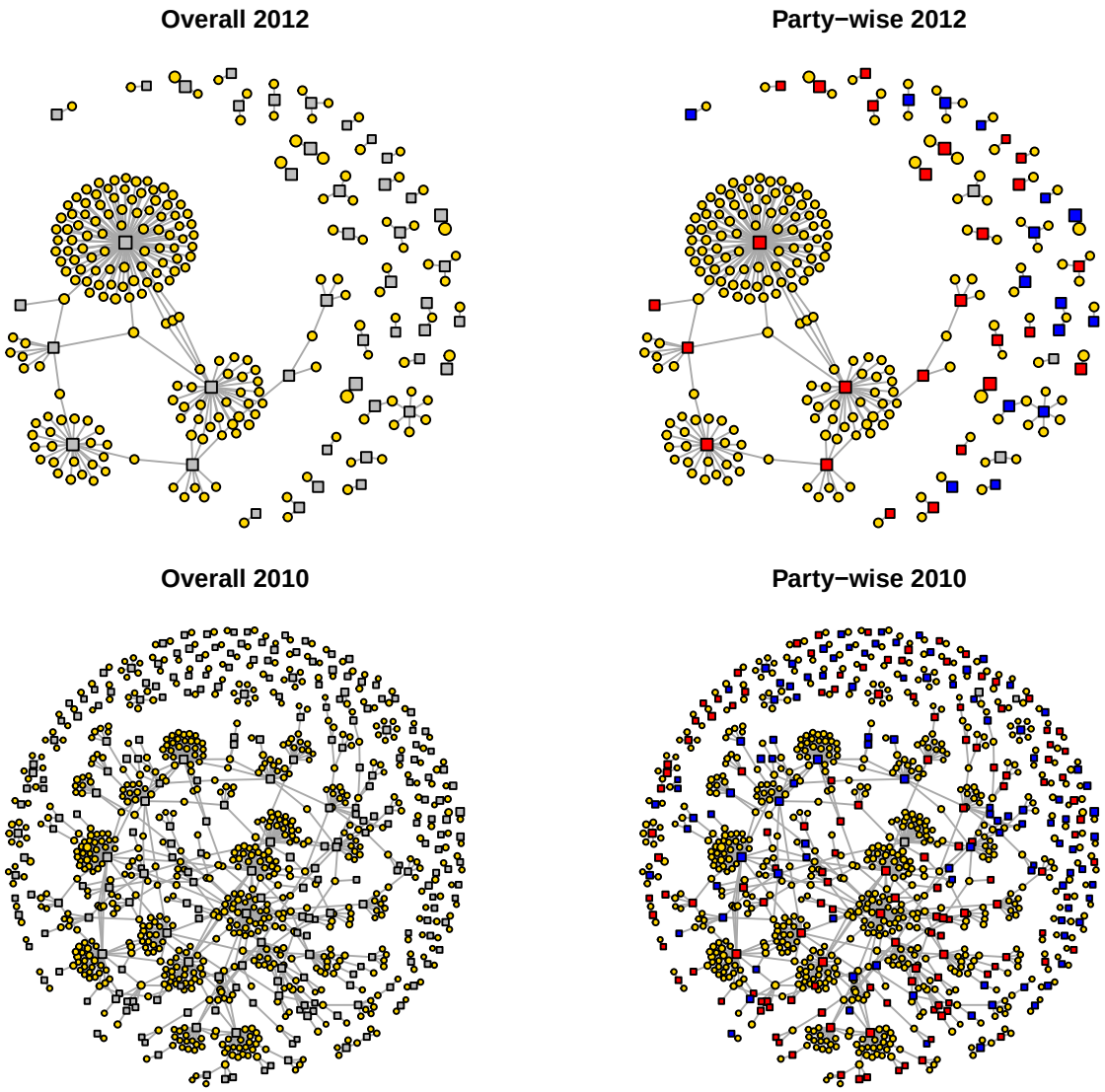
Figure 8 reveals a key transition in the nature of political giving over the period 1979-2012. It plots the share of donors giving to just Republican candidates, just Democrats or to candidates of both parties. In 1990, the shares were all around 30-36 percent but by 2012 the share of donors giving to both parties had fallen below 20It is unclear whether this change reflects a change on supply or demand side. It could be that candidates became progressively less comfortable with accepting donations from those also donating to their opponents. Alternatively, it could reflect a change on supply side where donors could be becoming increasingly partisan and donating to candidates of one party across all races. Finally, it could reflect changes in campaign finance laws but we do not observe any discrete change that this might suggest.

Figure 9 plots the C-projection of the 125 largest donors and colours those judged to be Republican, Democrat, or Independent as red, blue and grey respectively. As may be expected there are two clusters of Democrat and Republican donors, the edges between whom are too numerous to distinguish. However, what is more surprising is that there are two donors (one democrat, one independent) who share recipients with both Republican and Democrat donors. Given, that as we have already seen these 125 largest donors account for 21% of all donations this almost complete separation is perhaps surprising. Moreover, it is not limited to the largest few donors. Comparison with Figure B3 shows that a similar pattern is true of the large donors accounting for 50% of (the value of) donations.

This level of polarization is hard to reconcile with the standard models of Grossman and Helpman (1996, 2001) in which donors may donate to parties they do not prefer to alter their platforms. It thus may suggest a richer model, in which for example, candidates choose from whom to accept money given the views of their voters, or one in which donors make their funding conditional on not accepting funding from ideologically distinct sources.

Looking at Figure B4 it seems that the polarization of donors is a relatively recent phenomenon. In 1998 there were a relatively large number of donors who shared recipients with both Republicans and Democrats. This poses another natural question: Does this polarization in funding drive, or reflect growing political polarization more broadly as studied empirically by Fiorina and Abrams (2008) who argued there was little evidence that increasing polarization of elites was reflected in increased polarization in the population as a whole? As well as Abramowitz and Saunders (2008), who in response argued that there was. More recently Ezrow et al. (2014) provided cross-country evidence and Dorn et al. (2020) and Boxell et al. (2017) have analysed the impact of trade shocks and the internet on polarization respectively. Kamada and Kojima (2014) argue theoretically that polarization may be more readily reconciled with standard models of political competition if voters are not assumed to have concave utility functions. The increased polarization of donors is also related to the important recent literature on the political influence of the media particularly Bernhardt et al. (2008), Gentzkow et al. (2015), Gentzkow and Shapiro (2011), Gentzkow et al. (2011, 2014) and social media and fake news Allcott and Gentzkow (2017), Prior (2013), Puglisi and Snyder (2015). It is beyond the scope of this research to establish any causality between the increased polarization of elite donation networks and political polarization more generally but it is worth noting that our finding of polarization amongst donors is consistent with the literature on polarization being initially at least an elite phenomenon as surveyed by Fiorina and Abrams (2008), and the limited influence attributed to the internet, social media, or fake-news by Allcott and Gentzkow (2017), Boxell et al. (2017), Gentzkow and Shapiro (2011).

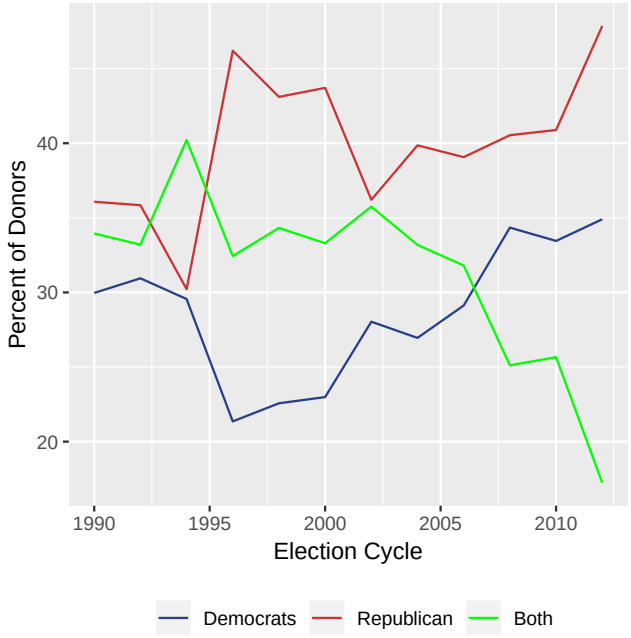
Figure 7: Concentration of Campaign Contributions within the Corporate Sector



Notes:

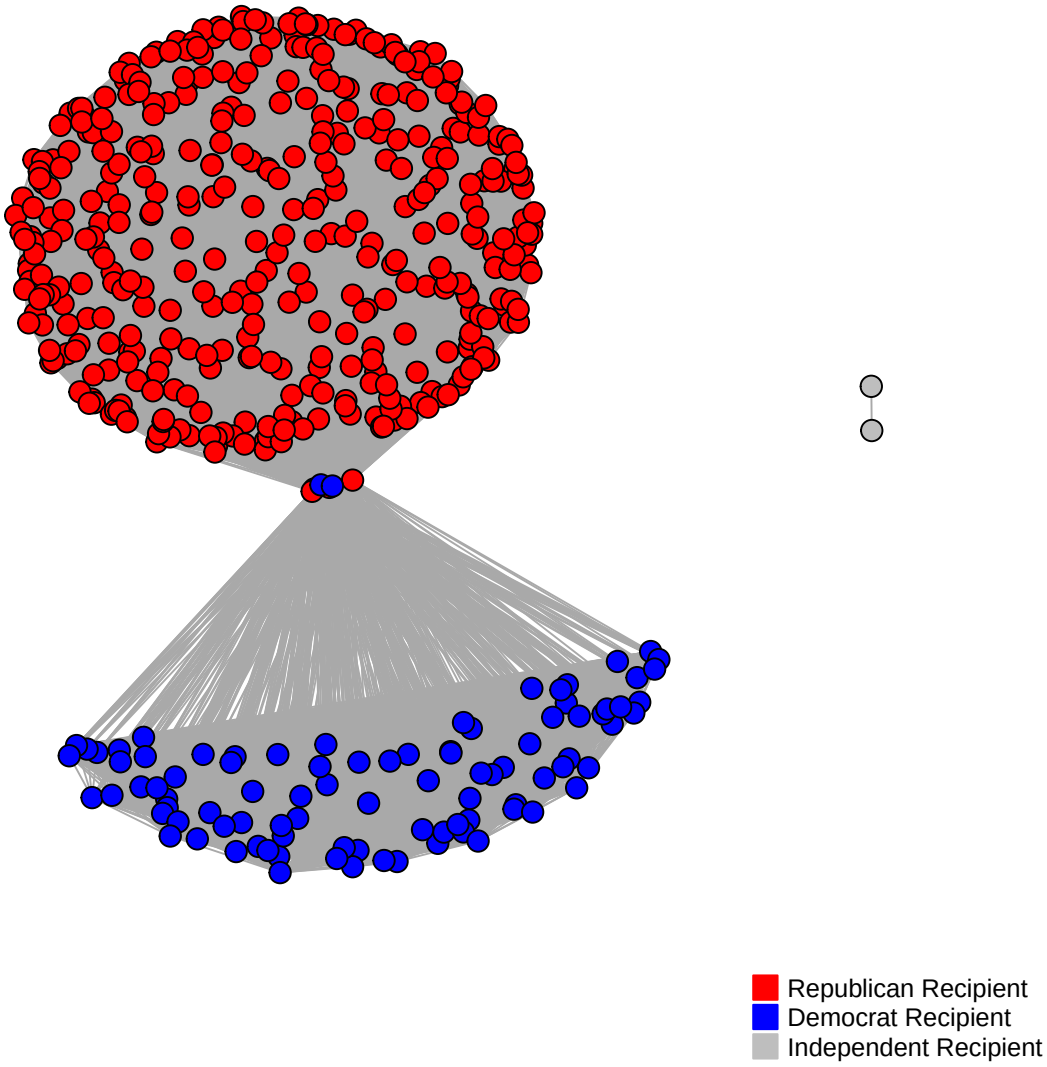
Notes: This bipartite graph displays the concentration of corporate donations in the 2012 election-cycle as compared to 2010. 30% *of total Donations were given by* 1.7% *of corporate donors in 2012 compared to* 7% *of the corporate donors in 2010. Donors are represented by (yellow) circles and recipients by squares indicating party affiliation. For clarity, only a subset of the network is plotted. All calculations exclude presidential campaigns and donations to (super) PACs.*

Figure 8: Party-wise Corporate Elites Donations Overtime



Notes: The y-axis measures the percentage of corporate-elite donors who donate to both Democratic & Republican candidates, or to candidates of one party exclusively. Excludes donations to Presidential campaigns and (Super) PACs.

