Are Campaign Contributions a Form of Speech? Evidence from Recent US House Elections *

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Abstract

This paper investigates the effects of the sources of candidates' campaign funding on their electoral outcomes, with particular emphasis on whether candidates who rely on a narrow base of funding suffer adverse electoral consequences. An extensive dataset consisting of over 650,000 contributions to House candidates in elections from 1980 to 1992 is used. The results reveal a negative relationship between the concentration of contributions and voteshare for open seat candidates and challengers. This may have significant implications for some of the empirical premises underlying the US Supreme Court's landmark *Buckley v. Valeo* decision. At very least the finding is an important stylized fact about US elections which is robust over the 1980's and early 1990's. *Keywords: Campaign Contributions; Campaign Finance J.E.L.* classification: D72; K39

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1. Introduction

The impact of campaign spending on electoral outcomes has been the focus of an extensive empirical literature (e.g. Jacobson 1978, 1990; Abramovitz, 1988; Green and Krasno, 1988; Gerber, 1998; Erikson and Palfrey, 1998). However, most of these studies have been concerned with the effects of a candidate's *aggregate* spending; with the exception of Palda and Palda (1998), little attention has been paid to whether the sources and dispersion of a candidate's campaign funding influence their electoral outcomes. [1] The relative lack of attention to this issue is somewhat surprising, in view of its possible implications for one of the central issues in US campaign finance jurisprudence. In 1976, the US Supreme Court ruled in its landmark *Buckley v. Valeo* [2] decision that, while the overall level of spending by a candidate can be considered a form of speech and thus could not be regulated, contributions were subject to regulation because donations do not constitute a form of speech by contributors. This ruling has played a crucial role in the development of the current campaign finance system, and has given rise to a substantial academic and popular literature. [3]

Virtually all of the scholarly discussion of the merits of the Court's reasoning has taken place within the discourse of constitutional law, with reference to abstract legal principles. However, the decision rests, in part, on a number of premises (both implicit and explicit) which are indisputably *empirical* in nature. This paper represents a new departure, in that it discusses *Buckley* from an empirical perspective. In particular, it seeks to clarify the empirical premises on which the conclusion (that campaign contributions are not a form of speech) rests, and to confront these hypotheses with empirical evidence. The fundamental idea of this endeavor is that, if an empirical link can be established between the sources of a candidate's contributions and that candidate's share of the vote, then a case can be made that contributions are a form of speech.

In pursuing this aim, this paper employs an extensive dataset consisting of PAC contribu-

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[1]Depken (1998) uses data from the 1996 Congressional elections to examine the relative effects of contributions from PACs, individuals, and parties on voteshares. Palda (1997) did this for the 1990 House elections. However, neither of these authors looked at the dispersion of contributions, which is the main focus of this paper.

[2]424 U.S. 1 (1976).

[3]For instance, Moore (1980) estimates that complying with contributions regulations costs candidates up to 10% of their budgets; this amounts to hundreds of millions in election years.

tions (totaling 650,224 donations) to House candidates in elections from 1980 to 1992. This micro-level data facilitates the calculation of concentration indices which measure the degree to which a candidate's funding is derived from a narrow or broad range of donors. [4] The empirical findings suggest that there is a strong negative relationship between the concentration of candidates' funding sources and their electoral success for challengers and open seat candidates. The relationship for incumbents is either insignificant or weakly positive. This relationship has wide-ranging implications, not only for campaign finance regulation (as noted above), but also for theoretical models in the political economy literature, and for public debates surrounding campaign finance law. Theoretical models of campaign expenditures (e.g. Austen-Smith, 1987; Grossman and Helpman, 1996) typically assume that the effects of spending by candidates are independent of the source of the funds. The results in this paper may provide some grounds for modifying this approach. In addition, they appear to suggest that popular concerns regarding the influence of money on politics may be somewhat misplaced; to the extent that voters react adversely to candidates who rely on narrow sources of funding, there would seem to be "intrinsic" limits to the power of interest groups to influence politics through campaign contributions.

Of course, it is possible that the direction of causality may run in the other direction (i.e. that candidates who are expected to receive a high voteshare receive a wider range of contributions). This simultaneity issue plagues the entire literature on campaign spending and electoral outcomes. Some researchers have concluded that no statistical solution is possible (e.g. Jacobson, 1990), while others have sought to use instrumental variables (e.g. Gerber, 1998), or to achieve identification through covariance restrictions (Erikson and Palfrey, 1998). This paper is primarily intended to present this hitherto unknown finding of a relationship between campaign contribution sources and voteshare. It does not claim that the causal link is solely from contributions to votes. However, the above remarks regarding *Buckley* only require that the *entire* relationship is accounted for by the effect of anticipated voteshare on contributions. It remains for future research to disentangle the two simultaneous effects; however, the existence of the relationship highlighted in this paper appears to be interesting

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[4]Kroszner and Stratmann (1998) also calculate analogous concentration indices; however, they use them as measures of politicians' strategies in seeking contributions from interest groups, rather than as a determinant of electoral outcomes.

in its own right. Even if there is disagreement over our interpretation of the negative relation between concentration of contributions and a candidate's voteshare, the present paper can be seen as contributing a "stylized fact" about the relation between these two variables which has not been previously recorded and for which we find robust, long- term evidence.

In Section 2, the US Supreme Court's view, as expressed in its *Buckley* opinion, on the relationship between campaign contributions and political speech is explored, and some recent legal commentary on the case by constitutional scholars is briefly reviewed. Then, the empirical premises which are implicit in the Court's reasoning are identified, and formulated as testable hypotheses. Section 3 introduces some theoretical issues that bear on the links between voteshare and the dispersion and sources of contributions. The data (on House elections during presidential years since 1980) is described in Section 4. The results are presented in Section 5, and section 6 concludes the paper.

2. Contributions and speech

This section reviews and briefly discusses the *Buckley* decision (Section 2.1), and outlines some of the main lines of legal commentary which constitutional scholars have put forward (Section 2.2). Then (in Section 2.3), it proceeds to introduce a novel approach to analyzing the issues raised by the case - namely, drawing out the empirical claims implicit in the Court's reasoning, and stating them in the form of testable hypotheses.

2.1 The Buckley decision

In 1974, Congress passed major amendments to the Federal Election Campaign Act (FECA), seeking to regulate campaign expenditures and contributions. These measures were subsequently challenged by a wide range of political figures. In *Buckley v. Valeo*, the Supreme Court decided this challenge by invalidating the regulation of expenditures on First Amendment grounds, while upholding the regulation of contributions. It is the latter aspect of the decision on which this paper focuses. The relationship between speech and the transmission of information, as envisaged by the Court, is explained in the following passages:

> A restriction on the amount of money a person or a group can spend on political

communication during a campaign necessarily reduces the quantity of expression by restricting the number of issues discussed, the depth of their exploration and the size of the audience reached. This is because virtually every means of communicating ideas in today's mass society requires expenditure of money (634-635)

However, in the Court's view, contributions do not transmit such information:

By contrast with a limitation upon expenditures for political expression, a limitation upon the amount that any one person or groups may contribute to a candidate or political committee entails only a marginal restriction upon the contributor's ability to engage in free communication. A contribution serves as a *general expression of support* for the candidate and his views, but *does not increase perceptibly with the size* of his contribution since the expression rests solely on the undifferentiated, symbolic act of contributing. At most, the *size of the contribution provides a very rough index* of the intensity of the contributor's support for the candidate...While contributions may result in political expression if spent by a candidate...the transformation of contributions into political debate involves speech by someone other than the contributor (635-636).

The Court appears to be arguing that there is a first order effect to contributing ("expression rests solely on the . . . symbolic act of contributing"), with the size of the contribution giving little extra information ("a very rough index") to the observer. This feature, in the Court's view, distinguishes contributions from campaign spending. According to this view, the informational value to a voter of learning that the Sierra Club had contributed to the campaign of a particular candidate would essentially be exhausted by the knowledge that the donation had been made; the amount contributed would be irrelevant.

2.2 Legal commentary on Buckley

In view of its central importance in US campaign finance jurisprudence, *Buckley* has given rise to a large volume of legal commentary by constitutional scholars. The literature on this issue prior to 1992 has been reviewed in Palda (1994). Since then, interest in the topic of campaign finance has grown even further. One prominent theme that stands out

in the recent legal literature is the continuing criticism of the distinction between campaign spending (as a form of speech) and contributions (as non-speech). For instance, Levit (1993, p. 474) argues that the distinction between contributions and spending "does not hold up to close analysis". Most of the critiques of the *Buckley* position tend to agree with the view that contributions are not a form of speech, but argue that campaign spending is worthy of no greater constitutional protection than the Court accorded to campaign donations (e.g. Sunstein, 1994).

In sharp contrast, Smith (1997) argues that the Court permitted Congress too much scope for regulating campaign finance in *Buckley*. In his view, contributions should be regarded as a form of speech, and their regulation should thus be subject to 'strict scrutiny' (the most stringent standard of judicial review in American constitutional jurisprudence). He claims (pp. 48f) that as well as being a form of 'conduct', political donations are a form of 'symbolic speech'; this category of expression is generally granted First Amendment protection by the courts in other contexts. Modern constitutional scholarship maintains that the government can only regulate such conduct to prevent a harm that would arise even if the conduct had no speech component. However, the alleged "harm" associated with campaign contributions (corruption, or its appearance) would not occur if they did not communicate a message of some sort.

Smith (1997) also challenges the Court's main rationale for permitting government regulation of contributions, which was to prevent corruption (the exchange of contributions for policies or Congressional votes). Smith argues that the Court's claim that contributions do not warrant full protection because they do not communicate the "underlying basis of support" contradicts its jurisprudence in other cases involving vague forms of speech (such as the desecration of a flag); he suggests that the size of the contribution can often send a message to the candidate about the donor's beliefs.

2.3 Empirical implications of the Buckley decision

As the preceding discussion suggests, analysis of the *Buckley* decision has hitherto primarily been undertaken from the standpoint of constitutional law, with a focus on abstract legal principles. This paper presents an alternative approach, which seeks to identify and test the

empirical premises and implications of the Court's reasoning. The Court's criteria for speech can be used to formulate several testable hypotheses:

Hypothesis #1: The number of contributions received by a candidate may have a significant effect on the candidate's voteshare.

