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Why Do Some Firms Give? Why Do Some Give a Lot?: High-Tech PACs, 1977–1996

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This article employs Heckman selection models to explore the determinants of corporate PAC formation and PAC size and how these determinants have changed over time. While the findings suggest that high-tech firms use PACs to seek rents from government, internal organizational politics influence their behavior as well. I also find that the effect of some independent variables, including firm size, susceptibility to regulation, and R&D spending, changed significantly over the two-decade span encompassed in the data, peaking in influence in the mid-1980s. The quantitative analysis is supplemented by interview data that point to the existence of a political "arms control" process among some market competitors.

Political scientists have produced a large body of work in recent years examining the link between campaign contributors and candidates. Our understanding of the goods exchanged in transactions between donors and recipients, and how they are priced, has grown substantially as a result.[1] While fruitful, our focus on these transactions has led us to take the underlying supply function of contributors for granted. In particular, corporations, which sponsor about 40% of political action committees (PACs) and account for about 40% of PAC contributions at the federal level, have been neglected. We still know relatively little about why some businesses choose to give to campaigns and others do not, and, of those that do give, why some give a little and some give a lot. No published papers, for instance, explore these questions using data from the 1990s. Just a handful use any data from after 1982, when the current system was still in its infancy. McKeown (1994) alone considers whether the forces that shape

Research assistance by Henry He, Paul Lekas, Frank Pacheco, and especially Kevin Karty is gratefully acknowledged, as is the support of the Dean's Research Fund at the Kennedy School of Government. Thanks for comments are due John Gerring, Tim McKeown, Neil Mitchell, Anne Piehl, and Davis Taylor.

[1] A recent article in this tradition, which references some of the relevant literature, is Cox and Magar (1999).

THE JOURNAL OF POLITICS, Vol. 63, No. 4, August 2001, Pp. 1230–1249

these aspects of business political behavior might change over time, and he brings the story only through 1984.[2]

This paper employs firm-level data over ten election cycles to test static and dynamic hypotheses about businesses and their PACs that derive from two complementary theoretical frameworks, rent-seeking and organizational politics. I find that both approaches help to explain the formation and size of corporate PACs in the high-technology sector. Both approaches are also useful for framing new hypotheses that pertain to the unique features of this sector, such as the wide variation in firms' research and development (R&D) spending levels and overall growth rates.[3]

Theory and Hypotheses

I take the firm as the unit of analysis in this article. This choice differs from some previous work (notably Grier, Munger, and Roberts (1994), on whom I rely heavily), which takes the industry as the unit of analysis and treats the formation of a PAC by any firm in an industry as a dichotomous dependent variable.[4] The industry-level approach assumes that business PACs primarily seek industry-level public goods; aerospace firms, for instance, might seek a larger Air Force procurement budget together if they can solve their collective action problem. However, as Lichtenberg (1989) (among others) suggests, firms may seek specific, rather than industry-wide benefits from government; indeed, they may seek to damage their rivals within the industry. "Arms races" (as Gray and Lowery (1997) put it) may be as important as "free riding." In practice, moreover, the firm is the locus of most PAC decision making. Chief executive officers (CEOs), vice-presidents for government affairs, and other executives decide whether to create PACs and how hard to work to solicit contributions from managers and shareholders.[5]

[2] The relevant papers are Andres (1985), Boies (1989), Esty and Caves (1983), Grier, Munger, and Roberts (1991), Grier, Munger, and Roberts (1994), Humphries (1991), Lichtenberg (1989), Masters and Keim (1985), McKeown (1994), Mitchell, Hansen, and Jepsen (1997), Munger (1988), Pittman (1988), Taylor (1997), Zardkoohi (1985), and Zardkoohi (1988). For a general introduction to PACs and campaign finance regulation, see Alexander (1995).

[3] I define "high-technology" more precisely at the beginning of the data section below; it encompasses computer hardware, software, and networking. As I note in the text, the high-tech sector is atypical in some respects; further research will be required to determine how well the findings of this paper can be generalized. Industry-specific studies like this one have the value of holding some important parameters constant (such as unionization in this instance), while permitting insights into specific interactions among firms (such as those that I characterize as "arms control" below) that are inevitably obscured in broader samples. Moreover, the high-tech sector comprises an increasingly important group of actors on the national scene that are worthy of study in their own right.

[4] Grier, Munger, and Roberts (1991) and Esty and Caves (1983) also take the industry as the unit of analysis.

[5] While the administrative costs of running a PAC can be paid directly by a firm, funds for the PAC's contributions to candidates must be raised from the firm's managers and shareholders.

One way of conceiving these decisions is as a process of rational choice on behalf of the firm. The key executives act as if they analyze the costs and benefits of forming and running a PAC. When the expected total rents to the firm that will be gained from a change in government policy outweigh the fixed start-up costs, a firm will form a PAC, and it will expand the PAC until the expected marginal benefits equal the marginal costs. This rent-seeking conception of the corporate PAC supply function has framed much of the previous work on PAC formation and PAC size and suggests one group of independent variables to be tested.