Figure 9: Polarization of Corporate Donations



Notes: This graph is the C-projection of the bipartite graphs of donors and recipients, as defined in (2) for the 500 largest corporate donors in 2012. These donors account for 35% *of total donations. That is two donors are linked if they have donated to the same candidates. Excludes donations to Presidential campaigns and (Super) PACs.*

6 Centrality

Stylised Fact 7. *The contributions network is increasingly dominated by small number of high-degree nodes.*

An important advantage of analyzing candidates and donors as a network is that we can recover which are the most influential or important nodes and analyze how the distribution of nodes' importance has changed over time. More precisely, we analyze three key aspects of centrality – Degree Centrality, Betweenness Centrality, and Power Centrality.

The distribution of Degree Centrality (degree) captures the extent to which the network is dominated by a small number of individuals who make or receive many donations. Given the bipartite incidence matrix $\mathbf{X}$, the degree of a vertex in the network defined as the number of ties incident upon node x_i is given by:

$$\delta_i = \sum_j x_{ij}$$

Thus, the node with the highest degree is that which has the most neighbors or connections, and is thus presumed to have a key role in its neighborhood if not the network as a whole.
Degree centrality is typically normalized by dividing by the maximum number of ties possible, which in a graph of n nodes is $n-1$. However, in a bipartite graph, no node can be connected to all others as by definition within group ties are not possible. So, the degree centrality of each set of vertices is adjusted by the number of nodes in the other set:

$$\delta_i^* = \delta_i / M \tag{3}$$

$$\delta_j^* = \delta_j / N \tag{4}$$

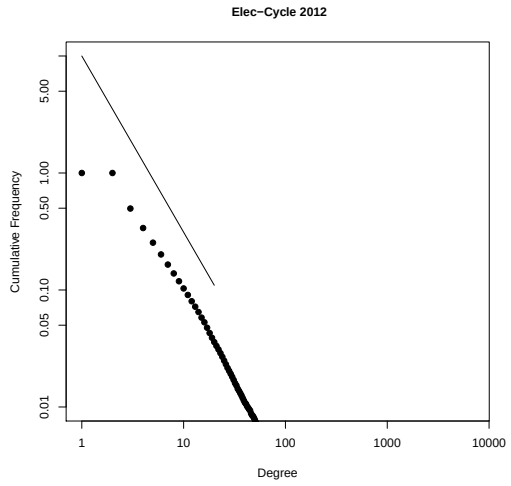
where δ_i is the degree of the vertices, M and N are the total number of nodes in the set of candidates and donors respectively and $0 \leq d_i^* \leq 1$.
The degree distribution is thus the probability distribution of these degrees over the whole bipartite network and is defined as: $P_C(\delta)$: degree distribution of nodes in Vertex set C; $P_D(\delta)$: degree distribution of nodes in vertex set D.

Plotting the CDF of the degree distribution, as in Figure 10, with both axes on a log-scale, allows us to see that the relationship is roughly linear. This suggests, that the degree follows a power-law distribution, important in this context as networks with such a degree distribution will have a so-called giant component. Such a predominant group of nodes, surrounding a small number of donors of very high degree, is very much counter to the logic of Becker (1983).

Looking at Figure 11 we can see how the degree distribution of donors has changed over time. In the top-left plot, we see that in 1980 the maximum degree was around 50 and the relationship was approximately linear. Ten years later, in the plot for 1990 in the leftmost plot of the second row, we see a very similar pattern. However, moving down another row it becomes clear that not only has the maximum of the degree distribution doubled, but the relationship is now increasingly concave, with more mass than would be expected on nodes of high degree. The increase in the maximum degree, other things equal, would suggest only that the degree-distribution had remained the same but the number of donors grew. However, the increase in concavity suggests that the relative number of very high-degree donors is now more than predicted by the standard power-law specification and suggests that there is a greater concentration of links on a small number of individuals than is observed in other social networks.

Now looking at Figure 12 we can see a similar pattern for candidates. Again, the maximum degree has increased markedly from 1980, when it was around 50 to 2012 where it is around 5,000. Unlike, the donor degree distribution above, however, there seems to be no other change in the functional form of the relationship. This seems to remain approximately linear, albeit with a continued excess of nodes of very high degree as can be seen in the bottom right of each plot. This increasing concentration on the top recipients is interesting as it may reflect changes in the effective distribution of power in US politics. A relatively (and only relatively) uniform distribution of donations as seen at the beginning of the period is compatible with donations being targeted at a number of politicians who may all be important to the passage of legislation of interest, for example. On the other hand, the concentration on a small number of 'mega-recipients' as in more recent cycles is compatible with influence being concentrated on a small number of key players.

Figure 10: The Degree-Centrality Distribution of Donors (2012)



Notes: The y-axis measures the cumulative frequency of donors on a log scale. The x-axis plots the degree of each donor, d_i^*, as defined in (3) also on a log scale. Excludes donations to Presidential campaigns and (Super) PACs.

Stylised Fact 8. *Power due to network effects, as captured by centrality measures, is increasingly concentrated.*

We will capture two different aspects of centrality, and thus power, using two different standard measures of centrality—betweenness centrality and eigenvector centrality. Both of these capture different aspects of power (Hafner-Burton et al., 2009). Note, we will compute these centralities across $V = C \cup D$ such that we obtain the overall distribution of power across both donors and candidates.

Betweenness centrality measures how central a vertex is by counting the number of shortest paths between every pair of vertices that go through that vertex. Thus, computation reduces to counting the number of cases for which that is true (and weighting appropriately) compared to the total number of shortest paths.[16] Intuitively, as in Padgett and Ansell (1993)'s study of the rise of the Medici family in medieval Florence, being the (best) link between many other individuals or factions is a source of influence and control. Thus, in our analysis representatives or donors with high betweenness centrality are those who provide the best link between many other donors and recipients.

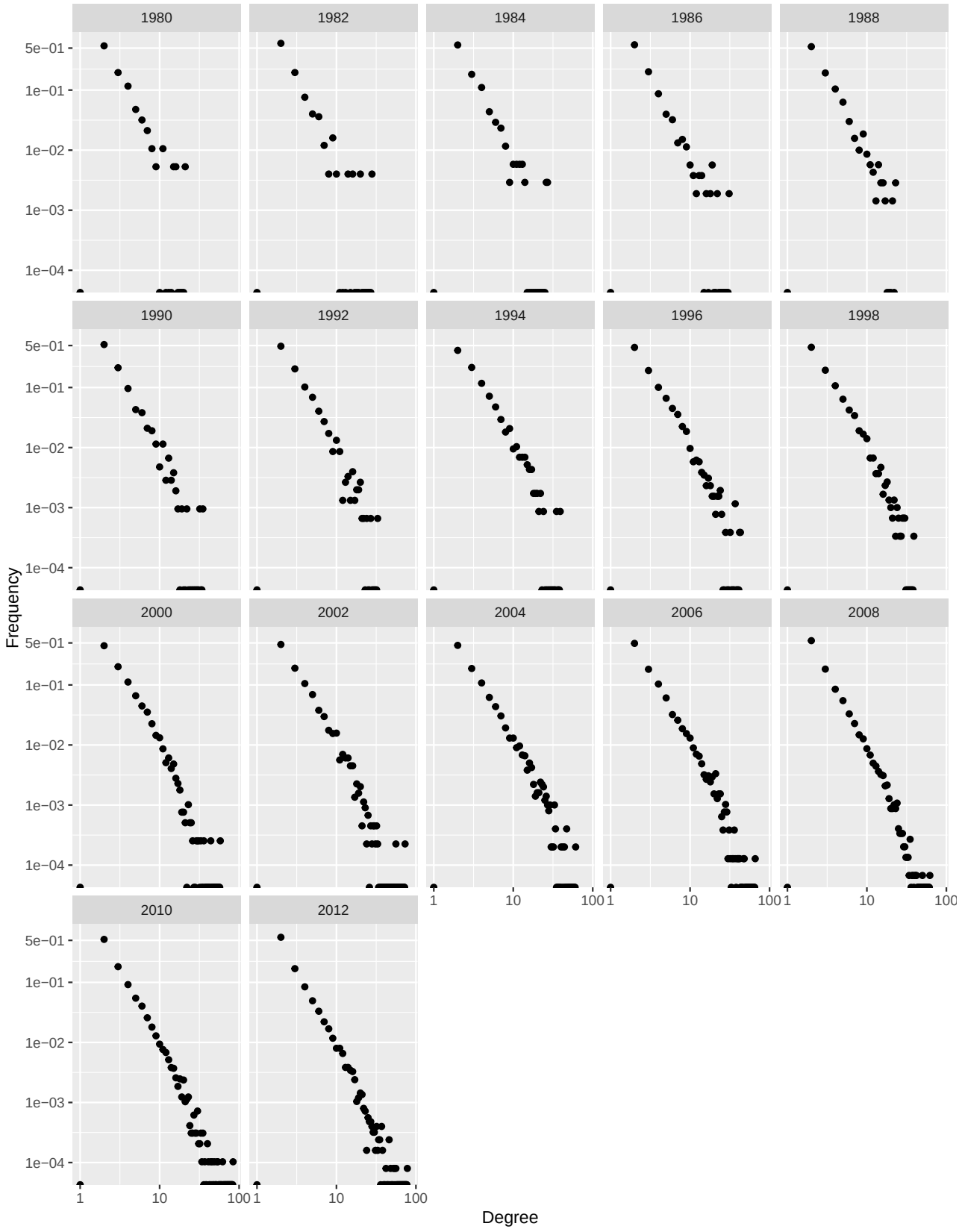
We plot the resulting distribution of betweenness centralities for each election cycle in Figure 13. To ensure comparability between elections, the results are normalized such that the individual with the

[16] We employ the algorithm proposed by Brandes (2001).

highest betweenness centrality always has centrality 1, and thus that all other individuals' centralities can be thought of in percentage terms. Formally, for any given individual i the normalized centrality is: $Ce_i^{B\prime}(g) = Ce_i^B(g) / \max(Ce_i^B(g))$ for each cycle. Given the very large number of individuals for whom $Ce_i^B(g) = 0$ and the long right tail, we focus on the interval $(0.0001, 0.15)$. The first thing we notice is that the overall shape of this distribution is consistent over the entire period. Most individuals, as might be expected have low centrality. What is notable however, is that there is a clear decline in the proportion of individuals who have intermediate centrality. While there is variation from cycle to cycle, it's clear that the distribution is increasingly skewed with more and more of the mass close to zero. This suggests the increasing relative importance of the nodes with the highest betweenness centrality.