This relates to the Court's notion that contributing is a symbolic act with no information content beyond the fact that someone gave a contribution. This hypothesis can perhaps be justified with reference to the idea that the number of contributions may act as an `opinion poll' that conveys information. There is support for this notion from the research of McKelvey and Ordeshook (1984, 1985). McKelvey and Ordeshook show that an uninformed voter can learn from a sequence of polls approximately where a candidate stands on some straightforward issues, such as whether military spending should be $1 billion, or $2 billion, or $3 billion. In their experimental study, some of the students were told beforehand what positions the imaginary candidates held, while others were left uninformed but were paid to study the polls and learn the positions. They found that the number of uninformed subjects who correctly identified the positions of imaginary candidates rose to 58% after the first poll, 79% in the second, and 81% in the third and final poll. If contributions are viewed as a form of opinion poll, then this analysis suggests that they may carry useful information and that limiting them is more than "a marginal restriction upon the contributor's ability to engage in free communication."

Unfortunately, a meaningful statistical test of this hypothesis is close to impossible. Candidates with many contributions tend also to be candidates with many votes. Surveys of US voters show that 8% of them contribute to elections. This means that a candidate with many votes will benefit from a large fraction of the 8% contributing. At best, a test of a statistical relation between the number of contributions and the number of votes would not reject the above hypothesis. These considerations however are of minor importance to the theme of the present paper, which is to propose that the Supreme Court may not have fully accounted for all the ways in which contributions may transmit information. It is these other ways in which contributions transmit information to which our statistical inquiries will be directed.

Wittman (1989) has pointed to one form of information latent in contributions, which the Supreme Court has ignored. He argues that campaign contributions are endorsements that

carry information and that there is information in the amount of money spent on a campaign, independently of how that money is spent. In Wittman's (1989, pp.1400-1401) view:

> Voters can also look at the list of campaign contributors (who typically make their endorsements public) and infer the characteristics of the candidates' policies (pro or con). That is, interest group endorsements are like signals in the market and provide strong cues about candidates' preferences.

Unfortunately, this is not a testable hypothesis as present data available to research- ers simply show how much money the candidate spent, and not the information content of messages that were sent out. To date no researchers have tried to disentangle the amount spent from the information content of the message. There is however a testable implication latent in Wittman's comments; namely that the fraction of funds a candidate receives from differing groups may influence that candidate's votes. A candidate who relies heavily on funding from ecological groups may send a signal to voters that he or she is a friend of nature. The Supreme Court recognized no such a possibility in *Buckley v. Valeo* and so this leads us to formulate the second hypothesis emerging from *Buckley v. Valeo:*

Hypothesis #2: If the Supreme Court's view is correct, then we should find that the share of a candidate's contributions made up by any individual or group does not influence a candidate's votes.

On the surface, this appears to be a readily testable hypothesis. The Federal Election Commission divides contributors into several seemingly intuitive categories (corporate PACs, public interest PACs, individual contributors among others) and it is a simple matter to regress candidate voteshares on the fraction of contributions he or she received from each category of contributor. As we shall see in more detail in the empirical section, the are flaws with the FEC classification which do not encourage confidence in the validity of such a test. The FEC draws a distinction between contributions from political action committees and contributions from private individuals, and yet, PACs are made up of private individual contributions. It is hard to rate one source of contribution as being qualitatively different from another and it is difficult to argue that voters should care about the FEC classifications. These difficulties with the FEC classifications have led us to formulate a third hypothesis emerging from the *Buckley* ruling; it is the testing of this hypothesis which is the lynchpin

of the present paper.

Hypothesis #3: According to the Supreme Court, the dispersion of a candidate's contributions does not have a significant effect on that candidate's voteshare (i.e. two otherwise identical candidates who spend the same amount would receive identical voteshares, even if one relies on a narrower range of funding sources).

The following section discusses why the dispersion of contributions may be an important signal to voters, and why Hypothesis 3 seems to be the best avenue for testing the Supreme Court's claim that contributions are of minimal value as signals to voters.

3 Why should dispersion matter?

What emerges from the discussion above is that the validity of the Court's empirical hypotheses in *Buckley* depends crucially on whether voters respond to characteristics of a candidate's contributions other than the number of donors. This paper focuses especially on the concentration of contributions, in order to test Hypothesis 3. This section sketches two simple accounts of possible reasons why, taking the pattern of contributions as exogenously given, voters may respond to the degree of dispersion of a candidate's contributions. The first (Section 3.1) involves a scenario in which interest groups are 'benign', in the sense that their interests are identical to those of each other, and of the voters. However, the groups have private information concerning how best to achieve the common aims; in these circumstances, a candidate with more dispersed contribution sources may end up being better informed. Section 3.2 considers an alternative case in which interest groups are seeking private goods (such as subsidies) for themselves, where these groups' interests are in conflict with those of each other, and of the voters. It is shown that, in such a situation, it may be the case that candidates with more dispersed contribution sources are less susceptible to being captured by any one group, and thus may be preferred by voters. Finally, Section 3.3 considers other possibilities, notably that the pattern of contributions may itself be influenced by anticipated voteshare.

2.1 The 'Informational' Rationale

Suppose that there are n interest groups active in the political system. Prior to the election,

they make (exogenous) donations C_i for i =1, 2, ..., n to a candidate. Following the election, each group receives a private signal x_i, which is a realization of an i.i.d. random variable X with $E[X] = 0$ and $Var[X] = \sigma^2$. The groups then reveal this signal to the elected candidate. The signal is assumed to be verifiable, so that no strategic behavior enters into the revelation of the information. It is assumed that the signal is relevant for some policy-related purpose, so that an accurate and precise estimate of X is desired by the elected candidate (and, implicitly, by the voters). This setting is thus one in which all the interest groups, and the voters, have identical interests (in terms of `better' policy); however, the groups differ in that each has private information regarding how best to achieve this common aim. [5]

The effect of the campaign contributions, and, more generally, the nature of the implicit `exchange' between donors and candidates have been the subject of much discussion in the political economy literature. One theoretical approach, represented by Austen-Smith (1995), models campaign contributions as a means of gaining access to legislators. In this vein, it is assumed here that, if elected, the candidate weighs each group's signal by the fraction of total contributions which was received from that group; i.e. by a factor c_i, where

$$c_i = \frac{C_i}{\sum_{j=1}^{n} C_j} \tag{1}$$

Thus, the elected candidate can be conceptualized as using an estimator W of the form

$$W = \sum_{i=1}^{n} c_i x_i \tag{2}$$

for X. The following example may help clarify the scenario. Suppose that a number of business, consumer, and environmental groups each have private information concerning the likelihood of adverse consequences resulting from global warming. Furthermore, suppose that representatives of each of these groups are ushered in for discussions with the elected candidate (at which this private information is revealed), with the time devoted to each meeting being proportional to the amount contributed by each group during the previous election cycle. Following the discussions, the elected official forms an estimate of the probability of adverse consequences, weighting each group's information by the length of time for which she was exposed to it.

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[5]Note that this situation is somewhat akin to that in which analysis of the Condorcet Jury Theorem and other issues relating to information aggregation have been undertaken in the political economy literature.

As the legislator's assessment of the value of X is assumed to be relevant for policymaking, it is reasonable to assume further that voters will care about the statistical properties of W. Clearly, W is unbiased:

$$E[W] \quad = \quad c_1 E[x_1] + c_2 E[x_2] + \ldots + c_n E[x_n] \tag{3}$$

$$= \quad 0 \tag{4}$$

Consider the efficiency of W:

$$Var[W] \quad = \quad Var[c_1 x_1] + Var[c_2 x_2] + \ldots + Var[c_n x_n] \tag{5}$$

$$= \quad c_1 \sigma^2 + c_2 \sigma^2 + \ldots + c_n \sigma^2 \tag{6}$$

It is clear that the minimum-variance estimator of X will be obtained when $c_i = 1/n$ for all i; each group contributes the same fraction of the candidate's campaign funds, so that the dispersion of donations is maximized, and W is simply the sample mean. More generally, the relative efficiency of W will depend on the degree of concentration of the contributions received by the candidate. Voters will be wary of candidates who rely on concentrated sources of contributions, because this may reduce the precision of the candidate's estimates of important policy-relevant variables. Thus, according to this view, a positive relationship between dispersion of contributions and votes would be expected.

A standard measure of market concentration in the industrial organization and antitrust literature is the Herfindahl-Hirschman Index (HHI). The expression $\sum c_i^2$ in the formula for $Var[W]$ above is closely analogous to the HHI. It should be noted, however, that the HHI is generally calculated using market share percentages (rather than proportions), and is by convention (though not by theoretical necessity) often restricted to the four largest firms in the industry. Modifying the HHI measure to use proportions, and to apply to all n interest groups, a "campaign contribution concentration index" (CCCI) can be defined as follows:

$$CCCI = \sum_{i=1}^{n} \left(\frac{C_i}{\sum_{j=1}^{n} C_j} \right)^2 \tag{7}$$

It follows that the lower is CCCI (so that contributions are less concentrated), the more efficient is W (and, presumably, the more attractive the candidate is to voters). *3.2 The*

"Capture" Story (or the Madison-Montesquieu conjecture)

The discussion in Section 3.1 above assumed public-spirited interest groups seeking to further the common good. This section considers a situation in which interest groups are self-seeking, in that their aim is to obtain subsidies for themselves. This formulation introduces direct conflicts between the interest groups, and between them and the voters (as the subsidies are costly to the voters, in terms, for example, of increased taxes).

Suppose that there are n interest groups, each lobbying for a subsidy s_i where i ranges from 1 to n. Following the election, the legislature will enact an n-dimensional vector of subsidies $\vec{s}$. It is assumed that the legislature is organized in a decentralized manner (e.g. Weingast and Marshall, 1988), whereby each legislator exercises exclusive proposal power along one dimension of the policy vector. Consider a candidate who, if elected, exercises jurisdiction over area i. This candidate will, if elected, effectively choose s_i (assuming for the sake of simplicity that each proposal is adopted, through, for instance, a 'universalistic' norm of deference (e.g. Weingast, 1979)). The size of the subsidy indicates the degree to which the candidate has been 'captured' by group i. Zelinsky (1993) and, more formally, Dharmapala (1999) have argued that, in such circumstances, it may be the case that the larger the number of groups engaged in lobbying, the more they will tend to counteract each other's efforts, and, hence, the lower the degree of capture.