A second vision of PAC management opens up the black box of the firm and considers the perceptions and interests of individual decision makers. They have limited attention and information and are engaged in internal struggles for power and control. From this organizational politics perspective, firms form PACs when the key decision makers have an individual interest in doing so or when their attention is focused on the possibility by the organizational unit, such as the government affairs department, that would benefit from having one. Fads, peer pressure, community norms, focusing events, internal lobbying, and the like carry weight in this view. The organizational politics perspective on corporate PAC formation and PAC size is less developed than the rent-seeking perspective, but it too yields a group of testable hypotheses.

Both theoretical frameworks predict that *firm size* will influence PAC formation. From the rent-seeking point of view, large firms are more likely than small firms to receive a substantial share of any public goods that may be supplied as a result of any PAC contributions. They may also be more capable of amortizing the fixed costs of running PACs. From an organizational politics point of view, larger size permits greater functional differentiation, allowing specialists to focus on peripheral aspects of running a business, like participation in public policy. These specialists may then persuade their bosses of the value of having a PAC. With a few exceptions, previous work finds a significant, positive relationship between firm size and PAC formation. Should larger firms have larger PACs? Again, the two perspectives converge on a positive answer for much the same reasons that influence PAC formation. However, given the limits on contributions in any given election cycle, increasing firm size is likely to have diminishing effects on PAC size. These hypotheses that positively relate firm size and PAC size have generally been borne out in prior studies.

The rent-seeking literature also typically tests *sales to government* as a determinant of PAC formation and PAC size. Political contributions provide a selective incentive for legislators to steer contracts to their friends in business. The bigger the contribution, the harder the legislators are likely to work on this task. The literature does find a significant and positive relationship between sales to government and both PAC formation and PAC size. One exception is Humphries (1991), who finds that the effect of government sales on PAC formation disappears when the existence of a Washington office is taken into ac-

count. He suggests that the relationship is indirect; large government sales lead a firm to establish a Washington office, whose staffers, in turn (as organizational theorists might suggest), convince headquarters to form a PAC.

Government regulation is similar to government sales. Whether firms seek regulation for protection or to eliminate regulations that limit their behavior, campaign contributions may grease the wheels. And, like government sales, most researchers who have looked at the relationships between government regulation and PAC formation and PAC size find them to be positive and significant. However, McKeown (1994) found that regulation was significant for PAC formation only in 1980, but not in 1974 or 1984, and Grier, Munger, and Roberts (1994) found that regulation was not a significant determinant of PAC formation (although it was significantly related to PAC size).

The rent-seeking approach also suggests that *R&D spending* may be a determinant of corporate political behavior. Taylor (1997), for instance, theorizes that investments in technological innovation and investments in political activity might be substituted for one another as their relative rates of return change.[6] He also suggests that innovative firms may use political contributions to secure assistance that facilitates the deployment of new technologies, particularly in regulated industries. His empirical work supports this hypothesis. Alt et al. (1999) conceive of R&D spending as a proxy for asset specificity. They hypothesize that firms with more specific assets (and hence, more R&D spending) are more likely to exercise their voices by being politically active since they cannot use the threat of exit to secure changes in public policy. They find empirical support for this conjecture in an analysis of Norwegian firms and legislators.[7]

Returning to the organizational politics perspective, the existence of a *Washington office* within a firm may raise the likelihood that it will form a PAC. In-house lobbyists are more likely to perceive the value of a PAC and hence to employ their lobbying skills internally to get one established. As I noted above, Humphries argues that this variable mediates between PAC spending and other explanatory variables. On the other hand, Sabato (1984) and Boies (1989) argue that CEOs can be the initiators of PAC formation, particularly when they have strong personal political commitments, and my interviews confirm this

[6] On this point, see also Magee, Brock, and Young (1989), 181.

[7] Another hypothesis generated by the rent-seeking perspective is that *industrial concentration* (that is, the degree to which an industry is dominated by a small number of firms) influences business PAC behavior. Highly concentrated industries should seek benefits from government more frequently and more aggressively than less concentrated industries, because their costs of collective action are lower. These expectations have not often been realized in previous work; industrial concentration has usually been found not to have a significant effect on PAC formation or PAC size. However, Grier, Munger, and Roberts (1991 and 1994), whose work is among the most thorough on this question, do find significant relationships in most of their specifications. These results are tempered by a diminishing effect as concentration grows beyond a certain threshold. They hypothesize that the most highly concentrated industries no longer need government assistance to obtain industry-level public goods. Unfortunately, as I describe in a footnote in the data section, I was unable to test this hypothesis adequately with my dataset.

possibility. This evidence suggests that a Washington office is neither a necessary nor a sufficient condition for PAC formation, but rather a contributing factor. PAC size has been ignored in this line of work, but the same considerations apply.[8]

If the CEO, rather than the Washington office director, is sometimes the key locus for decisions about PAC formation and PAC size, *headquarters location* may matter. CEOs are likely to be members of local networks of elites and hence to partake of the local political culture. Elazar (1994) argues that cultures vary across the U.S. in the degree to which they emphasize and look favorably upon campaign contributions. Firms based in states with individualistic and traditionalistic political cultures, according to this notion, would be more likely to form PACs and to have larger PACs than firms based in states with moralistic political cultures. This hypothesis has not been tested before.