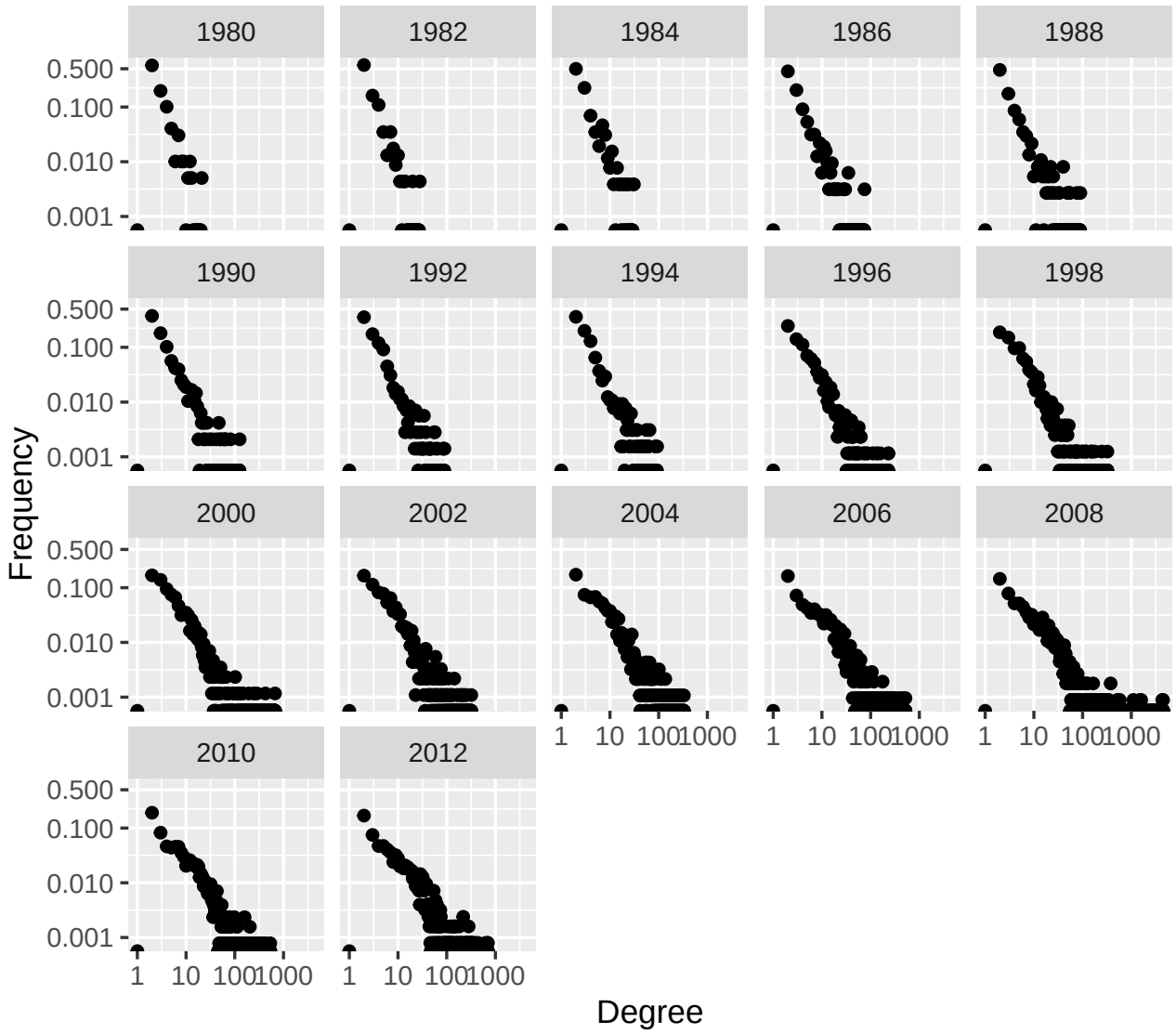
We now consider our other measure of centrality, eigenvector centrality, sometimes termed prestige or power-centrality. This infers the importance of a vertex by how important its neighbours are. Thus, the most important vertices are those that are connected to many other important vertices, but those other important vertices are otherwise linked to less important vertices. In our context this implies that the most powerful politicians and donors are those that are directly connected to many other important donors and recipients. That is, they are central in the sense that *they know everybody worth knowing*. There are a number of alternatives but we focus on eigenvector centrality as it is both standard, and because it reduces the need for further normalization. Defining A, the biadjacency matrix of the Graph $G = (C, D, E)$, is the $M \times N$ matrix in which $A_{i,j} = 1$ if and only if $(C_i, D_j) \in E$. Calculating eigenvector centrality reduces to obtaining the eigenvector, x that is associated with the largest eigenvalue of A. That is, the solutions to: $Ax = \lambda x$. Figure 14 plots the distribution of eigenvector centralities, again weighting by the size of donations, excluding observations for which $x \leq 0.0001$ or $x > 0.2$ for clarity. We observe a similar pattern. Again, we see a preponderance of vertices with centrality scores close to zero, and here this is understated as the smallest are excluded. Again, we also see, a long thin right tail. We also see the number of individuals with centralities greater than 0.05 steadily falling. The plot for 1980 in the bottom right shows positive support across the range $(0, 0.2)$ plotted. By the 2012 election cycle, in the top right, the density is much more concentrated close to 0. The implication of this, given that the eigenvector centralities are computed such that the most central individual always has centrality 1 is that an increasing percentage of politicians and donors have centralities that are a very small fraction of the most central individuals. That is, that power is increasingly concentrated.

Figure 11: The Degree-Centrality Distribution of Donors by Election Cycle



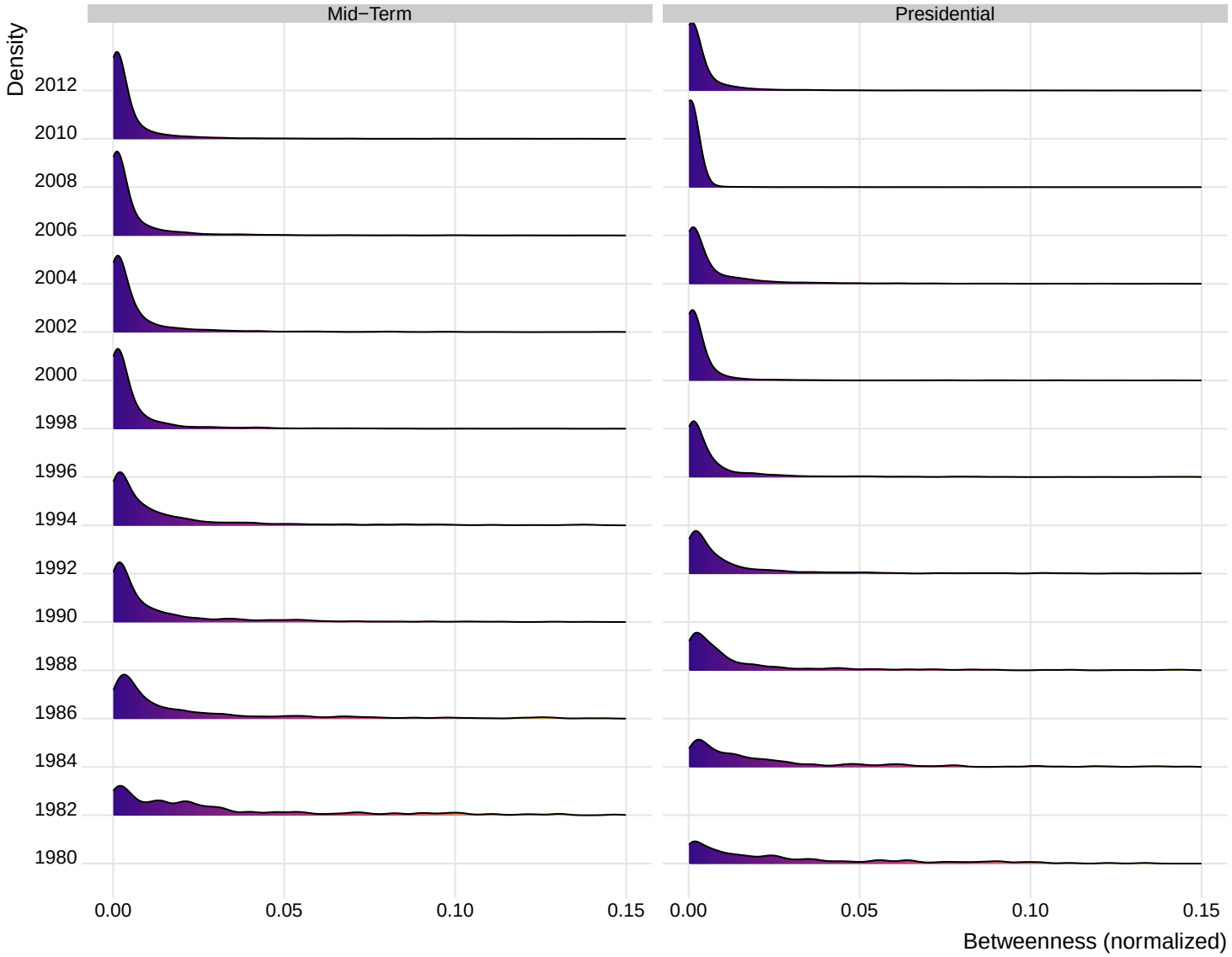
Notes: Each panel plots the degree distribution of donors for a particular election cycle. For each, the y-axis measures the cumulative frequency of donors on a log scale and the x-axis plots the degree of each donor, d_i^*, as defined in (3) also on a log scale. To facilitate comparison the axes-scales are the same for all years. Excludes donations to Presidential campaigns and (Super) PACs.

Figure 12: The Degree Distribution of Candidates by Election Cycle



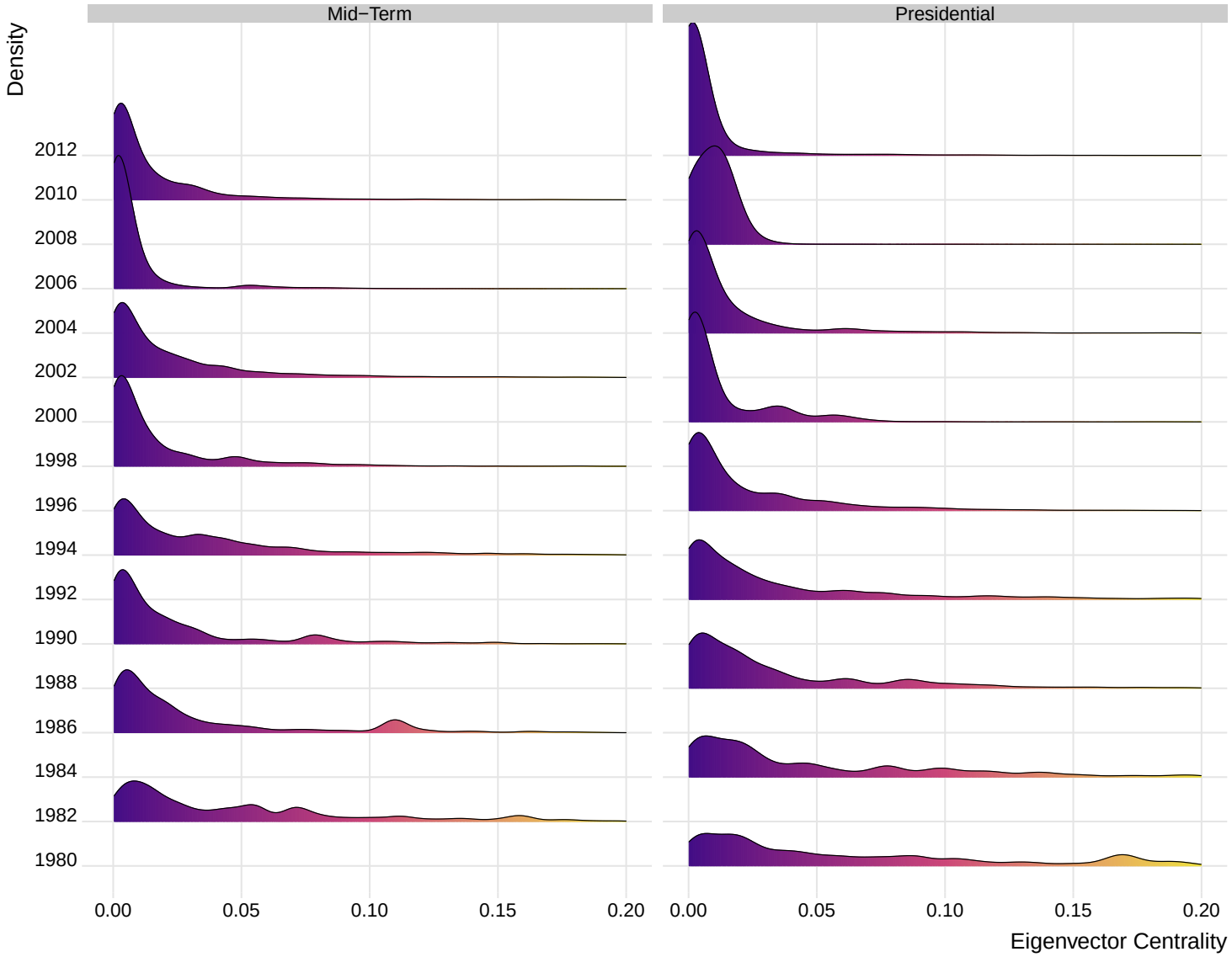
Notes: Each panel plots the degree distribution of candidates for a particular election cycle. For each, the y-axis measures the cumulative frequency of candidates on a log scale and the x-axis plots the degree of each candidate, d_j^*, as defined in (4) also on a log scale. To facilitate comparison the axes-scales are the same for all years. Excludes donations to Presidential campaigns and (Super) PACs.