Assume that the i'th interest group derives a benefit $b_i(\vec{s})$ from the vector of subsidies, with the benefits from increasing s_i being positive, and those from increasing subsidies to other groups being negative:

$$\frac{\partial b_i}{\partial s_i} > 0, \quad \frac{\partial b_i}{\partial s_j} < 0 \tag{8}$$

for all j not equal to i. Prior to the election, the interest groups offer campaign contributions to the candidate. Assume that the candidate who is expected to be allocated area i is always lobbied by group i. In addition, suppose that this candidate is also lobbied by m other groups, where $m \leq n - 1$.

Following the election, the candidate, if successful, will choose s_i. Suppose that this choice involves a cost $c(s_i)$, which can be interpreted as representing a cost of (legislative) effort, or a subsequent electoral cost (note that $c'(s_i) > 0$ and $c''(s_i) > 0$. The joint surplus

of the candidate and the $m+1$ groups who lobby the candidate can be expressed as:

$$b_i(s_i) + \sum_{j=1}^{m} b_j(s_i) - c(s_i) \tag{9}$$

where the lobby groups other than i have (without loss of generality) been numbered $j = 1, \ldots, m$. The efficient choice of s_i must maximize this joint surplus;[6] thus, the FOC is:

$$b_i(s_i^*) + \sum_{j=1}^{m} \frac{\partial b_j}{\partial s_i} = c'(s_i^*) \tag{10}$$

Note that the second term on the LHS is negative (as each term in the sum is negative). Moreover, as m increases, the sum becomes more negative. Thus, $c'(s_i^*)$ is decreasing in m. As $c''(s_i^*) > 0$, this implies that s_i^* is also decreasing in m. Hence, the larger the number of interest groups lobbying the candidate, the lower will be the equilibrium subsidy to group i. As voters are harmed by the subsidies, they will prefer candidates with a greater variety of contributors. This is a more modern formulation of Madison's belief, as stated in Federalist 10, that the best way of preserving a democracy against factionalism was to have many opposing groups under one national government. Antecedents to this view can also be found in the writings of Montesquieu.

3.3 Other possibilities

The discussion in Sections 3.1 and 3.2 above took the behavior of interest groups as given, and focused on the reactions of voters to variations in the diversity of a candidate's contribution sources. A more general framework, however, has to take into account the possibility that campaign donors may be influenced by the voteshare which the candidate is expected to receive, or that they may respond to some underlying characteristics of the candidate (e.g. candidate "quality") which also affect the behavior of voters. For instance, the groups in Section 3.2 are likely to discount the anticipated subsidies by the candidate's probability of victory, and would thus wish to focus their lobbying efforts on candidates who are expected to win. In such a scenario, it would not be clear whether contributions were being driven by anticipated votes, or votes by the characteristics of contributions. This

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[6]See Dharmapala (1999) for more extensive discussions of models of this type, and the nature of the interaction between the lobbyists and the politician.

point is closely related to the simultaneity issue highlighted earlier - it provides a theoretical underpinning for the empirical possibility that causality may run in both directions. While this caveat must be borne in mind, the models sketched in Sections 3.1 and 3.2 nonetheless illustrate some of the reasons why voters may respond to the dispersion of candidates' campaign contributions.

4. The data

This study uses data for all House elections between 1980 and 1992 to investigate whether there is a link between the sources of contributions and voteshares (to test Hypothesis 2), and measures of the dispersion of candidate contributions and voteshares (to test Hypothesis 3). The principal focus is on the latter hypothesis (because of weaknesses in the data pertaining to Hypothesis 2 discussed in Section 2) and it is this hypothesis on which most of the discussion is focused.

Measures of candidate votes are, of course, readily available. On the other hand, measures of the dispersion of candidate contributions have not previously been constructed in the literature on the determinants of candidate votes. The measure of dispersion we use is a Herfindahl-type index. As discussed in Section 3.1, such an index falls directly out of a simple theoretical model explaining the signaling value in contributions. As also mentioned in Section 3.1, the Herfindahl index for a single candidate is calculated as follows (where CCCI stands for campaign contribution concentration index, and n stands for the number of interest groups contributing to the candidate):

$$CCCI = \sum_{i=1}^{n} \left(\frac{C_i}{\sum_{j=1}^{n} C_j} \right)^2 \tag{11}$$

Hay and Morris (1979) explain that the Herfindahl index is directly related to the concentration curve of an industry. A concentration curve measures the cumulative market share of the largest firm, the first and second largest firms, the first second and third largest firms, and so on. The steeper is the concentration curve along any of its segments, the greater is the Herfindahl index. It is important to distinguish between this index and the variance of contributions, which appears to be another plausible dispersion measure. A high variance of contributions does not necessarily indicate that a candidate's contributions are not concentrated.

Following the discussion of the Herfindahl index in Hay and Morris (1979), the CCCI is related to variance in the following manner:

$$CCCI = n\sigma^2 + \frac{1}{n} \tag{12}$$

where n is the number of contributions to a candidate and σ is the standard deviation of contributions to the candidate. This means that *ceteris paribus* the concentration of a candidate's contributions *increases* with the variance of that candidates contributions. The role of the number of contributions is ambiguous in the above measure and depends on the degree of dispersion. If all contributions are of the same size so that the variance is zero, CCCI becomes the reciprocal of the number of contributions and we get the highly intuitive result that concentration diminishes as the number of donors increases. When variance is high, a rise in the number of contributions of all sizes can raise concentration, as the weight of large contributions dominates the weight of small contributions in the index. This is why variance is not a meaningful measure of dispersion in the context of this paper's treatment of dispersion.

We constructed the Herfindahl measures from Federal Election Commission data tapes listing the source of each candidate's contributions. In principles, these contributions may come from individuals (the law strongly encourages, though does not formally oblige, candidates to record the source of all individual contributions above $200) or from political action committees (PACs). Our datasets provided only rudimentary information on individuals which did not allow them to be included in the Herfindahl measures. Our Herfindahl measures focused on PACs. There are as many "records" (i.e. observations) on PAC contributions for each candidate as there are PAC filers making contributions in the campaign. Table 1 reports the number of filers recorded on the FEC tapes for each of the election years covered by this study.

For each election year, the dispersion measures for candidates were calculated by analyzing approximately 100,000 data points. For example, to calculate the Herfindahl index of contributions to Rep. George J. Hochbrueckner in the New York First Congressional district race in 1986, data on the 98 filers who contributed to his campaign was analyzed, yielding the statistics that his average PAC contribution was $2,556, the sum of his contributions was $250,563, and the standard deviation of PAC contributions to Hochbrueckner was $2,960.

This procedure was repeated for each candidate in the 1986 election. Tables 2(a)-(b) shows the averages over incumbents, challengers, and open seat candidates of the candidate campaign contribution concentration index (CCCI) for each election, as well as the average of standard deviations of contributions over candidates (one measure of standard deviation calculated for each candidate) and mean number of contributions to which the CCCI is related (as spelled out in equation 12 above). The sample consists of Democratic and Republican candidates, with third party candidates, independents, and candidates in primary elections in Louisiana being excluded.

Table 2(a) shows that, using the Herfindahl index, incumbents have less concentrated contributions than do challengers in all years. Candidates vying for open seats also have less concentrated contributions than challengers, and overall are even less concentrated than incumbents. In calculations not shown here, it was found that the difference between challenger and incumbent Herfindahl indexes was statistically significant in almost all cases. One of the puzzling features of Table 2(b) (and Table 1) is that the number of contributions as counted by the Federal Election Commission is small; it seems difficult to reconcile the 111,891 contributions given in the 1992 House elections with survey data indicating that nearly 8% of Americans give money to candidates and parties. The explanation is that in our sample, all the contributions candidates receive come from political committees, so called PACs. PACs bundle what may be the contributions of hundreds of people and hand them as a single contribution to a candidate or party. This bundling accounts for what appears to be a small number of contributors. The existence of bundling may also raise questions about the usefulness of our campaign contribution concentration index CCCI. If there is a broad variability in the bundling of PAC contributions candidates receive, the CCCI may be a very noisy measure of contribution concentration. However, as individuals who contribute to the same PAC perceive that they have common interests, bundling may not pose a significant problem for the CCCI measure, as what is important is the concentration of contributions from different interests, rather than different individuals *per se*.

5. The results

It was hypothesized earlier that there should be a negative structural relation between

the dispersion of contributions and a candidate's voteshare: the more dispersed a candidate's contributions, the greater will be the candidate's share of the popular vote. Correlations will not reveal structural relations, but may indicate that an association exists. Figure 1 shows the correlations between candidate voteshares and the Herfindahl index weighted by what percentage of his incoming funds a candidate received from PACs. This weight is necessary to make the concentration indices of candidates comparable. A candidate may have extremely concentrated contributions from PACs but may receive little of his overall revenue from PACs. Voters would then tend not to be worried by his high Herfindahl index calculated over PACs because PACs are a small part of his contributors. The weighted Herfindahl index takes this possibility into account. This is also an indirect way of taking into account our omission of individual contributions in the Herfindahl index.

Figure 1 shows that a consistent negative association of concentration with votes for both challengers and open seat candidates. In other words, the higher the index (i.e. the more concentrated are contributions) the fewer votes a candidate is likely to receive. The significance levels of the correlations are shown in rows nine, and seventeen of Table 3. In all except one election are the correlations significant and in the hypothesized direction. This supports the conjecture of Hypothesis 3 about the relationship between dispersion and votes that was described in Sections 3.1 and 3.2. Consequently, this finding appears to contradict the Supreme Court's *Buckley* reasoning on the relationship between contributions and information. However, there is no significant result for incumbents. If anything, there seems to be a positive relationship between contribution concentration and voteshares for incumbents, albeit statistically insignificant at conventionally accepted levels in half the elections (see row 1 of Table 3). While it may be premature to speculate on correlations without further analysis, one possible explanation for the lack of correlation between concentration of contribution and voteshares for incumbents is that voters do not need to look at the dispersion of incumbent contributions to obtain information on how beholden an incumbent is to special interests. Voters know less about challengers and open seat candidates than they know about incumbents and may look at the dispersion of contributions for guidance. This may explain the strong and consistent significance of results for challengers and open seat candidates.