In addition to spending more heavily on R&D, high-technology firms are distinguished by their rapid growth. Firms that grow large very quickly may be less likely than older firms of comparable size to form PACs, either because their top executives are less completely socialized into political networks or because they lack the organizational capacities to perceive the relevance of government action (and hence political contributions) to their bottom lines. Those young firms that do form PACs may have smaller PACs for similar reasons. *Age* of the firm, then, may be a negative influence on both of my dependent variables, and it, too, has not been tested before.

Data[9] and Findings

This study restricts high-technology to information and computer technology. I used the annual listings of the *Fortune* 500 or 1000 (supplemented by

[8] Gray and Lowery (1997) also argue that the decision to form a PAC is subordinate to the decision to lobby, which might be proxied at the Federal level by the existence of a Washington office. They tested this hypothesis at the state level using survey data and found that the likelihood of PAC formation declined among organizations that perceived lobbying to be peripheral to their work.

[9] The data constraint on my study is significant. Firms do not publicly release all the information (like their sales to the government) that one would like them to. Even for items that are reported, consistency over a two decade span poses a challenge, particularly in a sector in which firms are promiscuously merging, acquiring, and spinning off. The data on industrial concentration demonstrate the point. The standard procedure in the literature on PACs is to match the first standard industrial classification (SIC) assigned to each firm by Compustat with the concentration ratio for that SIC calculated by the Census every five years. These matches can be quite imprecise. Many firms operate in multiple SICs, and the SICs themselves are often heterogeneous aggregations. To take one example, as a member of the semiconductor industry, Intel is assigned a four-firm industrial concentration ratio of 41 (meaning that the top four firms in this industry have 41% of its sales) in 1992, even though most observers ascribe Intel alone a market share of 80% or more in its major product line, microprocessors for personal computers. This problem could in principle be addressed by using firm-specific concentration ratios weighted by line of business (as in Munger

those of *Ward's Business Directory*) to create a universe of 120 firms.[10] (They are listed in Appendix A.) This selection method excludes firms that never became large, but it does include firms that became large but were small early in the period. PAC size is a continuous dependent variable, operationalized as total contributions to all Congressional candidates in an election cycle; PAC formation is a dummy variable defined by zero or non-zero PAC size.[11] Definitions and sources for all variables can be found in Appendix B. Tables 1 and 2 supply descriptive statistics, and Table 3, a correlation matrix. IBM (10 observations) was dropped from all of the models reported in the paper. It is by far the largest firm in this sector, but it has never had a PAC. IBM is thus an extreme outlier, and its inclusion obscures some valuable results. Using qualitative data, I discuss IBM in the final section.

The standard analytic technique in the literature on corporate PACs is the Heckman selection model. This approach solves two important problems that arise with alternative techniques, including Tobit. First, it supplies separate estimates for the effects of the independent variables on PAC formation and PAC size. Second, it corrects for bias in the models of PAC size that arises from the censoring of that dependent variable (that is, the fact that many firms have not formed PACs and hence the size of their PACs cannot be observed). Lichtenberg (1989) (the first to employ the Heckman model to study corporate PACs); Grier, Munger, and Roberts (1994); and Mitchell, Hansen, and Jepsen (1997) use Heckman's two-step estimation procedure. This procedure first estimates a

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(1988) and Lichtenberg (1989)) but such data are rare and are unavailable for my dataset. Worse, the computer industry classification scheme was reorganized by the Census between 1982 and 1987, and 1997 data have not yet been released. Hence, I have only 1987 and 1992 from which to interpolate or extrapolate an industrial concentration figure for each firm for each election cycle. Finally, concentration ratios are calculated only for manufacturing; none are available for service industries, such as software, which comprise a large part of the high-tech sector.

[10] The list includes any firm that appeared on the *Fortune* list at any point between 1977 and 1996 in the computer and data services, computer hardware, computer software, computer peripherals, networking, and semiconductor categories (for the years in which these categories exist), and those firms in *Fortune's* electronics and office machines categories that *Ward's* classifies under Standard Industrial Classifications (SIC) 3571, 3572, 3575, 3577, 3578, 3579, 3661, 3669, 3671, 3672, 3674, 3675, 3676, 3677, 3678, 3679, 5045, 7371, 7372, 7373, 7374, 7375, 7378, and 7379. Of course, diversification, technological innovation, mergers, and acquisitions limit the validity of any classification scheme of this type, particularly over such a long stretch of time.