Figure 13: Betweenness Distribution by Election Cycle



Notes: Each panel plots the Betweenness-Centrality distribution for a particular election cycle. For each, the y-axis measures the density, estimated using a Gaussian kernel. As described in the text centralities are normalised such that the maximum is 1 *in every cycle. That is:* $Ce_i^{B\prime}(g) = Ce_i^B(g) / \max(Ce_i^B(g))$. *For clarity, the x-axis is truncated to the interval* $(0.0001, 0.15]$ *to exclude the large mass of individuals with centralities close to* 0 *and the very small number of individuals with extremely high centralities. Excludes donations to Presidential campaigns and (Super) PACs.*

Figure 14: Eigenvector Centrality Distribution by Election Cycle



Notes: Each panel plots the Eigenvector-Centrality distribution for a particular election cycle. For each, the y-axis measures the density, estimated using a Gaussian kernel. For clarity, the x-axis is truncated to the interval $(0.0001, 0.2]$ *to exclude the large mass of individuals with centralities close to* 0 *and the very small number of individuals with extremely high centralities. Excludes donations to Presidential campaigns and (Super) PACs.*

7 Network Structure

This section presents the regression results based on the dyads data obtained from the methodology given in section 4.1, which computes the dependent variables used in this analysis: the number of common recipients for each donor dyad and the number of common donors for each legislator dyad. Thus, this section has two parts. First, we begin with the discussion of the corporate donors' network and the common characteristics of the donors which may give rise to the formation of these networks. The second part is the analysis of legislator's network who are financed by the same set of corporate elites.

To understand what characteristics those donors who give to the same politicians share, we regress the number of common recipients for each unique pair of donors, (i, j) where $i > j$, on a number of their shared characteristics. Thus the model we estimate is of the following form:

$$\begin{aligned}\#\text{Common Recipients}_{ij} \sim \beta_1 \text{Same Company} + \beta_2 \text{Same Sector} + \beta_3 \text{Same State} \\ + \cdots + U_i + U_j + \varepsilon_{ij}.\end{aligned} \tag{5}$$

This model has two key features which preclude using OLS. Firstly, our dependent variable, the number of common recipients, is a count variable that exhibits over-dispersion compared to a Poisson distribution, and for which there is no separate process generating additional zeros. Secondly, we need to address unobserved heterogeneity in the characteristics of donors. As well as leading to omitted variable bias in the normal way, given the dyadic structure of the data unobserved heterogeneity will also induce dependence between observations given that donors will be common to many dyads. Thus, we include a donor-specific random intercept (random effect).[17] One can alternatively interpret these random effects as capturing clusters in the data due to different dyads having individuals in common. That is we assume $U_i \sim N(0, \sigma)$, $U_j \sim N(0, \sigma)$,and $\varepsilon_{ij} \sim NB(r, \phi)$. Given the scale of our data, a conventional maximum likelihood estimator was infeasible and so we estimate an equivalent Bayesian model with a diffuse prior using the NUTS sampler Stan Development Team (2016). Given the diffuse prior and the large sample at hand the modes of the posterior distributions (MAP) of the means and standard deviations we obtain will be virtually identical to the maximum likelihood estimates.[18]

7.1 Network of Donors

Stylised Fact 9. *Predictors of donors giving to the same legislators have been constant over time.*

In this section we describe and present the results of the corporate elites' donation network. We study the common characteristics of each pair of corporate elites who have financed the same set of legislators. We have $14,848$ donors and $3,000,000$ dyads in the latest election cycle and the number of common recipients in this year ranges from 0 to 27.[19]

Moving on to the regression results of the determinants of the donors network, we focus on the C-projection and thus the dependent variable is the number of common recipients. The negative binomial estimator we use models the log of the expected count as a function of the predictor variables.

[17] Note, that this approach is preferred to a fixed-effect estimator as in most cases there is no consistent conditional fixed effects estimator (Guimarães, 2008) and given the number of recipients in our data, an unconditional estimator is infeasible.

[18] Asymptotically, they are equivalent.

[19] The preceding descriptive analysis is based on the whole dataset, however due to the size of this C-projection matrix for the last few election cycles, computational limitations meant we had to take a random sample of 3 million dyads in each cycle for the regression analysis.

To simplify the interpretation of the estimated coefficients we therefore present the incident rate ratios (IRR) instead of beta coefficients. These ratios, are simply obtained by exponentiating our model coefficients (and the associated confidence intervals). Figure 15 presents IRR estimates for (5) estimated for each election cycle separately. The whiskers associated with each dot describe the 95% confidence interval.[20] They are plotted in all cases, where they cannot be seen this reflects the precision of the estimates.

We find that the directors and executives from the same company are more likely to finance the same set of candidates for Congress i.e., more specifically a pair of donors who are from the same company are more likely to have more common recipients. The IRR varies between elections, particularly at the beginning of the period when it's higher, but stabilizes at around 1.5. The coefficient on "same sector" is also positive and statistically significant, although not in earlier elections. Note, that this nests the same firm and industry variable, so the expected count for donors in the same firm will combine these two effects. The results show that the corporate elites from the same sector will have around 1.1 times the incident events as those from different sectors which implies that donors from the same sector are more likely to finance same candidates for Congress than others.

The largest effect, perhaps unsurprisingly, is that donors resident in the same state are much more likely to donate to the same candidates. In some years the IRR is as high as 10. But, the coefficient, whilst always precisely estimated varies considerably over time. Whether, this reflects the changing importance of local politics, or is driven in part by election between presidential elections is unclear.

One way to understand this better is to analyze those resident in the same congressional district. Here, we find a consistently small effect. This might suggest that the relevant level of analysis for corporate donors is the state and not the congressional district. The final two rows of Figure 15 report the results if their companies are located in the same state or same congressional district respectively. We see in both cases that the coefficient is positive and around 1.5 consistently. This suggests that donors whose companies are located in the same region are more likely to finance the same set of candidates.

Thus, our findings suggest that directors and executives from the same company and sector is the primary characteristic that is associated with (contributes to) financing the same set of legislators, more than other common traits. We argue that the number of common recipients (financing the same set of legislators) between donors is an important indicator of their overlapping preferences and goals.

7.2 Network of Legislators

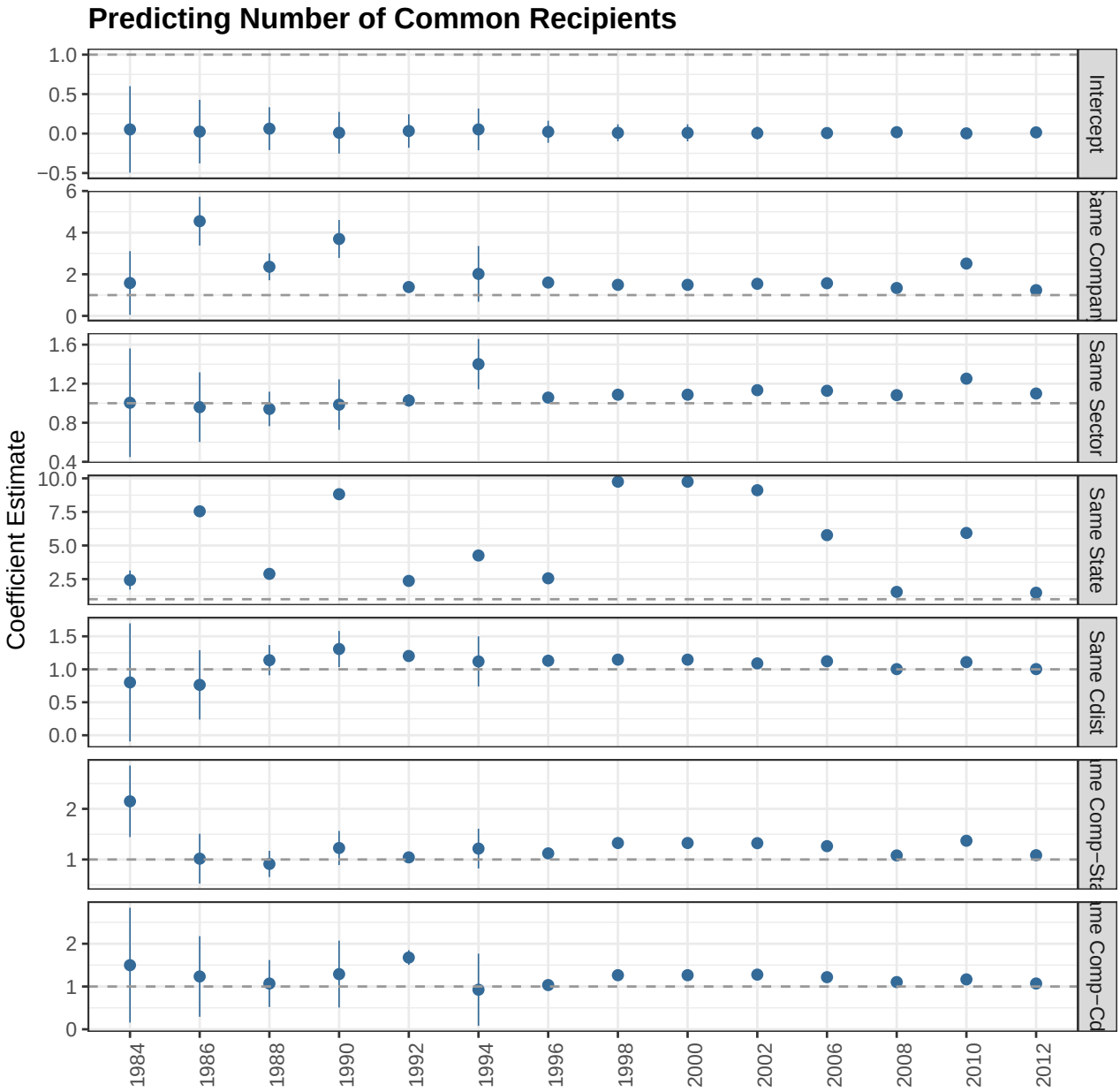
Stylised Fact 10. *Predictors of legislators receiving donations from the same donors have been approximately constant over time.*

Here we reverse the analysis to study the legislators' network who are financed by the same set of corporate elites. That is we study the D-projection, where the dependent variable is now the number of donors common to each unique pair of candidates, (i, j) where $i > j$. Thus the model we estimate here is of the following form:

$$\begin{aligned}\#\text{Common Donors}_{ij} \sim \beta_1 \text{Same Party} + \beta_2 \text{Same Committee} + \beta_3 \text{Same State} \\ + \cdots + U_i + U_j + \varepsilon_{ij}.\end{aligned} \tag{6}$$

[20] In fact they are the 2.5 and 97.5 percentiles of the posterior distribution of β, but as above given the large sample and diffuse prior the confidence interval and these will coincide.