To account for the possibility that voters also respond to the concentration from the *type* of PAC which contributes to a candidate, we have calculated separate Herfindahl measures

for each of the seven categories into which the Federal Election Commission separates PAC contributions. Figures 2(b) and 2(c) show that for challengers and open seat candidates, the relation remains largely negative over the 1980- 1992 period, whereas for incumbents it remains largely positive. Table 3 indicates significance levels and once again shows a more predominant pattern of significance for challengers and open seat candidates than for incumbents. Yet the signs of the correlations are not as persistently significant in the case of challengers and open seat candidates as in the case of the Herfindahl index covering all categories of PAC. The implication may be that voters do not distinguish between FEC category when integrating concentration into their decisions on how to vote for a candidate. This result underscores our skepticism of the meaning for voters of FEC classifications. This skepticism is further confirmed in the analysis of regressions that follows.

Correlations by themselves are no proof of causation; however, as mentioned earlier, to re-open the debate on the Supreme Court's insistence that contributions are not a source of information, it is not essential to disentangle the precise structural effects of dispersion of contributions on votes. We simply have to show that there is a link in the data between the two and that this link is not due to spurious relation to some third variable not included in the analysis. While it would be ideal to be able to specify a full structural model of votes and contributions, no model of this sort has come to be generally accepted in the literature to date. Moreover, Milyo (1998) has recently developed a comprehensive critique of the whole effort to identify the structural parameters of a votes-spending relation. He argues that there are no satisfactory instruments that allow a structural interpretation of estimated parameters, and that the best approach to discerning a relation between votes and spending lies in the analysis of data generated by extreme electoral situations he describes as natural political experiments.

Our compromise between correlations and searching for the ideal structural model has been simply to estimate OLS regressions (without taking into account questions of simultaneity) as a first step in investigating whether interesting results emerge which can later be subjected to further scrutiny using more elaborate techniques. This is a procedure to which many authors in recent academic work on the topic have resorted, in view of the apparent intractability of the simultaneity problem. We present these regressions in Tables A1-A3 of the appendix because we believe they send a valuable message. In spite of potential biases that may exist

due to possible correlations between error terms and independent variables, the same though somewhat weaker association emerges over 1980-1992 between the Herfindahl index and voteshares as was found in the simple correlations.

The dependent variable in these regressions is the voteshare of incumbents, challengers, or open seat candidates. Votes are assumed to be a function of the candidate's campaign expenditure divided by his or her expenditure plus the expenditure of his opponent. This is the influence variable (called "candidate spending as a fraction of all candidate spending" in Tables A1-A3) made prominent by Tullock (1980), and often seen in the tournament literature, initiated by Lazear and Rosen (1981). Other independent variables include a party dummy indicating whether the candidate is a Democrat, the weighted CCCI index over all classes of PACs as well as the CCCI indexes over each category of PAC, and variables that control for the share of contributions a candidate received from the major classes of contributors as defined by the Federal Election Commission. This latter category of variables was mentioned earlier as being pertinent to testing Hypothesis #2.

Tables A1-A3 are voluminous and contain an overwhelming amount of information on the effects of concentration on voteshare. To simplify interpretations we present first Figure 3. This figure is based on regressions similar to those in Table A1-A3 in all respects except that the regressions behind Figure 3 contain only the weighted CCCI index over all classes of PACs, and exclude the other more detailed measures of concentration. What the figure shows is 95% confidence intervals for the regression coefficient attached to the weighted Herfindahl index. The figure also shows the values of the CCCI regression coefficient. What emerges is that the result of a negative relation between concentration and voteshare is confirmed and even strengthened for challengers, and weakened for open seat candidates. For incumbents a strong positive relation between concentration and voteshare emerges. [7]

Figure 4 is similar to Figure 3 but is based on the full regressions shown in Tables A1-A3. The confidence intervals in Figure 4 are not for a single concentration index regression coefficient but rather for the group of concentration coefficients including all categories of PAC as well as for the concentration index that covers all PACs. What we have done is

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[7]Readers who note the larger number of incumbents than challengers from the regressions and are puzzled may understand this by the phenomenon than in many southern states incumbents faced off against independent challengers. Our sample analysed only the voteshares of Republicans and Democrats.

to ask what is the marginal effect on voteshare of an equal increase in all concentration coefficients simultaneously. We used the variance covariance matrix of each regression to calculate the 95% confidence bands around this joint effect of an increase in all measures of concentration. The results remain in the same direction as in Figure 3 and as in the case of correlations. Challengers continue to show a negative (though weaker than in Figure 3) relation between concentration and voteshare. As in Figure the relation is in doubt for open seat candidates and continues to be positive for incumbents. [8]

Tables A1-A3 also contains independent variables pertinent to Hypothesis 2, that the source of funds may influence a candidate's voteshare. We took the Federal Election Commission's classifications of corporate PAC contributions, contributions by individuals, contributions by "public interest" groups. We excluded the fraction of money from a candidate's own pocket to avoid a singularity in the regression matrix. We then created variables that represent the share of contributions a candidate received from each source. What emerges is that the coefficients attached to these variables measuring the candidate's reliance on a particular source have no consistent sign over seven elections, and in many cases are statistically insignificant. This is not entirely surprising, as these variables are based on FEC classifications of sources of funds, and the categories of importance to voters need not coincide with those of the FEC. For instance, the FEC draws a clear distinction between contributions by individuals and contributions by PACs, yet PAC donations are bundles of money raised from individuals. To voters contemplating where candidates get their funds, there may be no distinction to make between PAC and individual contributions. If few voters care about the FEC classifications, we should expect to see no consistent pattern or significance in the coefficients attached to the source variables in the regressions of Tables A1-A3.

While any definite conclusions would be premature in view of the caveats above, the robustness, using different statistical indicators, over so many elections of this relation between concentration of contributions and challenger voteshares appears remarkable, and worthy of further study. The evidence on open seat candidates is strong only in the case

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[8]We should note that underlying Figure 4 is not quite the same mental experiment as that which would be conducted in a joint significance test of all variables. ANOVA tests a hypothesis about joint significance where our confidence bands measure a hypothesis about the sum of effects of variables. We have conducted ANOVA on joint significance (not shown in the present paper) and report these largely confirm the findings in Figure 4.

of simple correlations and disappears in multivariate analysis. The evidence on a negative relation between concentration and voteshare for incumbents is non-existent in the case of simple correlations, and in multivariate analysis a positive relation emerges. Is it possible that these numbers suggest an U-shaped relation between concentration and votes as one goes from challenger status, to open-seat status, and finally incumbent status? We have not developed such a theory in the present paper. Our theory mainly seems to be confirmed by the case of challengers, but the fact that a positive relation emerges, albeit weakly, for incumbents, suggests that maybe our theory is a subset of a larger theory of the relation between concentration and political support.

6. Conclusion

This paper has advanced the hypothesis that the sources of a candidate's campaign contributions may influence his or her voteshare. Raising this possibility challenges a central doctrine in US campaign finance jurisprudence. In its 1976 *Buckley v. Valeo* decision, the US Supreme Court held that campaign contributions (unlike campaign expenditures) were not a form of speech meriting First Amendment protection. This paper has proposed several theoretical mechanisms by which contributions may signal valuable information to voters. The paper's basic hypothesis was then tested using a new measure of the dispersion of contributions. This measure, which we call the campaign contribution concentration index, or CCCI, is analogous to the Herfindahl index of industry concentration familiar to students of industrial organization. We found remarkably consistent evidence over seven US House elections ranging from 1980 to 1992, that there is an inverse relationship between concentration of contributions and the voteshare of challenging candidates, and weaker evidence of such a relation for open-seat candidates. Surprisingly, we found evidence of a positive relation between concentration and voteshare for incumbent candidates.

Although fundamental issues of causality remain to be addressed in future research, our results raise important questions. The strong relationship between concentration of contributions and a candidate's voteshare further complicates the now quarter century-old quest to disentangle the effects of campaign money on votes. Moreover, the possibility that campaign contributions represent a form of "speech" challenges current legal doctrine. We

believe that the results presented in this paper cast some doubt on the empirical premises underlying the US Supreme Court's 1976 view of the nature of political contributions. At very least, our exploratory analysis has uncovered stylised facts about concentration and votes not previously brought to prominence in the campaign finance literature.

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TABLE 1

Election	Number PAC of filers
1980	78,885
1982	96,622
1984	101,834
1986	106,221
1988	107,616
1990	100,759
1992	111,891

Source: *FEC* Data description booklets.

TABLE 2A

Average size of PAC contribution, and Herfindahl measures of dispersion

Election	Averagesize of contribution			Herfindahl CCCI Index		
	Incumbent	Challenger	Open seat	Incumbent	Challenger	Open seat
1980	684	871	1095	0.07	0.36	0.12
	(340)	(645)	(504)	(0.13)	(0.35)	(0.19)
1982	802	1131	1162	0.04	0.26	0.10
	(314)	(723)	(367)	(0.10)	(0.29)	(0.18)
1984	916	1533	1342	0.04	0.33	0.08
	(329)	(1162)	(482)	(0.10)	(0.33)	(0.12)
1986	1008	1396	1391	0.03	0.37	0.06
	(334)	(814)	(515)	(0.08)	(0.33)	(0.11)
1988	1151	1491	1633	0.03	0.42	0.08
	(365)	(1028)	(691)	(0.09)	(0.36)	(0.16)
1990	1279	1467	1679	0.03	0.43	0.05
	(415)	(1000)	(529	(0.10)	(0.36)	(0.07)
1992	1446	1252	1486	.04	0.36	0.11
	(430)	(765)	(519)	(0.13)	(0.34)	(0.20)

Figures in brackets are standard deviations.

TABLE 2B

Components of $CCCI = n\sigma^2 + 1/n$ (standard deviation of PAC contributions to candidates, and number of contributions) averaged over each election.