[11] To the best of my knowledge, my definition of PAC size corresponds to most previous studies. However, Boies (1989) uses "receipts," Lichtenberg (1989) uses "disbursements," and Taylor (1997) uses "expenditures." These variables do not correspond to the definition in the text if the authors used the FEC definitions, but they may well be using more colloquial definitions that do match my dependent variable. Grier, Munger, and Roberts (1994) use only contributions to House candidates; my results do not change appreciably if I use this definition. PACs that existed legally but gave no money to candidates in a given election cycle are assigned a "0" rather than a "1" on the PAC formation variable. There are three such cases, and reversing the assignment does not change the results appreciably.

TABLE 1

High-Tech PAC Contributions, 1977–1996

	Number of Firms with Sales	Number of Firms with PACs	Total Contributions	Average PAC Size
1977–78	51	8	$ 240,144	$30,018
1979–80	57	14	$ 608,038	$43,431
1981–82	66	18	$1,085,718	$60,318
1983–84	72	18	$1,465,198	$81,400
1985–86	83	22	$1,854,083	$84,276
1987–88	88	27	$2,198,294	$81,418
1989–90	92	27	$2,156,572	$79,873
1991–92	97	28	$2,422,633	$86,522
1993–94	106	32	$2,262,010	$70,688
1995–96	106	33	$2,166,618	$65,655

probit model for PAC formation and then estimates a modified OLS model for PAC size, correcting in the second step for any bias caused by censoring.

The studies cited above use the same variables in both steps (probit and OLS) of the model. This approach creates identification problems.[12] It would be best to identify factors that affect PAC formation but not PAC size, include these in the probit step, and then omit them from the OLS step. My solution is imperfect: I use the square root of firm size and and the square root of R&D spending in place of firm size and R&D spending in the second step. This substitution makes sense because there are legal limits on the total size of PAC contributions; increasing firm size and R&D spending can plausibly be supposed to have diminishing marginal effects at the high end of their range.

Table 4 reports coefficients and standard errors for PAC formation and PAC size for a Heckman two-step model that follows the lead of Grier, Munger, and Roberts (1994) by pooling the data and employing a trend variable.[13] The probit step predicts about 80% of the PAC formations correctly, roughly the same as that achieved in earlier studies. The OLS step, which predicts PAC size, has an adjusted R-squared of .40, which is somewhat lower than those reported by

[12] Greene (1993), 978–81. The STATA manual (1999, 18) goes so far as to say "it would be difficult to take . . . seriously" the results of two-step models in which both steps use the same independent variables.

[13] Neither fixed nor random effects panel models, unfortunately, produced usable results. Although likelihood ratio tests generally support pooling, it may lead to autocorrelation, since the observations for any given firm are not necessarily independent from election cycle to election cycle. To address this possibility, I employed STATA's *cluster* command, which adjusts the standard errors and the variance-covariance matrix of the estimators. I ran numerous variants of the model reported here (for example, replacing the trend variable with dummies for each election cycle) to try to ensure that the findings are robust. I also tried squaring and cubing the trend variable to try to capture non-linearities over time.

TABLE 2

Independent Variables (n = 729)

Continuous Variables	Mean	Standard Deviation
Firm Size (in million $)	2323.178	3970.732
R&D Spending (in million $)	165.0636	298.1186
Age	25.42387	19.54124
Dummy Variables (Frequencies)	0	1
Washington consultant? (dummy)	621	108
Washington office? (dummy)	541	188
Government sales (dummy)	623	106
Regulation (dummy)	624	105
Region (dummy for traditionalistic culture)	586	143

others using this technique; my data are, however, undoubtedly noisier due to the longer time series and greater variation in such characteristics as firm size.

Firm size is consistently positively and significantly related to both PAC formation and PAC size. Most of the models, such as the one reported in table 4, reject the null hypothesis with 90% confidence for PAC formation and 95% confidence for PAC size. The coefficient for PAC formation, however, is not very large; sales would need to increase by about 1.75 standard deviations at the mean (or about $7 billion) to affect the probability of having a PAC as much as opening a Washington office does at the mean. The effect on size is more powerful. An increase in firm size from the mean to one standard deviation above the mean (holding other variables at their means) adds more than $70,000 to the predicted size of the PAC; from one standard deviation above the mean to two adds another $50,000.[14]

Sales to government, like firm size, is a strong predictor of both PAC formation and PAC size. The significant and positive relationships are robust in a variety of specifications. The impact of being a major defense contractor on PAC formation is quite powerful, more powerful than opening a Washington office, and the average high-tech defense contractor contributes about $50,000 more per election cycle through its PAC than a comparable non-defense firm.

The hypotheses about the relationships between regulation and PAC formation and PAC size are also supported by the empirical analysis, not only in Table 4, but in other specifications as well. Falling within the purview of the

[14] As Sigelman and Zeng (1999) point out, the OLS step of the two step model cannot be interpreted in the same fashion as a simple OLS model; due to the additional variable generated by the first step, the second step is not linear. I therefore generated predictions for the constructed observations reported in the text. I followed the same method with each independent variable; the reader should assume that all other variables are set to their means in my interpretations of the OLS results. Further sensitivity analyses, as recommended by Sigelman and Zeng (1999), may be carried out in future work.