Figure 15: Coefficient Estimates and Confidence Intervals: Corporate Donor Data



Notes: The dependent variable is the number of donors two candidates i and j have in common. Circles depict incident rate ration (IRR) estimates of (5), I.E.:

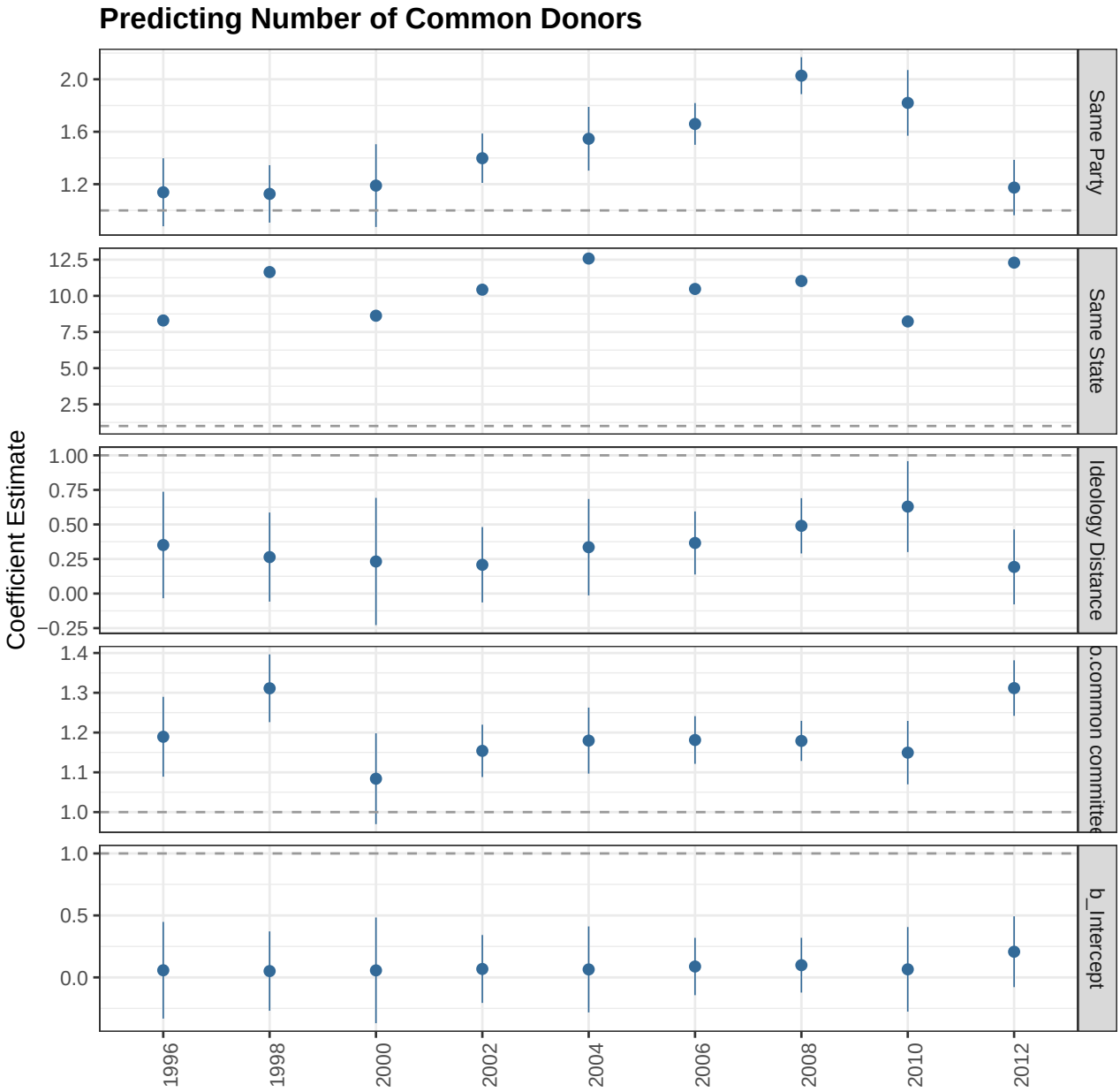
$$\#Common\ Recipients_{ij} \sim \beta_1 Same\ Company + \beta_2 Same\ Sector + \beta_3 Same\ State + \cdots + U_i + U_j + \varepsilon_{ij}$$

, the lines above and below represent the associated 95% confidence intervals. (5) is a random-effects negative-binomial model, including random-effects for both i and j. Estimates are obtained from an equivalent Bayesian model with a diffuse prior using the NUTS MCMC sampler given the scale of the data. Excludes donations to and from Presidential campaigns and (Super) PACs.

Again, we assume $U_i \sim N(0, \sigma)$, $U_j \sim N(0, \sigma)$, and $\varepsilon_{ij} \sim NB(r, \phi)$. Figure 16 presents the estimates of this model. Again we present the incident rate ratios (IRR) instead of beta coefficients. We find an extremely large coefficient of between 8 and 12 associated with being from the same state, perhaps reflecting large numbers of smaller local donors. Serving on the same committees, and thus being in a position to influence policy on particular issues was also found to increase the expected number of shared donors, by a rate of 1.39 compared to the reference group in 2012. But, this is larger than in recent years. We include the ideological distance between donors and as expected being further apart (conditional on whether they are in the same party) reduces substantially the likelihood of having donors in common, with a coefficient of 0.23 suggesting that a unit increase in distance (on a $[-1, 1]$ scale) reduces the probability of common donors by three quarters. The key change over the period is the importance of being of the same party. In 1996 being from the same party only suggested a 20% increase in the expected number of donors in common. By 2010 the IRR was around 2 implying double the number of donors in common compared to the reference group. However, the decline in 2012 suggests this may not be a permanent change.

The overall conclusion, for both the donor and recipient data, is that whilst there is some interesting variation the key patterns in terms of who gives to whom have not changed. Changes in the network, such as increasing polarization and the importance of a small number of central players, may thus be a consequence of the actions of a relatively small number of actors.

Figure 16: Coefficient Estimates and Confidence Intervals: Recipient Data



Notes: The dependent variable is the number of candidates two donors i and j have in common. Circles depict incident rate ration (IRR) estimates of (6), I.E.:

$$\#Common\ Donors_{ij} \sim \beta_1 Same\ Party + \beta_2 Same\ Committee + \beta_3 Same\ State + \cdots + U_i + U_j + \varepsilon_{ij}.$$

The lines above and below represent the associated 95% confidence intervals. (6) is a random-effects negative-binomial model, including random-effects for both i and j, estimates are obtained from an equivalent Bayesian model with a diffuse prior using the NUTS MCMC sampler given the scale of the data. Excludes donations to and from Presidential campaigns and (Super) PACs.

8 Conclusion

American corporate and political elites are connected by the donations that the latter receive from the former. Using a novel dataset, this paper analyzes these connections as a social network. This analysis uncovers the changing structure of this network, and thus of the changing nature of money in US politics. We characterized ten stylized facts:

1. Donations by members of the corporate elite increased 1,000 fold over the period 1978-2012 and increased as a share of individual donations from 2% to 30%.
2. Donations go to incumbents (increasingly).
3. Powerful representatives receive more donations.
4. More connected politicians receive more donations.
5. Ideology does not predict donations.
6. Top donors account for a large and increasing share of the total and are increasingly partisan.
7. The contributions network is increasingly dominated by small number of high-degree nodes.
8. Power due to network effects, as captured by centrality measures, is increasingly concentrated.
9. Predictors of donors giving to the same legislators have been constant over time.
10. Predictors of legislators receiving donations from the same donors have been approximately constant over time.

Taken together these stylized facts suggest that while the personal campaign contributions of corporate elites have long been driven by their location, and the sector of their firm, etc., that such factors cannot explain changes in the network of campaign contributions since the 1980s. Alongside substantial increases in the aggregate scale of donations, there have been increases in the polarization of donations and the extent to which donations are concentrated on a small number of politicians. This has led to a substantial increase in the relative power, as captured by network centrality indices, of the most powerful donors and politicians. Their positions as co-coordinators, brokers, and gate-keepers means that they potentially wield influence far beyond their personal donations or political position. Notably, the accretion of power to a small number of key actors is in contradiction to prior theoretical work, such as Becker (1983), that conceptualized the market for corporate influence as a competitive one, rather than one dominated by a small number of key players. This potentially has important implications for the normative interpretation of campaign finance laws.

The results of this paper have several implications for future research. Firstly, it will be important to establish what is driving the increased polarization of donations. Does this reflect a lack of supply, or demand? That is, for example, it may be that many races are now insufficiently competitive to necessitate corporate elites hedging their bets and donating to both sides. Alternatively, it might, again for example, reflect that increased transparency about donations makes it hard for some politicians to accept donations from some donors. Secondly, the network structure of donations has important implications for attempts to identify the causal determinants and effects of campaign contributions as discussed by Fafchamps (2015) and Doudchenko et al. (2020) for the bipartite case.

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Appendix

A Data

Our analysis uses a novel dataset on contributions by individuals who are in senior positions in the corporate sector. To construct these data we have combined two data sources: First, we have used the Database on Ideology, Money and Elections (DIME) which contains details of all individual contributions for all election Cycles from 1980-2014 (Bonica, 2014). This data set is based on Federal Election Commission (FEC) register data, but has the advantage of providing unique identifiers for individual donors. The FEC requires the registering of all individual contributions of more than $200 to individual candidates, parties, campaigns and political action committees (PACs). Whilst, we have data on the timing of each donation as analyzed by Traag (2016) we abstract from this to the contributor-recipient-cycle level by totaling all of the individual contributions by each person to each candidate in an election cycle.

Second, data on corporate elites along with the details about company affiliation, position, employment dates etc., are taken from Bloomberg (2016). Bloomberg contains all the relevant information but it is extractable only for the current board members and top management of a company. In order to to get the historical information from the Bloomberg database, we collected data manually for each company since its founding. Our data also contains a set of other relevant company specific variables E.G. market capitalization, sector, industry, sub-industry etc., and head office location.

Next, to identify those directors and executives who have made political contributions, we employed automated record-linkage methods. The process of fuzzy matching included matching the last name, first name, middle name, contributor occupation, employer and address respectively. The output of this procedure is a unique dataset of all campaign contributions by both current and former directors and executives of all the 2346 currently listed companies in U.S. Firms were mapped to congressional districts via zip codes. Summary statistics are provided in Section C of the Appendix in Tables C1 to C3.

A.1 Data on Legislators' Power, Connections and Ideology

The data on legislators is taken from committee assignment data from Nelson (2020), Nelson et al. (1993) and Stewart and Woon (2020).[21] We define the following three groups of variables to capture key characteristics of legislators:

- Power Indicators
  Some of the earlier work on PAC-Committee relationships (e.g.,Romer and Snyder Jr (1994), Romer and Snyder (2007), Milyo (2005), Fouirnaies (2018),Fouirnaies and Hall (2018),Powell and Grimmer (2016)) has emphasized the importance of certain legislators' characteristics in the legislative process. We use most of them here in order to comprehensively cover the sources of power that may lead to additional contributions. The details of each of them are as follows:

  1. Membership of Important Committees: We use 19 important House and Senate committees and define a binary variable for membership of each of these;
  2. Important Positions: We define binary variables for each of the following positions; Vice Chairman/Co-Chairman, Committee Chairman, Majority Leader, Minority Leader, Ranking Minority member, Speaker of the House;
  3. Seniority: Number of years served in the legislature, and

[21] These data were accessed via http://web.mit.edu/17.251/www/data_page.html.

4. Majority Party: Being the member of a majority party in that Congress.

- Party and Non-Party Connections

  1. The personal donations of members of Congress to other fellow members may indicate the extent of their connections in the chamber Box-Steffensmeier et al. (2020). Thus, this research uses the total number of distinct legislators to whom the member has personally donated as a measure of their connections in the Congress.
  2. Non-Party Connections: The amount of non-party Independent expenditures made in support of the member during his election campaign can show the extent of members connections.

- Ideology
  We use six categories of members' ideological position: Far Left (FL), Left (L), Moderate Left (ML), Moderate Right(MR), Right (R), Far Right (FR) to incorporate the within party political orientation and the extremity of members' ideology. The data on legislators' ideologies are provided by Keith Poole and Howard Rosenthal (Poole and Rosenthal, 2017).[22]

We merge these data with already constructed information on contribution receipts from corporate elites by using the unique identifiers present in both data sets. Thus the above exercise provides us with the following: A panel dataset on all of the House and Senate members from 103rd-114th Congress, the detailed information on each members' committee assignment, positions held, seniority, connections, ideology, and the money they receive from corporate elites etc.

B Graphs

[22] Source: http://www.voteview.com.