Election	Standard deviation of contributions σ			Average number of contributions n		
	Incumbent	Challenger	Open seat	Incumbent	Challenger	Open seat
1980	1009	1125	1492	103	32	70
	(543)	(750)	(482)	(59)	(51)	(56)
1982	1151	1497	1708	140	34	76
	(543)	(889)	(600)	(68)	(43)	(53)
1984	1236	1852	1812	157	34	98
	(533)	(1067)	(658)	(70)	(51)	(66)
1986	1303	1764	1840	170	24	104
	(521)	(1034)	(598)	(75)	(33)	(60)
1988	1444	1935	2141	175	21	104
	(517)	(1149)	(775)	(78)	(31)	(62)
1990	1513	1666	2109	168	20	105
	(550)	(974)	(579)	(76)	(32)	(57)
1992	1685	1490	1807	176	25	84
	(520)	(880)	(665)	(83)	(34)	(55)

Figures in brackets are standard deviations.

TABLE 3

Correlations of weighted Herfindahl measures with voteshares

Election	1980	1982	1984	1986	1988	1990	1992
				Incumbents			
Herfindahl index over all committees × committee contributions as fraction of total receipts	0.18 **	0.10	0.08	0.13 *	0.08	0.14 **	0.22 **
Herfindahl index over corporate committees × corporate committee contributions as fraction of total receipts	0.23 **	0.29 **	0.24 **	0.32 **	0.28 **	0.17 **	0.23 **
Herfindahl index over labor committees × labor committee contributions as fraction of total receipts	0.02	0.22 **	0.05	0.14 **	0.16 **	0.11 *	0.20 **
Herfindahl index over trade committees × trade committee contributions as fraction of total receipts	0.26 **	0.03	0.18 **	0.14 **	0.08	0.15 **	0.16 **
Herfindahl index over cooperative committees × cooperative committee contributions as fraction of total receipts	-0.15 **	-0.02	-0.01	0.08	0.11 *	0.04	0.11 *
Herfindahl index over non-connected committees × non-connected committee contributions as fraction of total receipts	-0.02	0.07	0.03	0.08	0.10	0.05	0.03
Herfindahl index over without stock committees × without stock committee contributions as fraction of total receipts	-0.15 **	-0.02	-0.01	0.08	0.11 *	0.04	0.11 *
Herfindahl index over party committees × party committee contributions as fraction of total receipts	0.06	-0.19 **	-0.08	-0.28 **	-0.23 **	-0.20 **	-0.33 **
				Challengers			
Herfindahl index over all committees × committee contributions as fraction of total receipts	-0.34 **	-0.25 **	-0.10	-0.29 **	-0.35 **	-0.14 **	-0.26 **
Herfindahl index over corporate committees × corporate committee contributions as fraction of total receipts	-0.08	-0.16 **	-0.04	-0.09	-0.08	-0.13	-0.01
Herfindahl index over labor committees × labor committee contributions as fraction of total receipts	-0.17 **	-0.05	-0.29 **	-0.10	-0.22 **	-0.05	-0.08
Herfindahl index over trade committees × trade committee contributions as fraction of total receipts	0.10	0.08	-0.17 **	-0.06	0.20 **	-0.01	-0.05
Herfindahl index over cooperative committees × cooperative committee contributions as fraction of total receipts	0.09	-0.15 **	-0.15 *	-0.08	-0.09	-0.08	-0.02
Herfindahl index over non-connected committees × non-connected committee contributions as fraction of total receipts	0.22 **	0.30 **	0.15 **	0.25 **	0.27 **	0.09	0.21 **
Herfindahl index over without stock committees × without stock committee contributions as fraction of total receipts	0.09	-0.15 *	-0.15 *	-0.08	-0.09	-0.08	-0.02
Herfindahl index over party committees × party committee contributions as fraction of total receipts	-0.11	-0.08	-0.04	-0.13 *	-0.20 **	-0.11	-0.22 **
				Open seat candidates			
Herfindahl index over all committees × committee contributions as fraction of total receipts	-0.39 **	-0.24 *	-0.44 **	-0.33 **	-0.49 **	-0.18	-0.39 **
Herfindahl index over corporate committees × corporate committee contributions as fraction of total receipts	-0.39 **	-0.08	0.13	-0.24 **	-0.08	-0.14	-0.22 **
Herfindahl index over labor committees × labor committee contributions as fraction of total receipts	0.14	-0.18	-0.14	-0.18	-0.27 **	0.13	0.12
Herfindahl index over trade committees × trade committee contributions as fraction of total receipts	-0.20	-0.17	-0.09	0.21	0.01	-0.07	-0.13
Herfindahl index over cooperative committees × cooperative committee contributions as fraction of total receipts	-0.24 **	-0.30 **	-0.14	-0.39 **	-0.03	0.19	-0.14
Herfindahl index over non-connected committees × non-connected committee contributions as fraction of total receipts	0.33 **	0.36 **	0.33 *	0.33 **	0.01	0.08	0.15
Herfindahl index over without stock committees × without stock committee contributions as fraction of total receipts	-0.24 *	-0.30 **	-0.14	-0.39 **	-0.03	0.19	-0.14
Herfindahl index over party committees × party committee contributions as fraction of total receipts	-0.47 **	-0.23 *	-0.20	-0.18	-0.26	-0.36 **	-0.33 **

** stands for correlation significant at the 5% level. * stands for significance at the 10% level.

TABLE A-1

Incumbent voteshare regressions

Election	1980	1982	1984	1986	1988	1990	1992
Constant	35	46	25	36	28	33	35
Democratic party dummy	0.73	11.12	1.50	5.70	3.04	1.23	-0.95
	(0.66)	(0.00)	(0.46)	(0.00)	(0.08)	(0.53)	(0.55)
Incumbent spending as	43	20	49	42	46	48	33
a fraction of all candidate spending	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fraction of contributions			3.01	-4.57	0.27	-6.01	2.79
from individuals			(0.62)	(0.50)	(0.97)	(0.40)	0.63)
Fraction of contributions	-91	-81	-16	-309	82	-15	-344
from party	(0.05)	(0.10)	(0.83)	(0.02)	(0.54)	(0.95)	(0.05)
Fraction of contributions from	-7.19	-5.03	-8.20	-20	0.21	-27	1.38
corporate committees	(0.47)	(0.64)	(0.44)	(0.06)	(0.99)	(0.02)	(0.89)
Fraction of contributions from	-10	-19	-7.98	-28	-2.57	-21	-7.85
labor committees	(0.12)	(0.03)	(0.34)	(0.01)	(0.82)	(0.07)	(0.45)
Fraction of contributions from	3.74	21	15	15	3.48	-5.20	4.68
trade committees	(0.73)	(0.16)	(0.30)	(0.29)	(0.81)	(0.74)	(0.71)
Fraction of contributions from	-57	-122	-14	-29	-30	-43	-49
cooperative committees	(0.37)	(0.10)	(0.80)	(0.60)	(0.69)	(0.60)	(0.46)
Fraction of contributions from	-127	-203.68	-65	-64	-125	-126	-131
non-connected committees	(0.03)	(0.00)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)
Fraction of contributions from corporations	-51	345	166	-51	88	166	-50
without stock committees	(0.81)	(0.03)	(0.20)	(0.60)	(0.35)	(0.09)	(0.60)
(Herfindahl index over all committees) ×	70	130	-8	165	134	-129	336
(committee contributions as fraction of total receipts)	(0.15)	(0.08)	(0.95)	(0.34)	(0.54)	(0.31)	(0.23)
(Herfindahl index over corporate committees) ×	253	478	236	905	270	292	332
(corporate committee contributions as fraction of total receipts)	(0.02)	(0.04)	(0.46)	(0.01)	(0.41)	(0.02)	(0.34)
(Herfindahl index over labor committees) ×	-14	81	-31	151	13	136	280
(labor committee contributions as fraction of total receipts)	(0.78)	(0.33)	(0.78)	(0.29)	(0.92)	(0.35)	(0.10)
(Herfindahl index over trade committees) ×	116	-62	185	20	40	384	-182
(trade committee contributions as fraction of total receipts)	(0.10)	(0.66)	(0.14)	(0.87)	(0.85)	(0.03)	(0.34)
(Herfindahl index over cooperative committees) ×	48	206	-15	44	70	18	156
(cooperative committee contributions as fraction of total receipts)	(0.71)	(0.21)	(0.91)	(0.79)	(0.78)	(0.94)	(0.48)
(Herfindahl index over non-connected committees) ×	165	447	245	256	436	351	100
(non-connected committee contributions as fraction of total receipts)	(0.12)	(0.00)	(0.04)	(0.03)	(0.00)	(0.05)	(0.57)
(Herfindahl index over without stock committees) ×	-37	-437	-272	233	-92.98	-81	154
(without stock committee contributions as fraction of total receipts)	(0.91)	(0.13)	(0.40)	(0.33)	(0.71)	(0.68)	(0.37)
(Herfindahl index over party committees) ×	66	49	10	176	-161	-106	96
(party committee contributions as fraction of total receipts)	(0.23)	(0.42)	(0.91)	(0.28)	(0.39)	(0.76)	(0.71)
Dummy for southern states	2.41	1.60	3.16	2.70	4.17	2.75	-0.79
	(0.10)	(0.32)	(0.04)	(0.06)	(0.01)	(0.15)	(0.60)
Dummy for western states	-3.61	-0.98	-1.20	-3.61	-0.18	-6.41	-2.32
	(0.02)	(0.58)	(0.47)	(0.02)	(0.92)	(0.00)	(0.15)
Dummy for eastern states	-1.37	-1.42	-1.51	1.76	3.73	-2.02	1.96
	(0.35)	(0.37)	(0.35)	(0.24)	(0.03)	(0.31)	(0.22)
$\overline{R}^2$	0.57	0.46	0.51	0.53	0.45	0.33	0.39
F	26.5	16.7	20.3	21.9	16.7	10.1	11.7
Degrees of freedom	363	351	369	362	378	365	317

The symbol n.a. stands for not applicable. The 1980 and 1982 datasets did not include information on contributions from individuals.