TABLE 3

Correlation Matrix for Independent Variables (n = 729)

	Firm Size	Sq Rt Firm Size	R&D Spending	Sq Rt R&D	DC Consultant	DC Office	Govt. Sales	Regulated	Region	Age
Firm Size										
Sq Rt Firm Size	0.9363									
R&D Spending	0.8463	0.7801								
Sq Rt R&D	0.7986	0.8300	0.9247							
DC Consultant	−0.0629	−0.0123	−0.0547	0.0102						
DC Office	0.4489	0.5114	0.4149	0.4484	−0.2458					
Govt. Sales	0.4361	0.4685	0.3102	0.3264	−0.1282	0.5307				
Regulated	0.1775	0.1411	0.0758	0.0689	−0.0281	0.1333	0.2630			
Region	−0.0726	−0.0601	−0.1515	−0.1975	0.0371	0.0720	0.1490	0.1417		
Age	0.2543	0.2799	0.2221	0.2402	0.0141	0.2062	0.232	0.1707	−0.0560	

TABLE 4

Determinants of High-Tech PAC Formation and PAC Size, 1977–1996 (Heckman Selection Model)

	Probit Model (PAC Formation)		OLS Model (PAC Size)	
Independent Variable	Coefficient	Standard Error	Coefficient	Standard Error
Firm Size	.0001004	.0000539*		
Sq. Rt. Size			2360.062	978.8882**
Govt. Sales	.8579869	.309767***	52319.31	26580.45**
Regulation	.5692633	.2674779**	67115.46	22642.35***
DC Consultant	.9576418	.2281707***	9218.058	31001.65
DC Office	.7673151	.2287121***	44650.48	25107.71*
Region	1.030825	.3053604***	22988.05	26835.02
R&D Spending	−.0003323	.0007605		
Sq. Rt. R&D	−6046.613	2821.382**		
Age	.0057783	.0064508	−1523.265	535.5842***
Trend	.022253	.0337905	5585.319	4122.696
Constant	−2.07875	.3649139***	−87490.71	—
	(79.6% predicted correctly.)		*(Adjusted R^2 = .404)*	

***$p < .01$
**$p < .05$
*$p < .10$

Unit of analysis is corporation-election cycle. Dependent variable for PAC formation is corporate PAC contribution during election cycle greater than zero. Dependent variable for PAC size is total contributions to House and Senate candidates during election cycle. N = 729.

Federal Communications Commission has a smaller effect on the probability of forming a PAC than being a major defense contractor does. On the other hand, all other things being equal, a regulated firm is predicted to give about $70,000 more per cycle than its unregulated counterpart.

Table 4 distinguishes firms that have their own representatives in Washington, DC, those that hire consultants there, and those that do neither. In this model, as in most of the other models that I ran, having either sort of representation is a very strong predictor that a firm will have a PAC. The effect is roughly the same as being a defense contractor. The relationship in the second step of the model is less clear. Table 4 shows that firms with corporate Washington offices have larger PACs (at the 90% confidence level) than those represented only by consultants or those not represented at all. This effect, too, is similar to that of defense contracting. However, the second step coefficient loses significance in some variations of this model, such as when the consultant and office variables are consolidated.

Region is a surprisingly strong predictor of PAC formation. The model reported here distinguishes states with traditionalistic political cultures (Southern states) and reveals that high-technology firms headquartered in these states are

significantly more likely (at the 99% confidence level) to form PACs than firms based elsewhere in the U.S. Indeed, the coefficient for region is larger than those for the other dummy variables (government sales, regulation, Washington office, Washington consultant) in the model. Firms headquartered in individualistic states and those headquartered in moralistic states do not differ from one another, contradicting the hypothesis that they would do so.[15] An equally consistent finding is that region has no significant relationship to PAC size; the PACs of firms headquartered in traditionalistic states do not give more than the PACs of firms based elsewhere in the country. As Gray and Lowery (1998, 1999) also show, further work is warranted on the uniqueness of the Southern interest group system.

R&D spending, by contrast, is usually not a significant predictor of PAC formation, but it does have a significant and negative effect on PAC size. An increase in R&D spending of one standard deviation at the mean subtracts about $50,000 from PAC size; moving from one to two standard deviations above the mean subtracts another $40,000. Neither Taylor (1997) nor Alt et al. (1999) prepares one for this result. I suspect that R&D spending is acting as a proxy for differences in production among firms in this case, rather than as a measure of investment or asset specificity. A casual perusal of the data suggests that information services firms, which spend much less on R&D than computer hardware or software firms, have larger PACs. However, I was unable to confirm this suspicion using the standard industrial classifications (SICs) from Compustat in the models.[16]

Contrary to the hypothesis stated in the previous section, age has no significant effect on PAC formation. However, age is significantly and negatively related to PAC size ($p < .01$). Of the firms that have PACs, then, younger firms have, on average, bigger PACs. Adding 20 years in age (about one standard deviation) to a firm subtracts about $30,000 from its PAC contributions per cycle; another 20 years has the same effect. Perhaps younger firms are more entrepreneurial in seeking government assistance once they have made the commitment to do so, even though the entrepreneurs that run them are no different from other executives in making such commitments in the first place. There may also be a cohort effect at work, which further research may uncover.