Figure B1: Distribution of total Contributions from Corporate Elites (Dependent Variable)

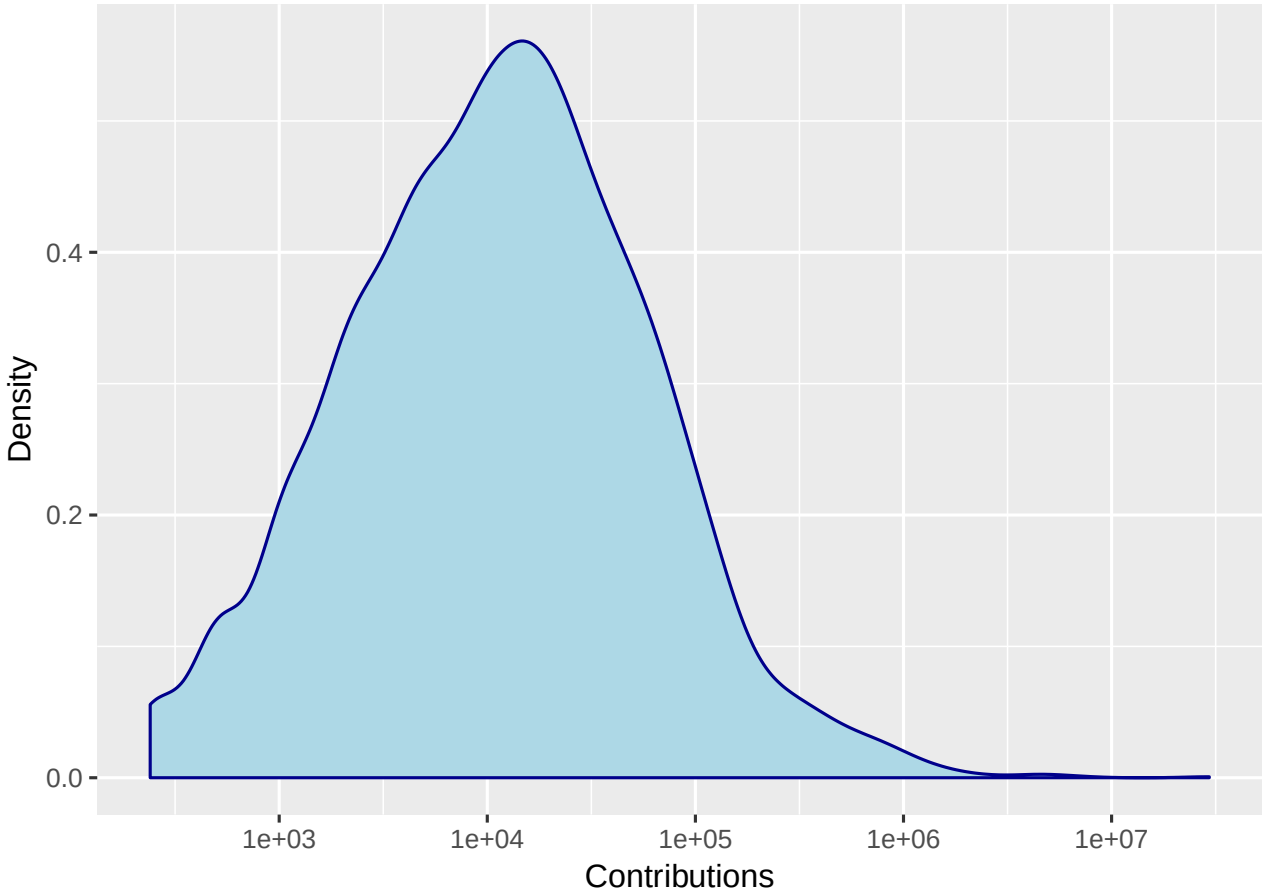


Figure B2: Concentration of Donors Overtime

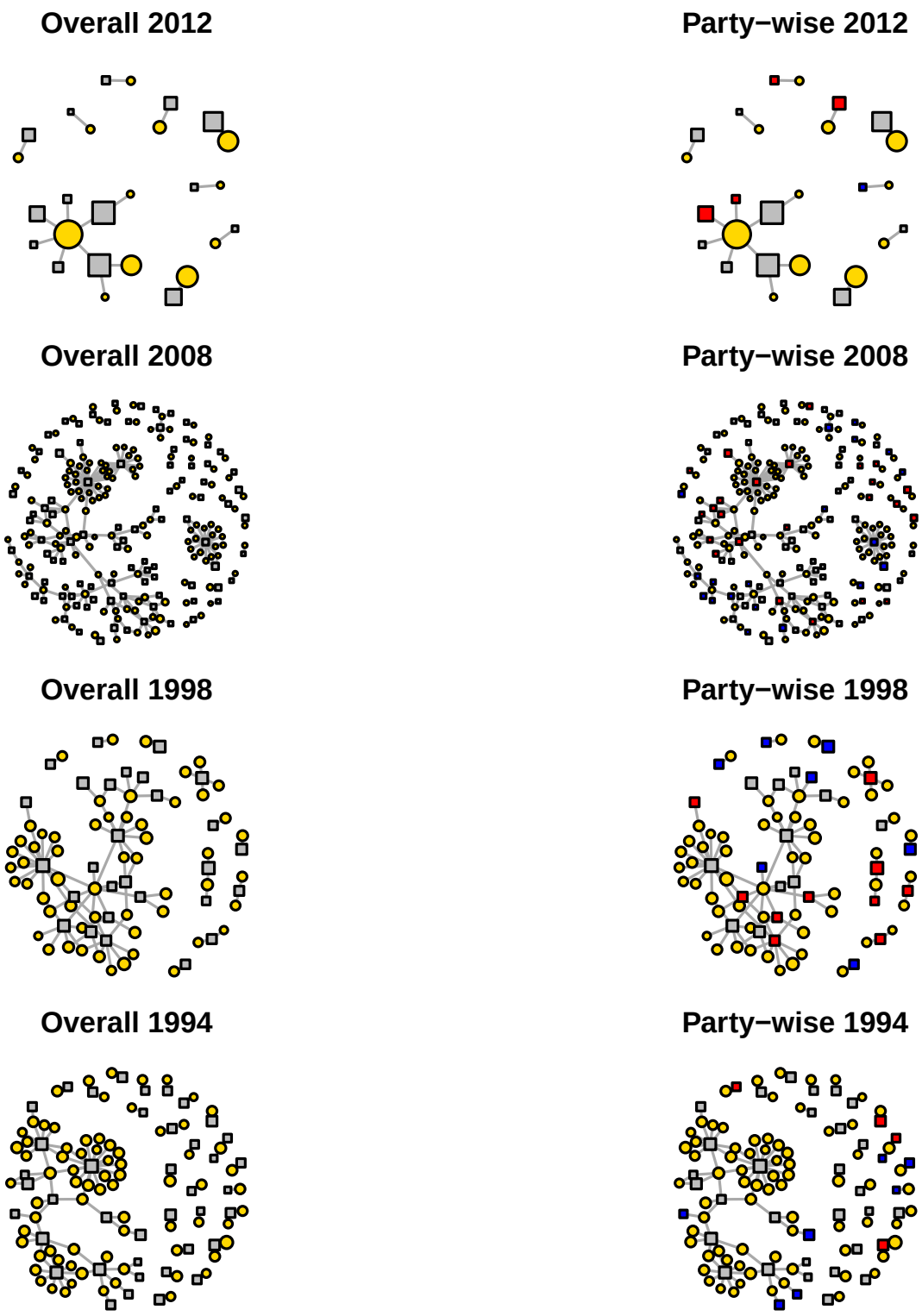


Figure B3: Political Polarization of Top Donors (50% donations in EC-2012)