TABLE A-2

Challenger voteshare regressions

Election	1980	1982	1984	1986	1988	1990	1992
Constant	24	26	25	21	26	32	28
Democratic party dummy	0.22	10.33	-2.68	2.97	-0.86	1.69	2.26
	(0.88)	(0.00)	(0.03)	(0.00)	(0.41)	(0.19)	(0.09)
Challenger spending as	28	13	28	20	19	2.26	29
a fraction of all candidate spending	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.36)	(0.00)
Fraction of contributions	n.a.	n.a.	(3.10)	(3.59)	(3.83)	(3.90)	(1.66)
from individuals	(n.a.	(n.a.)	0.12)	0.05)	0.02)	0.06)	0.45)
Fraction of contributions	31	33	7.55	16	32	24	22
from party	(0.01)	(0.04)	(0.41)	(0.41)	(0.02)	(0.40)	(0.44)
Fraction of contributions	6.88	27	28	82	18	11	54
from corporate committees	(0.57)	(0.17)	(0.04)	(0.00)	(0.33)	(0.62)	(0.00)
Fraction of contributions	22	12	6.55	20	8.87	9.64	7.25
from labor committees	(0.00)	(0.02)	(0.18)	(0.00)	(0.02)	(0.06)	(0.22)
Fraction of contributions	30	57	2.41	50	46	102	2.74
from trade committees	(0.10)	(0.03)	(0.89)	(0.01)	(0.08)	(0.00)	(0.87)
Fraction of contributions	11	409	671	-308	-384	-428	196
from cooperative committees	(0.96)	(0.24)	(0.02)	(0.46)	(0.40)	(0.01)	(0.70)
Fraction of contributions	54	4.76	28	12	70	84	12
from non-connected committees	(0.01)	(0.76)	(0.05)	(0.34)	(0.00)	(0.02)	(0.72)
Fraction of contributions	2211	2195	-710	-352	-50	789	540
from corporations without stock committees	(0.04)	(0.02)	(0.24)	(0.10)	(0.49)	(0.37)	(0.02)
(Herfindahl index over all committees) ×	-5.02	-18	3.29	0.44	-2.39	32	-13
(committee contributions as fraction of total receipts)	(0.85)	(0.40)	(0.68)	(0.96)	(0.84)	(0.03)	(0.56)
(Herfindahl index over corporate committees) ×	15	-37	-29	-45	-70	-69	-24
(corporate committee contributions as fraction of total receipts)	(0.73)	(0.43)	(0.40)	(0.18)	(0.08)	(0.05)	(0.46)
(Herfindahl index over labor committees) ×	-35	-40	-17	-24	-9.90	-42	-12
(labor committee contributions as fraction of total receipts)	(0.25)	(0.08)	(0.09)	(0.04)	(0.43)	(0.01)	(0.67)
(Herfindahl index over trade committees) ×	-49	-74	-6.42	-64	-27	-141	-12
(trade committee contributions as fraction of total receipts)	(0.30)	(0.07)	(0.77)	(0.02)	(0.50)	(0.00)	(0.69)
(Herfindahl index over cooperative committees) ×	448	-173	-631	634	493	622	-216
(cooperative committee contributions as fraction of total receipts)	(0.30)	(0.65)	(0.08)	(0.30)	(0.57)	(0.03)	(0.71)
(Herfindahl index over non-connected committees) ×	-29	-50	-39	-11	-96	-117	15
(non-connected committee contributions as fraction of total receipts)	(0.46)	(0.10)	(0.03)	(0.56)	(0.00)	(0.00)	(0.73)
(Herfindahl index over without stock committees) ×	-2741	-2175	1018	334	90	-816	-527
(without stock committee contributions as fraction of total receipts)	(0.02)	(0.02)	(0.13)	(0.13)	(0.52)	(0.35)	(0.02)
(Herfindahl index over party committees) ×	-36	-19	-10	-12	-36	-56	-36
(party committee contributions as fraction of total receipts)	(0.25)	(0.48)	(0.41)	(0.60)	(0.06)	(0.11)	(0.36)
Dummy for southern states	0.25	0.64	2.24	2.66	1.54	2.56	0.75
	(0.84)	(0.60)	(0.04)	(0.01)	(0.09)	(0.03)	(0.53)
Dummy for western states	1.29	-2.15	-0.11	0.92	-1.98	1.40	-1.70
	(0.32)	(0.12)	(0.93)	(0.40)	(0.05)	(0.28)	(0.22)
Dummy for eastern states	0.69	-1.25	1.62	1.17	0.52	1.70	-1.43
	(0.59)	(0.33)	(0.15)	(0.28)	(0.62)	(0.24)	(0.27)
$\overline{R}^2$	0.58	0.54	0.58	0.54	0.56	0.33	0.53
F	19.3	17.1	20.1	15.1	16.9	18.7	17.2
Degrees of freedom	248	255	260	222	235	187	276

The symbol n.a. stands for not applicable. The 1980 and 1982 datasets did not include information on contributions from individuals.

TABLE A-3

Open seat candidate voteshare regressions

Election	1980	1982	1984	1986	1988	1990	1992
Constant	38	27	17	8.53	22	14	18
Democratic party dummy	4.33	9.64	-0.62	9.78	5.18	6.68	-3.95
	(0.47)	(0.03)	(0.92)	(0.01)	(0.40)	(0.26)	(0.20)
Open seat candidate spending as	24	21	52	44	39	38	36
a fraction of all candidate spending	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fraction of contributions	n.a.	n.a.	19	25	14	30	14
from individuals	(n.a.)	(n.a.)	(0.09)	(0.00)	(0.24)	(0.01)	(0.01)
Fraction of contributions	43	72	43	-103	71	164	-26
from party	(0.52)	(0.32)	(0.68)	(0.26)	(0.47)	(0.08)	(0.76)
Fraction of contributions from	47	29	-3.41	75	5.44	7.48	40
corporate committees	(0.38)	(0.43)	(0.94)	(0.11)	(0.93)	(0.90)	(0.07)
Fraction of contributions from	-19	21	-8	-3	6	10	48
labor committees	(0.51)	(0.12)	(0.65)	(0.86)	(0.84)	(0.76)	(0.00)
Fraction of contributions from	-27	106	-1.13	3.85	40	23	0.88
trade committees	(0.61)	(0.01)	(0.98)	(0.95)	(0.54)	(0.70)	(0.97)
Fraction of contributions from	-361	-5.15	205	367	491	316	-325
cooperative committees	(0.41)	(0.99)	(0.73)	(0.33)	(0.41)	(0.54)	(0.45)
Fraction of contributions from	49	-55	-5.57	22	-218	-101	63
non-connected committees	(0.56)	(0.19)	(0.92)	(0.64)	(0.01)	(0.22)	(0.28)
Fraction of contributions from corporations	-2183	741	795	-1582	48	-584	-340
without stock committees	(0.30)	(0.31)	(0.52)	(0.01)	(0.96)	(0.4)	(0.35)
Herfindahl index over all committees ×	184	48	86	167	-145	170	-66
committee contributions as fraction of total receipts	(0.20)	(0.54)	(0.59)	(0.31)	(0.58)	(0.65)	(0.47)
Herfindahl index over corporate committees ×	-273	151	2591	-2061	-1020	-1268	29
corporate committee contributions as fraction of total receipts	(0.45)	(0.49)	(0.00)	(0.01)	(0.31)	(0.09)	(0.87)
Herfindahl index over labor committees ×	77	-125	-0.76	-123	-273	-126	41
labor committee contributions as fraction of total receipts	(0.60)	(0.14)	(.99)	(0.31)	(0.29)	(0.59)	(0.70)
Herfindahl index over trade committees ×	-159	-370	39	81	315	-264	-75
trade committee contributions as fraction of total receipts	(0.35)	(0.01)	(0.82)	(0.73)	(0.38)	(0.49)	(0.18)
Herfindahl index over cooperative committees ×	1028	799	-475	238	-789	-276	106
cooperative committee contributions as fraction of total receipts	(0.22)	(0.21)	(0.69)	(0.72)	(0.27)	(0.78)	(0.91)
Herfindahl index over non-connected committees ×	-100	-168	-59	-63	1783	1354	-2.04
non-connected committee contributions as fraction of total receipts	(0.41)	(0.30)	(0.86)	(0.82)	(0.00)	(0.00)	(0.99)
Herfindahl index over without stock committees ×	2794	-648	-2037	2476	-624	788	392
without stock committee contributions as fraction of total receipts	(0.2)	(0.4)	(0.23)	(0.03)	(0.57)	(0.63)	(0.31)
Herfindahl index over party committees ×	-264	-108	-252	167	-155	-395	12
party committee contributions as fraction of total receipts	(0.1)	(0.35)	(0.13)	(0.27)	(0.41)	(0.03)	(0.94)
Dummy for southern states	-4.05	-2.07	-6.4	0.18	0.23	1.45	3.74
	(0.33)	(0.6)	(0.06)	(0.95)	(0.96)	(0.7)	(0.13)
Dummy for western states	-5.2	3.23	-4.11	0.86	8.17	-3.11	-1.18
	(0.33)	(0.43)	(0.36)	(0.75)	(0.22)	(0.51)	(0.64)
Dummy for eastern states	-0.29	2.05	-4.95	0.13	0.81	-2.34	1.55
	(0.94)	(0.67)	(0.22)	(0.97)	(0.88)	(0.58)	(0.62)
$\overline{R}^2$	0.46	0.45	0.63	0.72	0.54	0.59	0.58
F	3.9	5.1	5.4	10.36	4.09	4.5	10.5
Degrees of freedom	48	80	33	55	33	31	122

The symbol n.a. stands for not applicable. The 1980 and 1982 datasets did not include information on contributions from individuals.