The trend variable is far from being significant in the first step of the model in this specification. In the second step, it falls slightly below the 90% confidence level, although it surpassed this level in other specifications. One interpretation of these results is that the rate of PAC formation and growth in PAC

[15] There is nothing unusual, either, about firms from California (compared to those from other non-southern states) or those from Texas (compared to those from other southern states), which were tested in other models. (These are the two states with the largest populations of high-technology firms.)

[16] As Appendix B suggests, I am missing data on R&D spending for a number of firms. Several information service firms that have PACs (including Dun & Bradstreet, Electronic Data Systems, and Equifax) are in this group. If one substitutes zero in place of these missing values (which may be an accurate interpretation of firms failing to report R&D spending), the results are unchanged.

size is steady, driven more by processes internal to the industry than by changes in the political environment or the density of the high-tech interest group system, which might yield a secular trend.

Election Cycle Interaction Terms

To explore the dynamics of PAC formation and PAC growth more deeply, I ran Heckman selection models that included interaction terms that combined dummy variables for each election cycle with as many of the independent variables as the statistical analysis could accommodate. For instance, rather than a single independent variable for firm size, these models use ten firm size variables, one for each election cycle, on the right hand side. This approach allowed me to exploit a large number of observations (compared to cross-sectional regressions on each cycle) without running into some of the problems that arose with panel models. I then conducted a cumulative F-test on the coefficients for each group of interaction terms to see if they changed significantly over time.[17]

In the probit step, which tries to explain PAC formation, I found significant change over time in the effect of regulation. The hypothesis that there is no change in this coefficient can be rejected with 95% confidence. As Figure 1 shows, the biggest shift comes between 1987–88 and 1989–90; the shift may reflect the reemergence of communications regulation as a major item on the Congressional agenda and the need to counter the expansion of AT&T's PAC (see Mutch 1994). I also found significant change (at a confidence level greater than 90%) in the effect of R&D spending on PAC formation. The effect declines more or less steadily (in absolute value) over time. I found no significant change in the probit coefficients for firm size or Washington representation.[18]

In the OLS step, which aims to explain PAC size, I found significant change over time in the coefficients for firm size, regulation, and R&D spending at very high confidence levels ($>$99.9%). Figure 2 shows that all three follow a roughly similar pattern, rising to their maximum influence (in absolute value) in 1985–86 and declining to be indistinguishable from zero (at the 95% confidence level) in the years following. The changing effect of firm size on PAC size could be a sequence of maturation followed by saturation. In the first half of the period, large firms were prodded by potential recipients of PAC funds to get involved in campaign finance; later, the ranks of the smaller firm PACs filled out as they struggled to be heard in Washington. The decline in the effect of regulation on PAC size might reflect the rising probability of PAC formation among regulated firms in the late 1980s noted above, causing the size of these PACs to regress toward the mean. Finally, interpreting the R&D pattern requires a better understanding of what this indicator measures; if it is a proxy for differences in production, one might explore whether the Congressional

[17] I also ran likelihood ratio tests comparing each model with the interaction terms described in the text with a model that had the same independent variables but not the interaction terms. I found that these models were significantly different.

[18] I was unable to test sales to government, region, or age.

FIGURE 1

PAC Formation—Probit Coefficients for Selected Variables by Election Cycle

agenda affected information services firms (which spend very little on R&D) more profoundly in the late 1980s than before or after that period.