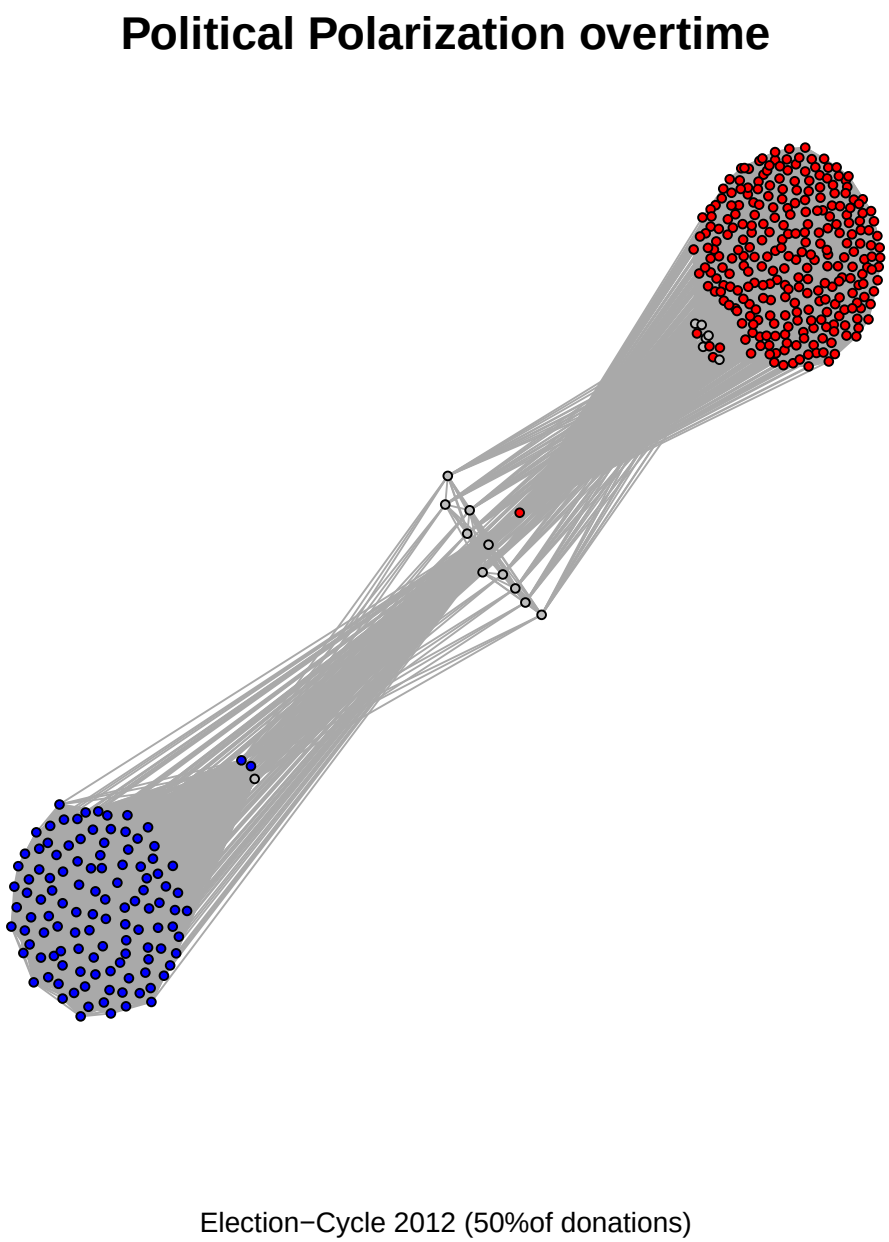


Figure B4: Political Polarization Overtime

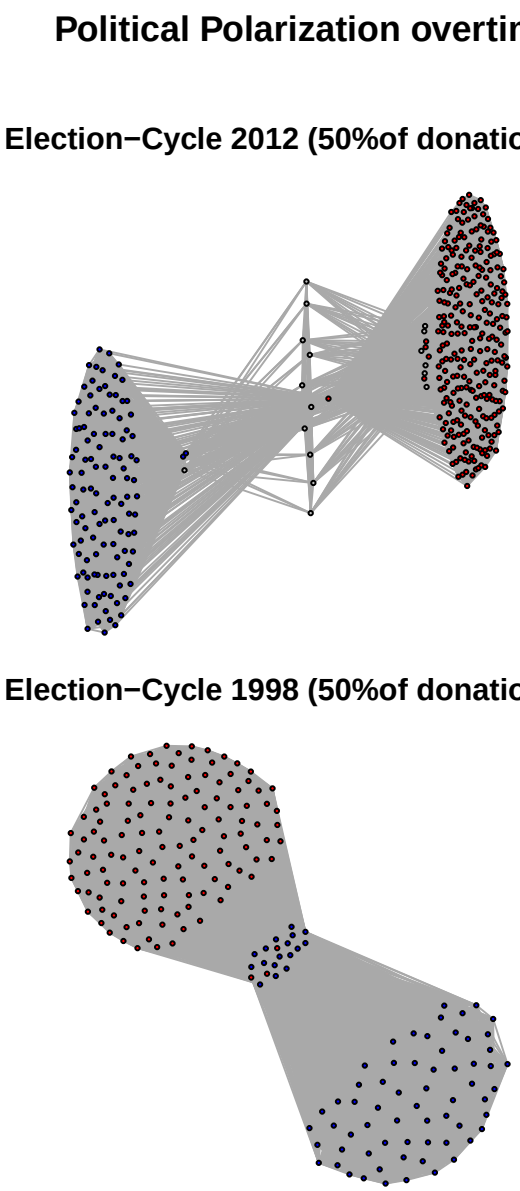


Figure B5: EigenvectorCentrality Distribution by Election Cycle

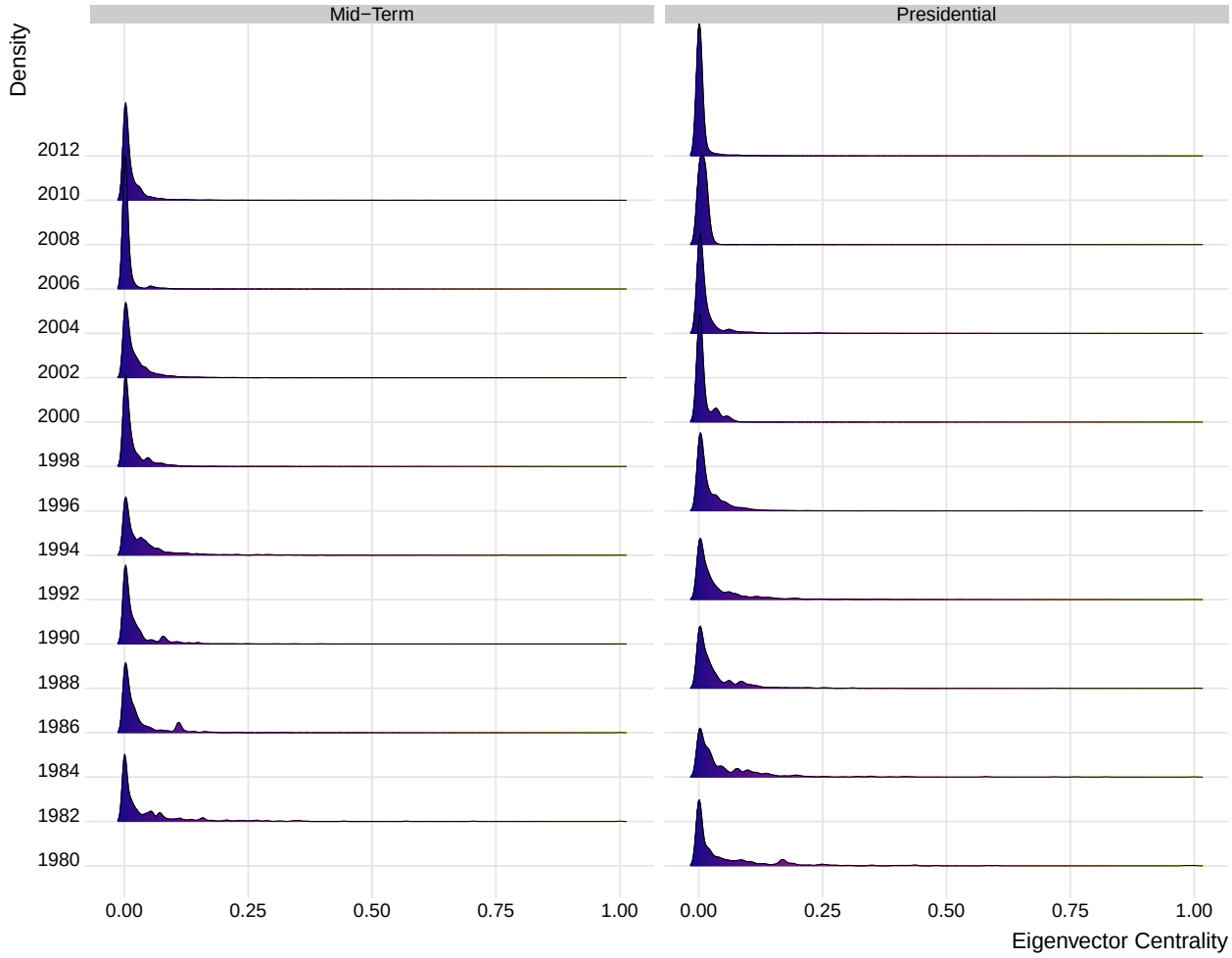
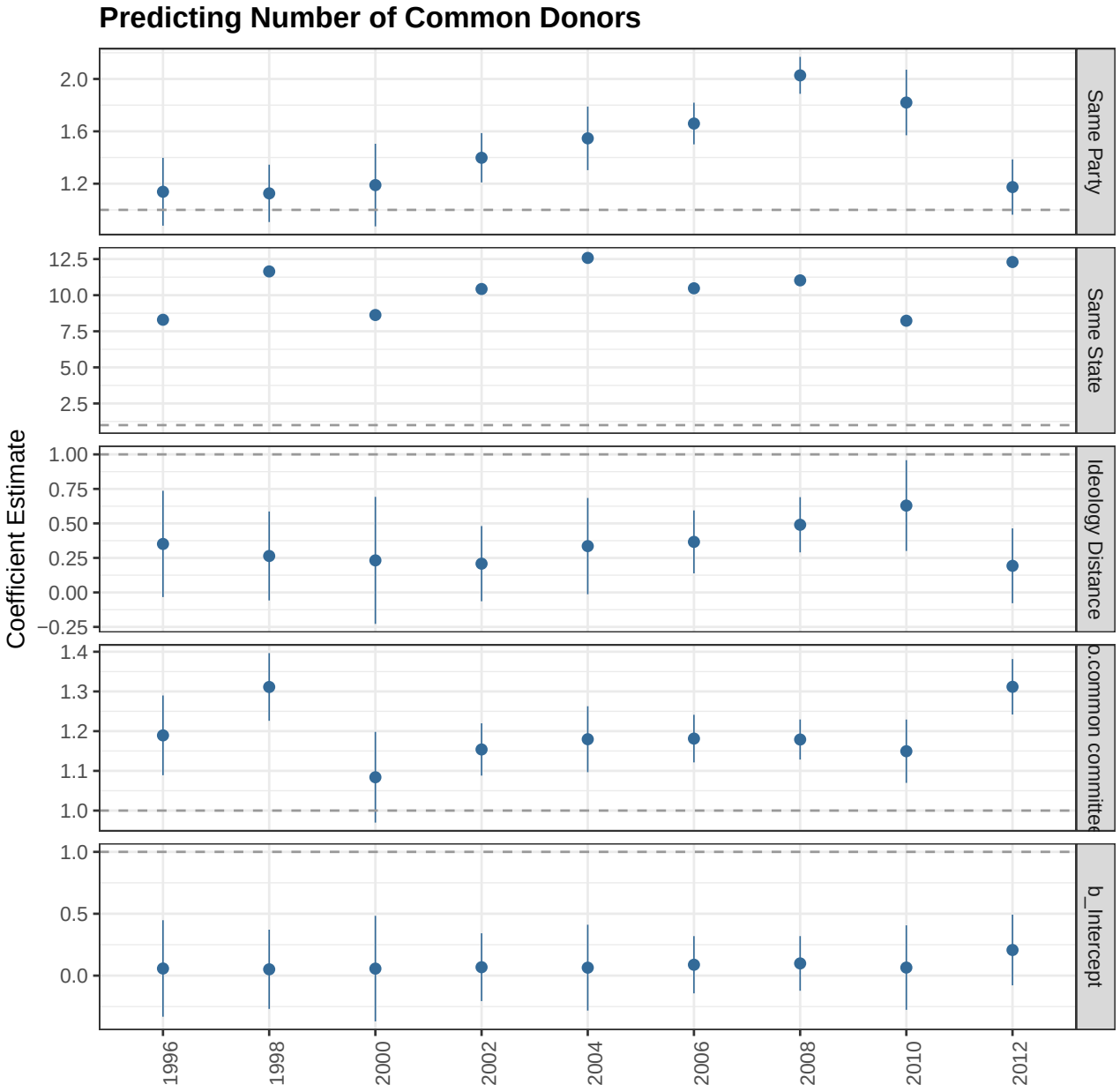


Figure B6: Coefficient Estimates and Confidence Intervals: Recipient Data (Forward Looking Committee Membership.



B.1 Tables

Table B1: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Contributions	5,393	43,521	438,362	0	1,000	25,750	29,466,759
Donors per Member	5,393	20.5	77.5	0	2	18	4,252
Party Connections	5,393	25.0	55.5	0	0	26	931
Ind.exp.for.Cand	4,452	6,749.2	60,194	0.0	0.0	21.0	1,879,734

Notes: This table presents the summary statistics of the following variables: Contributions are the total money received from corporate elites by a member. Donors per Member is the number of corporate elite donors per member, the other two variables are the indicators of connections explained in section A.

Table B2: Committee Membership

	Dependent variable: log(Contributions)			
	(1)	(2)	(3)	(4)
Energy & Commerce	0.417***	0.283**	−0.269**	−0.108
	(0.139)	(0.113)	(0.137)	(0.123)
Appropriations	0.204	0.051	−0.153	−0.073
	(0.131)	(0.133)	(0.145)	(0.127)
Ways & Means	0.521***	0.492***	0.110	0.247
	(0.141)	(0.140)	(0.191)	(0.167)
Taxation (Joint)	0.131	−0.007	0.030	−0.185
	(0.428)	(0.338)	(0.344)	(0.345)
Banking, Finance & Urban Affairs	0.385***	0.311***	−0.273**	−0.155
	(0.114)	(0.104)	(0.118)	(0.105)
Agriculture	−0.128	−0.055	−0.189	−0.081
	(0.114)	(0.111)	(0.146)	(0.139)
Foreign Affairs	−0.135	−0.241**	−0.254**	−0.166
	(0.129)	(0.119)	(0.130)	(0.116)
Budget	0.112	0.054	−0.068	0.025
	(0.111)	(0.092)	(0.090)	(0.085)
Armed Services	0.208*	0.218*	−0.006	0.093
	(0.117)	(0.117)	(0.162)	(0.156)
Public Works & Transportation	0.048	0.104	0.052	0.045
	(0.106)	(0.101)	(0.113)	(0.106)
Commerce, Science & Transportation	0.678***	0.837***	0.993**	0.729
	(0.207)	(0.250)	(0.463)	(0.492)
Finance	0.386*	0.374*	0.316	−0.273
	(0.213)	(0.227)	(0.319)	(0.309)
Appropriations (S)	0.528***	0.640***	0.928**	0.381
	(0.188)	(0.243)	(0.375)	(0.318)
Armed Services (S)	1.056***	0.999***	0.763***	0.497*
	(0.189)	(0.199)	(0.261)	(0.268)
Agriculture & Forestry (S)	0.457**	0.595***	0.684**	0.431*
	(0.197)	(0.213)	(0.328)	(0.252)
Foreign Relations (S)	0.720***	0.547**	0.518	0.091
	(0.214)	(0.231)	(0.360)	(0.341)
Banking,Housing & Urban Affairs (S)	0.504**	0.373*	0.232	−0.014
	(0.208)	(0.214)	(0.280)	(0.255)
Budget (S)	−0.017	0.023	0.139	0.013
	(0.181)	(0.225)	(0.370)	(0.319)
Energy & Natural Resources (S)	0.049	0.321	0.646**	0.322
	(0.201)	(0.204)	(0.282)	(0.278)
Member/Year Effects	No	Yes/No	Yes/No	Yes/Yes
Observations	4,442	4,442	4,442	4,442
R^2	0.095	0.445	0.224	0.100

Notes: This table presents the correlations between committee membership and contributions received. Columns 1, 2 and 3 report pooled, random effect and fixed effect estimates respectively. Standard errors (in parentheses) are clustered by legislator .***, **, & * denote significance at the 1%,5%, and 10% levels,respectively.