Figure 1: Correlation between voteshare
Herfindahl index

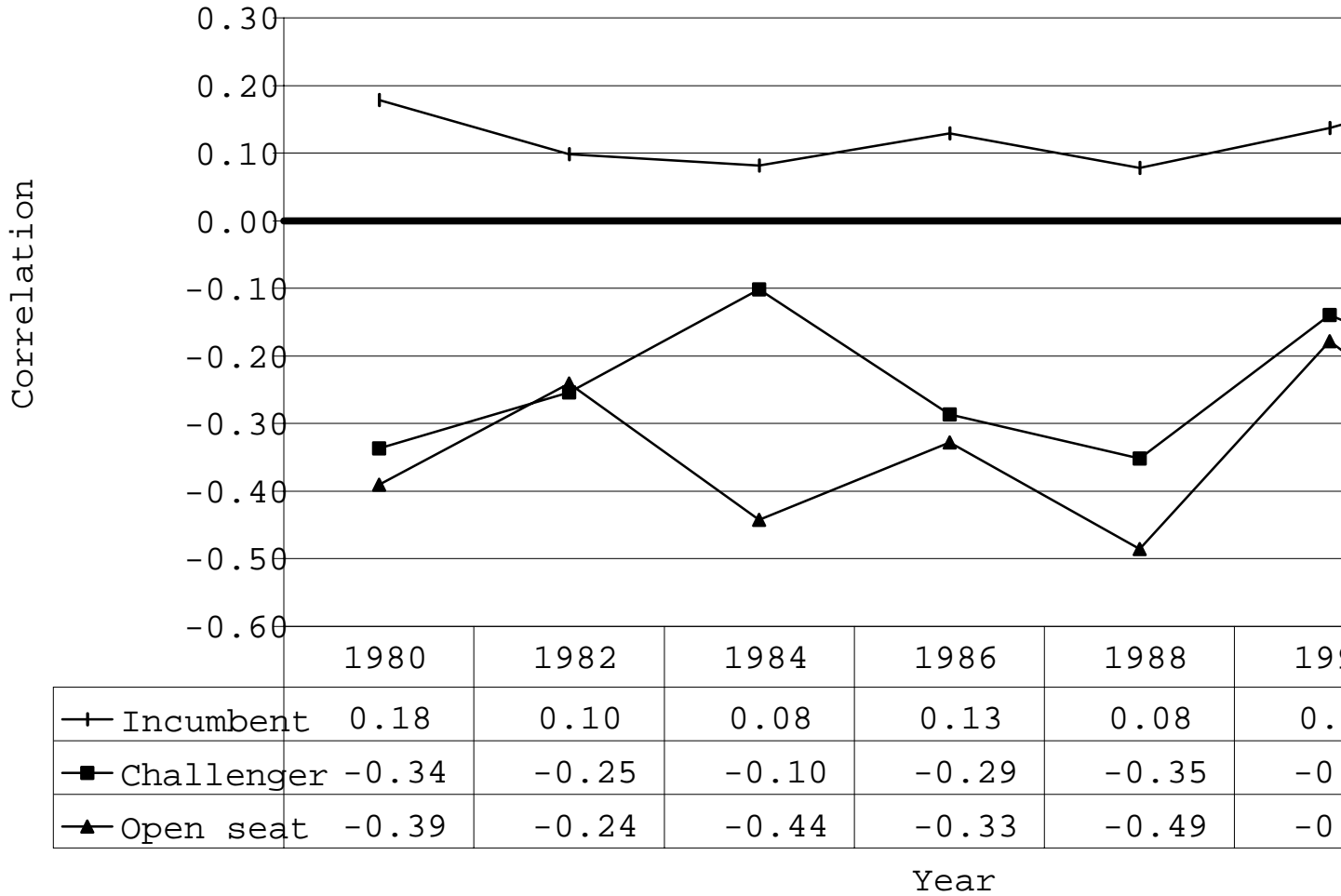|	1980	1982	1984	1986	1988	199
Incumbent	0.18	0.10	0.08	0.13	0.08	0.
Challenger	-0.34	-0.25	-0.10	-0.29	-0.35	-0
Open seat	-0.39	-0.24	-0.44	-0.33	-0.49	-0

Year

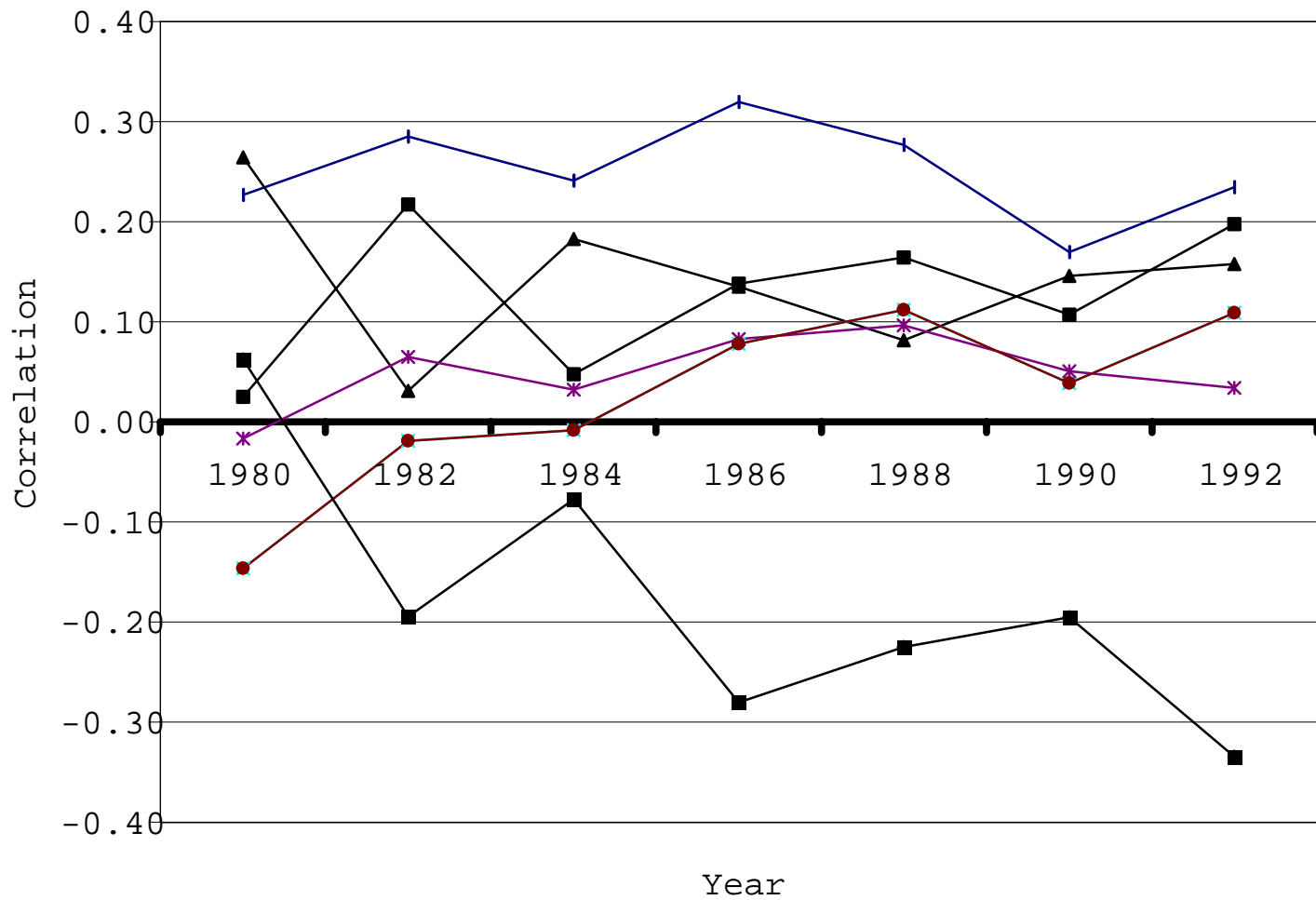Figure 2(a): Incumbents correlations betw
PAC-type Herfindahl index