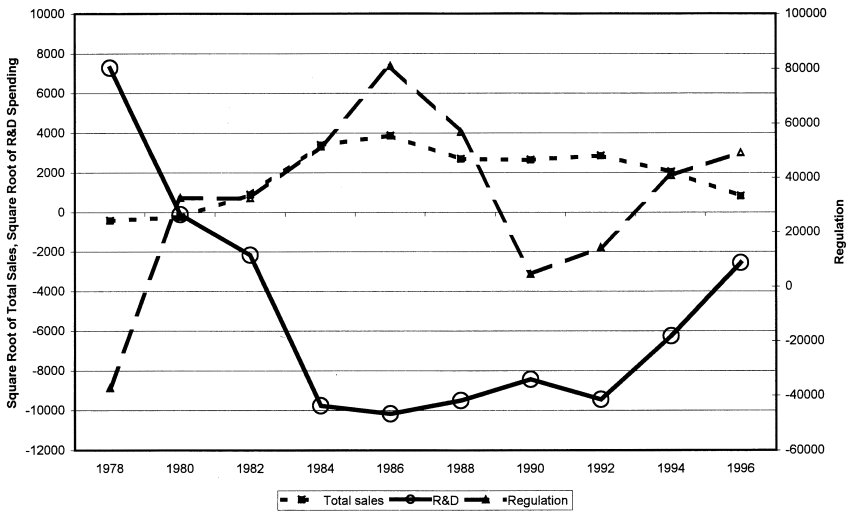
Qualitative Investigation

The quantitative analyses above leave much variation unexplained. While a substantial portion of this unexplained variation is probably measurement error and random variation, I may have also omitted important variables. To explore this possibility, I conducted interviews with government affairs managers for firms that were outliers in the quantitative work.

The most prominent of these outliers is IBM. As I noted above, IBM has never had a PAC, despite being by far the largest firm (as measured by sales) in the high-tech sector. (In 1998, IBM was twice as large—approximately $80 billion—as the second largest firm, Hewlett-Packard.) Yet IBM is no stranger to Washington. Its reported lobbying expenses are the sector's biggest, and its Washington office is highly respected on Capitol Hill. IBM's decision not to have a PAC, which has been revisited and reaffirmed regularly, has its roots in the firm's history. In the 1970s, when it dominated the computer industry far more than it does today, IBM came under attack from a number of quarters. It faced antitrust suits filed by the Department of Justice and by competitors. It was targeted by critics of multinational corporations in general. News reports tied the firm to campaign finance scandals in the U.S. and abroad, albeit sketch-

FIGURE 2

PAC Size—OLS Coefficients of Selected Variables by Election Cycle



ily. In response, IBM deliberately distanced itself from electoral politics, adopting a resolution at its 1976 shareholder meeting that forbade the company from making political contributions. This commitment has become ingrained in IBM's corporate culture and an aspect of its image that it has chosen to maintain, despite the formation of PACs by some of its competitors.[19]

Not all of IBM's competitors, however, took advantage of its absence from the PAC playing field. Digital Equipment Corporation (DEC), at one time one of IBM's most formidable competitors, instead followed IBM's lead. According to the long-time manager of DEC's government affairs office, when DEC was solicited for campaign support, it simply declined, claiming that the high-tech industry simply did not go in for politics. If PAC formation is sometimes an "arms race," as Gray and Lowery (1997) suggest, this industry provides an example of "arms control" with the dominant firm as a unilateral first mover.

Storage Technology Corporation (StorageTek) is an outlier on the other end of the spectrum; it has a much larger PAC than the quantitative analysis predicts it should have. As the director of StorageTek's Washington office tells the story, the firm's PAC was formed as the firm was emerging from bankruptcy in the late 1980s. The CEO at the time, who had a strong personal interest in politics in Colorado, where StorageTek's headquarters is located, saw the PAC as one element in a larger public relations strategy to improve its public image

[19] Hart, 2000, provides a detailed analysis of IBM. Of course, the firm may find ways other than contributing through a formal PAC to assist favored candidates.

and visibility among local political elites. Once established, the PAC continued to grow, although the top management would like it to be larger than it is. This case supports Sabato's (1984) claim that the preexisting political experience of firm CEOs may be a determinant of PAC formation and PAC size. One can imagine measures for this variable that could be incorporated into the quantitative analysis, although collecting the data would be very labor-intensive.

Conclusions

This article confirms some of the received wisdom about business PACs but also points in some new directions. The rent-seeking perspective holds up as expected in the high-tech sector. Firms with specific material interests in public policy, including government contractors and regulated firms, do seek to preserve these rents by investing in the electoral process. The organizational politics perspective seems particularly worthy of further elaboration and research, taking the impact of rent-seeking as a given. The engagement of key executives in policy networks, whether in Washington or near headquarters, seems to shape the political behavior of firms (see also Martin 1995). The evidence also suggests that organizational culture, which may be attributable in part to the central figures in a firm's history, including its founder, helps to determine the political behavior of business. Finally, the qualitative data pointing toward political arms control among competitors in the market suggests that a population ecology perspective might yield further insights.

The findings provide tantalizing hints of the value of more comprehensive time-series studies. While the cost of data collection for the independent variables is high, the results suggest that the changing agenda of Congress, the changing competitive context of business, and the changing shape of the larger campaign finance system all influence what firms do. We should not assume that universal, historically invariant laws govern them, even though we may find important threads of continuity along with change.