Table B3: Seniority

	Dependent variable: log(Contributions)			
	(1)	(2)	(3)	(4)
Committee Chairman	0.301**	0.194	0.340***	0.283**
	(0.145)	(0.129)	(0.127)	(0.126)
Minority Leader	1.118*	0.795	0.472	0.253
	(0.598)	(0.655)	(0.685)	(0.611)
Ranking Minority	0.423***	0.298**	0.315***	0.210*
Member	(0.155)	(0.129)	(0.121)	(0.120)
House Speaker	2.431***	2.064***	1.887**	1.887**
	(0.619)	(0.689)	(0.793)	(0.872)
Senior Party Status	0.078	−0.092	−0.015	0.084
	(0.382)	(0.327)	(0.381)	(0.381)
Majority Leader	0.948*	1.308***	1.248***	1.094***
	(0.497)	(0.408)	(0.296)	(0.321)
Years in Congress	−0.004	0.018***	0.069***	0.026***
	(0.003)	(0.003)	(0.003)	(0.009)
Majority Party	0.221***	0.198***	0.096*	0.103**
	(0.060)	(0.052)	(0.055)	(0.049)
Member/Year Effects	*No*	*Yes/No*	*Yes/No*	*Yes/Yes*
Observations	4,442	4,442	4,442	4,442
R^2	0.095	0.445	0.224	0.100
Adjusted R^2	0.088	0.440	-0.033	-0.201

Notes: This table presents the results of our model for the variables on position of the members, a relation between each of the six positions variables and the contributions received from corporate elites (measured by the log of Contributions). See section A for detailed definitions of these variables. Columns 1 to 4 present results from pooled, random effect, and fixed effect models respectively, numbers in parentheses are robust standard errors (clustered at individual level). ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table B4: Connections and Ideology

	Dependent variable: log(Contributions)			
	(1)	(2)	(3)	(4)
Party Connections	0.002***	0.002***		
	(0.001)	(0.001)		
Non-Party Connections	−0.021**	0.011	0.087***	0.116***
	(0.009)	(0.009)	(0.009)	(0.008)
ideology(L)	0.092	0.035	0.014	0.028
	(0.085)	(0.073)	(0.070)	(0.065)
Ideology(Moderate(L))	−0.145*	−0.082	0.019	0.010
	(0.087)	(0.072)	(0.069)	(0.063)
Ideology(Moderate(R))	0.061	0.042	−0.024	0.031
	(0.082)	(0.074)	(0.075)	(0.066)
Ideology(R)	0.162*	0.081	−0.049	−0.010
	(0.089)	(0.082)	(0.079)	(0.071)
Ideology(FR)	0.093	0.072	0.063	0.083
	(0.083)	(0.073)	(0.070)	(0.066)
Member/Year Effects	*No*	*Yes/No*	*Yes/No*	*Yes/Yes*
Observations	4,442	4,442	4,442	4,442
R^2	0.095	0.445	0.224	0.100
Adjusted R^2	0.088	0.440	-0.033	-0.201

*Notes:*This table presents the results of our model for the variables on Connection and Ideology of the members, a relation between these variables and the contributions received from corporate elites (measured by the log of Contributions). See section A for detailed definitions of these variables. Columns 1 to 4 present results from pooled, random effect,and fixed effect models respectively, numbers in parentheses are robust standard errors (clustered at individual level). ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

C Summary Statistics

Table C1: Data on Directors and Executives

Group	**No.of Individuals**	**Companies**	**Years**
Top Management	35917	2360	since Inception
Board Members	33570	2360	since inception

Table C2: Data Description

	Election Cycle	Number of Donors	Number of Recipients	Number of donations
1	1980	350	364	1,051
2	1982	315	381	866
3	1984	540	480	1,510
4	1986	709	570	1,910
5	1988	1,116	728	3,461
6	1990	1,504	1,003	4,059
7	1992	2,154	1,344	7,044
8	1994	1,489	1,179	5,197
9	1996	3,929	2,325	14,525
10	1998	5,082	3,583	20,675
11	2000	6,865	4,556	29,855
12	2002	8,316	5,738	36,109
13	2004	10,674	6,373	47,487
14	2006	16,036	8,353	66,955
15	2008	25,562	9,589	90,349
16	2010	20,578	9,875	74,052
17	2012	31,689	9,008	100,765

Table C3: Summary Statistics for Selected Variables: All Election-Cycles

Statistic	N	Mean	Std. Dev.	Min	Max
Election-Cycle:1980					
N. Common Recipients	666	0.2	0.6	0	4
Same Company	666	0.02	0.1	0	1
Same Sector	666	0.1	0.3	0	1
Same State	666	0.1	0.2	0	1
Same Congressional District	378	0.1	0.3	0	1
Same Company-State	666	0.1	0.3	0	1
Same Company-District	666	0.03	0.2	0	1
Election-Cycle:1982					
N. Common Recipients	703	0.1	0.3	0	4
Same Company	703	0.01	0.1	0	1
Same Sector	703	0.1	0.3	0	1
Same State	703	0.1	0.2	0	1
Same Congressional District	465	0.04	0.2	0	1
Same Company-State	703	0.1	0.2	0	1
Same Company-District	703	0.01	0.1	0	1
Election-Cycle:1984					
N. Common Recipients	1,524	0.1	0.4	0	4
Same Company	1,524	0.01	0.1	0	1
Same Sector	1,524	0.1	0.4	0	1
Same State	1,524	0.05	0.2	0	1
Same Congressional District	1,034	0.1	0.2	0	1
Same Company-State	1,524	0.05	0.2	0	1
Same Company-District	1,524	0.01	0.1	0	1
Election-Cycle:1986					
N. Common Recipients	5,995	0.1	0.3	0	5
Same Company	5,995	0.01	0.1	0	1
Same Sector	5,995	0.1	0.3	0	1
Same State	5,995	0.05	0.2	0	1
Same Congressional District	4,095	0.1	0.2	0	1
Same Company-State	5,995	0.05	0.2	0	1
Same Company-District	5,995	0.01	0.1	0	1
Election-Cycle:1988					
N. Common Recipients	13,170	0.1	0.5	0	9
Same Company	13,170	0.005	0.1	0	1
Same Sector	13,170	0.1	0.3	0	1
Same State	13,170	0.04	0.2	0	1

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Table C3: – continued from previous page

Statistic	N	Mean	Std. Dev.	Min	Max
Same Congressional District	8,857	0.1	0.2	0	1
Same Company-State	13,170	0.1	0.2	0	1
Same Company-District	13,170	0.01	0.1	0	1
Election-Cycle:1990					
N. Common Recipients	32,342	0.04	0.2	0	7
Same Company	32,342	0.003	0.1	0	1
Same Sector	32,342	0.1	0.3	0	1
Same State	32,342	0.05	0.2	0	1
Same Congressional District	18,360	0.1	0.3	0	1
Same Company-State	32,342	0.05	0.2	0	1
Same Company-District	32,342	0.01	0.1	0	1
Election-Cycle:1992					
N. Common Recipients	93,961	0.1	0.4	0	10
Same Company	93,961	0.003	0.1	0	1
Same Sector	93,961	0.1	0.3	0	1
Same State	93,961	0.05	0.2	0	1
Same Congressional District	61,075	0.1	0.2	0	1
Same Company-State	93,961	0.1	0.2	0	1
Same Company-District	93,961	0.01	0.1	0	1
Election-Cycle:1994					
N. Common Recipients	7,260	0.1	0.4	0	7
Same Company	7,260	0.003	0.1	0	1
Same Sector	7,260	0.1	0.3	0	1
Same State	7,260	0.05	0.2	0	1
Same Congressional District	5,253	0.1	0.2	0	1
Same Company-State	7,260	0.05	0.2	0	1
Same Company-District	7,260	0.01	0.1	0	1
Election-Cycle:1996					
N. Common Recipients	683,865	0.1	0.4	0	15
Same Company	683,865	0.002	0.05	0	1
Same Sector	683,865	0.1	0.3	0	1
Same State	683,865	0.04	0.2	0	1
Same Congressional District	454,581	0.1	0.2	0	1
Same Company-State	683,865	0.1	0.2	0	1
Same Company-District	683,865	0.01	0.1	0	1

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Table C3: – continued from previous page

Statistic	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Election-Cycle:1998					
N. Common Recipients	942,711	0.1	0.3	0	20
Same Company	942,711	0.003	0.1	0	1
Same Sector	942,711	0.1	0.3	0	1
Same State	942,711	0.05	0.2	0	1
Same Congressional District	583,451	0.1	0.2	0	1
Same Company-State	942,711	0.1	0.2	0	1
Same Company-District	942,711	0.01	0.1	0	1
Election-Cycle:2000					
N. Common Recipients	2478,651	0.2	0.5	0	22
Same Company	2478,651	0.003	0.05	0	1
Same Sector	2478,651	0.2	0.4	0	1
Same State	2478,651	0.05	0.2	0	1
Same Congressional District	1933,561	0.1	0.2	0	1
Same Company-State	2478,651	0.1	0.2	0	1
Same Company-District	2478,651	0.01	0.1	0	1
Election-Cycle:2002					
N. Common Recipients	3180,226	0.04	0.3	0	24
Same Company	3180,226	0.003	0.1	0	1
Same Sector	3180,226	0.2	0.4	0	1
Same State	3180,226	0.05	0.2	0	1
Same Congressional District	2569,345	0.1	0.2	0	1
Same Company-State	3180,226	0.1	0.3	0	1
Same Company-District	3180,226	0.01	0.1	0	1
Election-Cycle:2004					
N. Common Recipients	7259,955	0.2	0.5	0	40
Same Company	7259,955	0.002	0.05	0	1
Same Sector	7259,955	0.2	0.4	0	1
Same State	7259,955	0.05	0.2	0	1
Same Congressional District	6046,503	0.1	0.2	0	1
Same Company-State	7259,955	0.1	0.3	0	1
Same Company-District	7259,955	0.01	0.1	0	1
Election-Cycle:2006					
N.Common Recipients	3000,000	0.04	0.3	0	38
Same Company	3000,000	0.002	0.05	0	1
Same Sector	3000,000	0.2	0.4	0	1
Same Company-State	3000,000	0.1	0.3	0	1

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Table C3: – continued from previous page

Statistic	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Same Company-District	3000,000	0.02	0.1	0	1
Same Congressional District	2552,282	0.1	0.2	0	1
Same State	3000,000	0.05	0.2	0	1
Election-Cycle:2008					
N.Common Recipients	3000,000	0.1	0.4	0	19
Same Company	3000,000	0.002	0.1	0	4
Same Sector	3000,000	0.1	0.4	0	4
Same State	3000,000	0.04	0.2	0	1
Same Congressional District	2538,992	0.1	0.2	0	1
Same Company-State	3000,000	0.1	0.3	0	1
Same Company-District	3000,000	0.01	0.1	0	1
Election-Cycle:2010					
N.Common Recipients	3000,000	0.02	0.2	0	34
Same Company	3000,000	0.003	0.1	0	4
Same Sector	3000,000	0.1	0.3	0	3
Same State	3000,000	0.04	0.2	0	1
Same Congressional District	2540,679	0.1	0.2	0	1
Same Company-State	3000,000	0.1	0.2	0	1
Same Company-District	3000,000	0.01	0.1	0	1
Election-Cycle:2012					
N. Common Recipients	3000,000	0.1	0.4	0	16
Same Company	3000,000	0.003	0.1	0	4
Same Sector	3000,000	0.1	0.4	0	4
Same State	3000,000	0.04	0.2	0	1
Same Congressional District	2410,563	0.1	0.2	0	1
Same Company-State	3000,000	0.1	0.3	0	1
Same Company-District	3000,000	0.01	0.1	0	1