Figure 2(b): Challenger between voteshar[...]
Herfindahl index
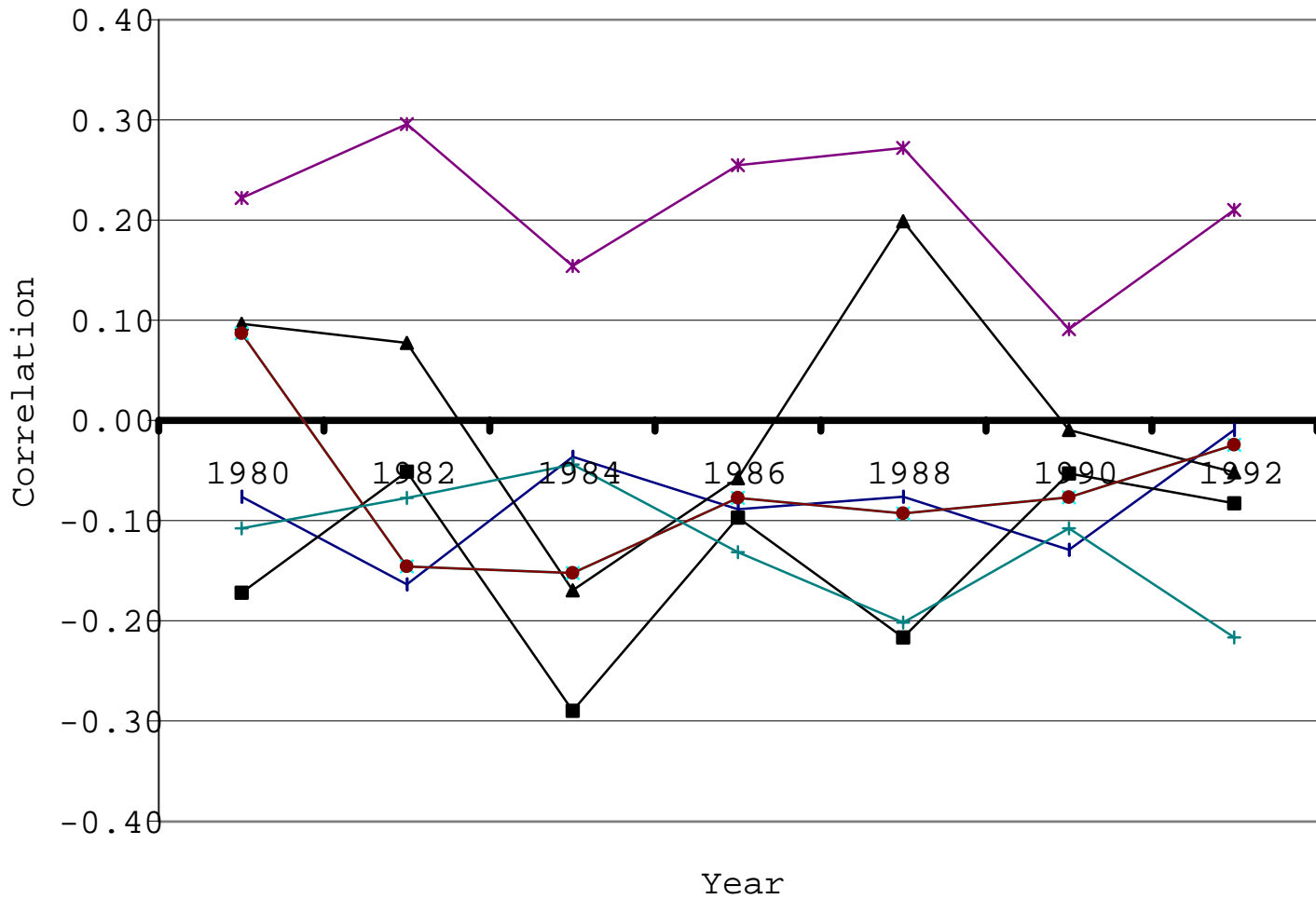
Figure 2(c): Open seat candidate correlati
and PAC-type Herfindahl index
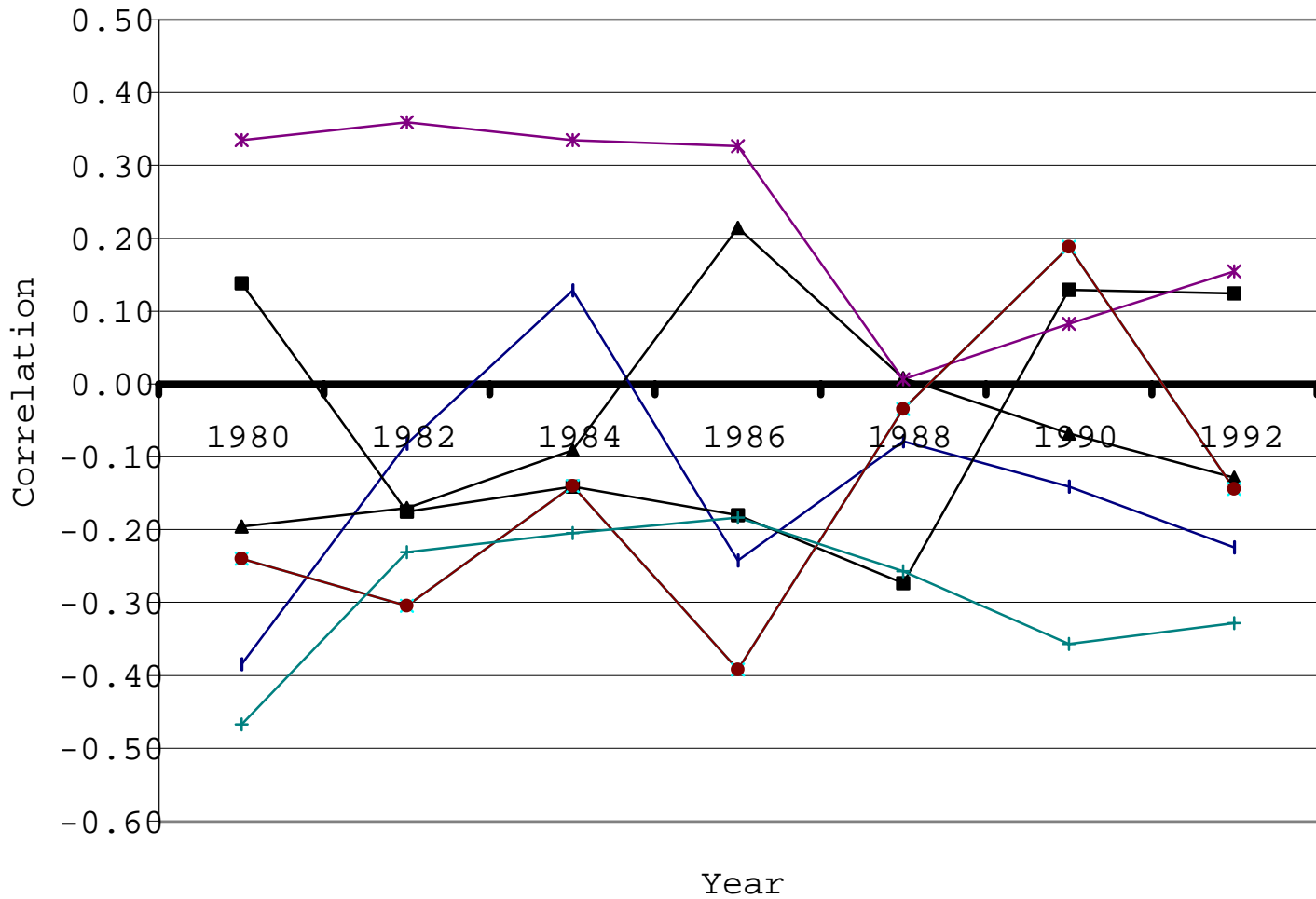
Figure 3: 95% confidence interva
Herfindahl coefficient

	80	82	84	86	88	90	92	80	82	84	86	88	90	92	80	82	84
UPPER	180	356	241	633	435	400	821	−16	−38	0	−2	−9	−5	−9	74	95	255
LOWER	62	129	−59	261	86	−6	306	−57	−80	−17	−27	−29	−22	−52	−159	−81	−242
· MEAN	121	242	91	447	260	197	563	−37	−59	−9	−15	−19	−14	−30	−42	7	7
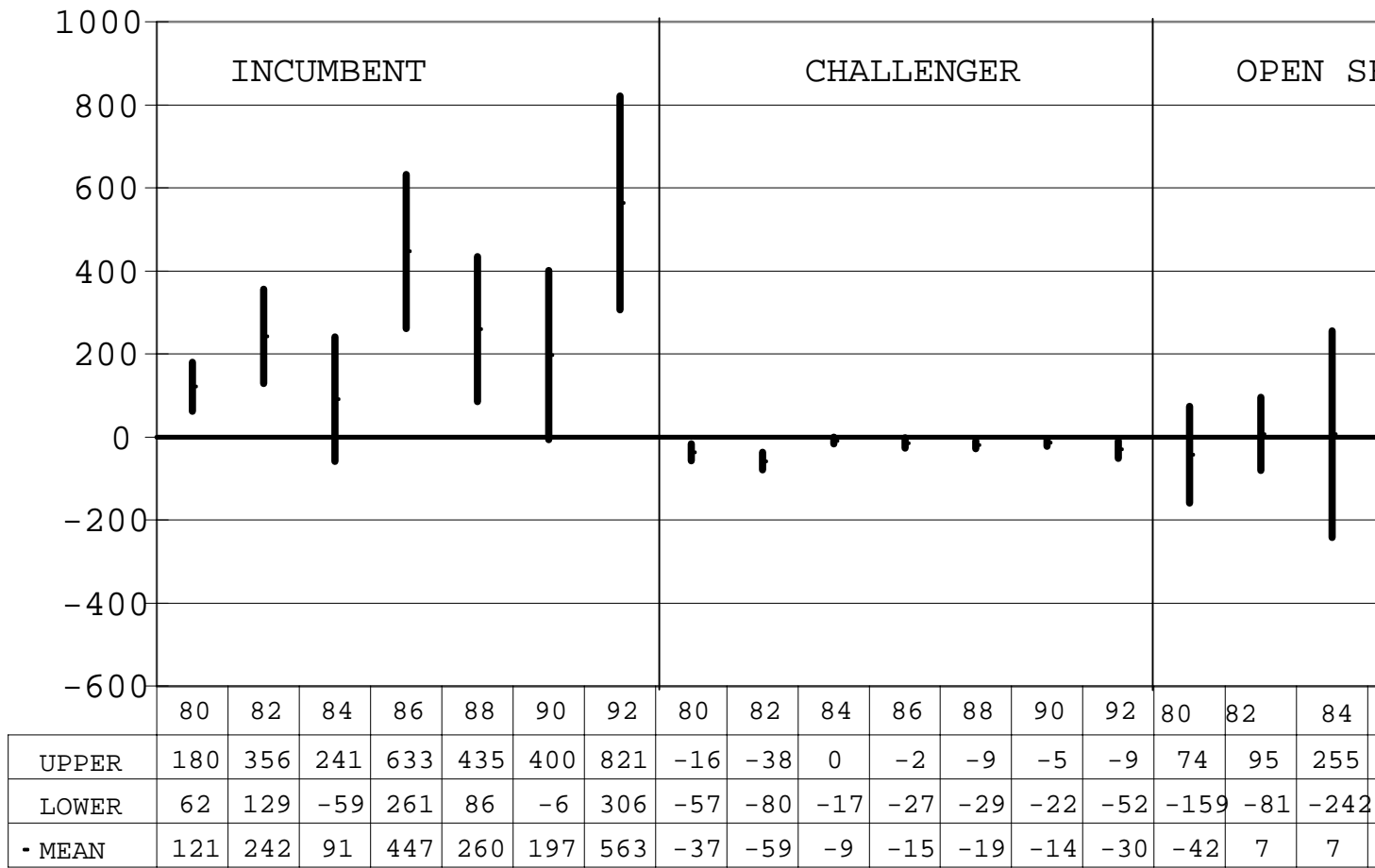
year

Figure 4: 95% confidence interval for sum of

	80	82	84	86	88	90	92	80	82	84	86	88	90	92	80	82	
UPPER	1388	1585	1113	2726	1543	1833	2094	−110	−551	1775	2040	2064	1060	384	7755	1530	3
MEAN	676	909	332	1935	712	873	1245	−2552	−2572	275	809	344	−619	−858	3287	−421	5
LOWER	−35	233	−449	1145	−120	−87	395	−4993	−4593	−1225	−422	−1377	−2298	−2100	−1182	−2373	−

INCUMBENT   CHALLENGER

year