Appendix A: List of Companies

1. 3COM CORP
2. ACNIELSEN CORP
3. ADC TELECOMMUNICATIONS
4. ADVANCED MICRO
5. AFFILIATED COMPUTER SERVICES
6. AMDAHL
7. AMERICA ONLINE INC
8. AMP INC
9. ANALOG DEVICES
10. APOLLO COMPUTERS
11. APPLE COMPUTER INC
12. APPLIED MATERIALS INC
13. ASCEND COMMUNICATIONS INC

14. AST RESEARCH
15. ATARI
16. ATMEL CORP
17. AUTOMATIC DATA PROCESSING
18. BAY NETWORKS INC
19. BDM INTERNATIONAL
20. BELL & HOWELL
21. CABLETRON SYSTEMS
22. CADENCE DESIGN SYS INC
23. CERIDIAN CORP
24. CHS ELECTRONICS INC
25. CIRRUS LOGIC INC
26. CISCO SYSTEMS INC
27. COGNIZANT TECH SOLUTIONS
28. COMDISCO INC
29. COMPAQ COMPUTER
30. COMPUTER ASSOCIATES INTL INC
31. COMPUTER SCIENCES CORP
32. CONTROL DATA CORPORATION
33. COOPER INDUSTRIES INC
34. CRAY RESEARCH INC
35. DATA GENERAL CORP
36. DATAPOINT CORP
37. DELL COMPUTER CORP
38. DIGITAL EQUIPMENT CORPORATION
39. DR HOLDINGS
40. DSC COMMUNICATIONS CORP
41. DUN & BRADSTREET CORP
42. E-SYSTEMS
43. EATON CORP
44. ELECTRONIC DATA SYSTEMS CORP
45. EMC CORP
46. EQUIFAX INC
47. FIRST DATA CORP
48. FIRST FINANCIAL MANAGEMENT
49. FISERV INC
50. FUTURE NOW
51. GALILEO INTERNATIONAL INC
52. GATEWAY 2000 INC
53. GENERAL INSTRUMENT CORP
54. GENERAL SIGNAL CORP
55. GOULD INC.
56. HARRIS CORP
57. HBO & CO
58. HEWLETT-PACKARD CO

59. HUBBELL INC
60. IMATION CORP
61. IMS HEALTH INC
62. INTEL CORP
63. INTERGRAPH CORP
64. INTL BUSINESS MACHINES CORP
65. IOMEGA CORP
66. ITT
67. JABIL CIRCUIT INC
68. LEXMARK INTL GRP INC
69. LOTUS DEVELOPMENT
70. LSI LOGIC CORP
71. LUCENT TECHNOLOGIES INC
72. MAGNETEK INC
73. MAXTOR CORPORATION
74. MEMOREX TELEX
75. MICRO WAREHOUSE INC
76. MICRON TECHNOLOGY INC
77. MICROSOFT CORP
78. MINISCRIBE
79. MOLEX INC
80. MOTOROLA INC
81. NATIONAL SEMICONDUCTOR CORP
82. NCR CORP
83. NOVELL INC
84. OAK INDUSTRIES INC
85. ORACLE CORP
86. PEOPLESOFT INC
87. PITNEY BOWES INC
88. QUALCOMM INC
89. QUANTUM CORP
90. RAYCHEM CORP
91. READ-RITE CORP
92. ROCKWELL INTL CORP
93. SANDERS ASSOCIATES
94. SCI SYSTEMS INC
95. SCIENCE APPLCTNS INTL
96. SCIENTIFIC-ATLANTA INC
97. SEAGATE TECHNOLOGY
98. SENSORMATIC ELECTRONICS
99. SILICON GRAPHICS INC
100. SOLECTRON CORP
101. SPERRY
102. STORAGE TECHNOLOGY CP
103. SUN MICROSYSTEMS INC

104. SUNGARD DATA SYSTEMS INC
105. SYBASE INC
106. TANDEM COMPUTERS
107. TELEX
108. TELLABS INC
109. TEXAS INSTRUMENTS INC
110. THOMAS & BETTS CORP
111. UCAR INTERNATIONAL INC
112. UNISYS CORP
113. US ROBOTICS
114. VARIAN ASSOCIATES INC
115. VISHAY INTERTECHNOLOGY
116. WANG LABS INC
117. WESTERN DIGITAL CORP
118. XEROX CORP
119. XIDEX
120. ZENITH ELECTRONICS CORP

Appendix B: Definitions and Sources of Variables

Variable name	Variable type	Definition	Source
PAC size	Continuous	Total contributions to all Congressional candidates.	U.S. Federal Election Commission, 1999; ICPSR, 1995
PAC formation	Dummy	PAC size = 0?	Same as above
Firm size	Continuous	Total sales	Compustat
Sales to government	Dummy	On list of top 100 DOD contractors?	U.S. Department of Defense
Regulation	Dummy	SIC 3661 or 3669 (communications)?	Compustat
D.C. consultant	Dummy	Listed in source?	Washington Representatives
D.C. office	Dummy	Listed in source?	Same as above
Region	Dummy	Headquarters location in traditionalistic state?	Elazar (1994), Compustat
R&D spending	Continuous	Firm-supplied	Compustat
Age	Continuous	Calculated from firm profile	Various

Note: All of the variables are available for all observations for which firm size was non-zero, except R&D spending, for which 97 observations are missing.

Manuscript submitted 8 March 2000
Final manuscript received 22 September 2000

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