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Rent-seeking and market structure: Comment

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Abstract. If the firms in an industry are to be successful in raising money to influence government, two conditions must be met: (1) there must be sufficient rents available from government decisions regarding that industry to make such expenditures worthwhile, and (2) the industry must be sufficiently concentrated to avoid a free-rider problem in fund-raising. This argument, though seemingly intuitively appealing, has been under recent empirical attack; this paper seeks to restore the parapets.

"Seek, and ye shall find." *Matthew* 7:7.

Most students of rent-seeking behavior would expect that, *ceteris paribus*, the greater the value of rents available in a particular situation, the higher the level of rent-seeking that would be observed. But what is behind the *ceteris paribus*? Tullock (1980) has proposed that the volume of resources devoted to rent-seeking may vary from much less than to much greater than the volume of the rents being sought, depending upon the structure of the rent-seeking 'game.' In particular, Tollison (1982) and Magee (1984) have suggested that the level of rent-seeking observed across interest groups might vary according to the ease or difficulty of organizing particular groups.

Some years ago, I wrote a paper in which I examined the effects of the structure of an industry on the propensity of firms in that industry to engage in a particular form of rent-seeking – the making of large political contributions (Pittman, 1977). Following in the tradition of such analysts as Downs (1957) and Olson (1971), I argued that any firm which considered seeking rents in this way would compute the likely benefits and costs as follows: (1) the benefits of involvement would be positively associated with the level of rents available (as measured by, say, government regulation of the industry or government purchases of industry output), while (2) the costs of involvement for a particular

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firm might exceed the benefits – even in an industry with a good deal of rents available – because of the difficulty of organizing an unconcentrated industry. These hypotheses received support from data concerning President Nixon's re-election committee, where firms in potentially rent-rich industries were found significantly more likely than other firms to be contributors, but only if the industry were concentrated.

There has of late been a good deal of interest in the empirical examination of industry involvement in politics.[1] So far as I know, my results had until recently gone unchallenged.[2] However, recent papers by Esty and Caves (1983) and Zardkoohi (1985) report patterns of results different from mine. Esty and Caves construct measures of both political activity and political success by political-action committees ('PACs'); they find that the potential level of rents available to an industry has little impact on either activity or success, while concentration has a significant impact on activity but not on success. Zardkoohi, examining contributions only, finds a positive impact for potential rents, regardless of concentration, and no significant impact for concentration.

The contradictory findings of the Pittman, Esty and Caves, and Zardkoohi papers seem to leave two basic questions unanswered: (1) How sensitive is the level of rent-seeking to the level of rents available? and (2) How sensitive is the level of rent-seeking to the ease of organizing a particular group of potential seekers?

The purpose of this paper is twofold: first, to present a new set of findings, based upon a data set similar to that used by Zardkoohi, which suggest that potential rents do indeed evoke rent-seeking by firms, but only in concentrated industries, and second, to present some factors which I believe may have led Esty and Caves and Zardkoohi to different conclusions.

1. The new results: Potential rents and ease of organizing still matter

1.1. *The argument*

Assume that the level of PAC contributions made by a firm is the outcome of a rational decision-making process. The firm will then choose to make contributions when the benefits anticipated from doing so exceed the costs. The benefits to the firm are likely to be strongly related to the degree to which the industry which includes the firm is affected by the decisions of government – that is, to the level of rents available. The costs involved have to do with both the persuasion of executives and stockholders to contribute and the opportunities foregone for alternative uses of the sums of money involved.

Such costs may appear likely to be small relative to the potential benefits of influencing government policy, particularly for a firm in an industry heavily

influenced by government decisions. However, if the industry in question is unconcentrated, then the firm may decide that the level of benefits accruing to the industry will be unaffected by its own level of contributions, so that the benefits may be enjoyed without incurrence of the costs. Such a calculation may be made by other firms in the industry, of course, with the result that a free-rider problem prevents firms individually from making political contributions, even if it is in their collective interest to do so.[3]

This would suggest a model of firm political contributions along the following lines:

$$\begin{aligned}\text{Contributions} = {} & \beta_0 + \beta_1 \text{ (available rents)} \\ & + \beta_2 \text{ (available rents times 0–1 concentration dummy)} \\ & + \beta_3 \text{ (firm size).}\end{aligned} \tag{1}$$

Such a model may be estimated as a single regression equation and the results segmented into two parts. For unconcentrated industries,

$$\begin{aligned}\text{Contributions} = {} & \beta_0 + \beta_1 \text{ (available rents)} \\ & + \beta_3 \text{ (firm size),}\end{aligned} \tag{2}$$

while for concentrated industries,

$$\begin{aligned}\text{Contributions} = {} & \beta_0 + (\beta_1 + \beta_2) \text{ (available rents)} \\ & + \beta_3 \text{ (firm size).}\end{aligned} \tag{3}$$

β_1 is expected to be insignificantly different from zero, while $(\beta_1 + \beta_2)$ is expected to be positive and significantly different from zero. β_3 allows for less systematic effects of firm size.[4]

Esty and Caves and Zardkoohi, in contrast, specify a simple model of the form:

$$\begin{aligned}\text{Contributions} = {} & \beta_0 + \beta_1 \text{ (available rents)} \\ & + \beta_2 \text{ (concentration)} + \beta_3 \text{ (firm size).}\end{aligned} \tag{4}$$

(Both include other variables which I will not discuss here.)

1.2. *The data*

The specific variables to be used here may be grouped as follows:

1.2.1. *Available rents: Positive effect*

Federal government purchases: the ratio of Federal government purchases of

the output of an industry plus Federal government sales of that industry's output to total industry output. The basic source of information is the Commerce Department's input-output tables for 1977 (U.S. Department of Commerce, 1984). However, in these tables government sales are subtracted from gross government purchases to yield a net government purchases figure, and this seems undesirable for our purposes (see Pittman, 1977). The Commerce Department kindly provided the data necessary for constructing the variable as desired. Its value ranges from zero to .89, with a mean of .03.

Federal regulation: dummy variable with a value of one for all industries considered to face significant Federal regulation, including those industries most subject to EPA regulations. With the exception of the EPA-affected industries, this variable is assigned somewhat impressionistically. An industry is added to the list based upon EPA regulation if in 1980 its pollution-abatement capital expenditures exceeded five percent of its total capital expenditures, for manufacturing industries, or if an EPA analyst so recommended, for mining industries. *Appendix A* lists the four-digit SIC industries considered regulated.[5]

1.2.2. *Available rents: Ambiguous or negative effect*

State government purchases: the ratio of state and local government purchases of the output of an industry plus state and local government sales of that industry's output, to total industry output. The data source is the same as that for Federal government purchases; the value of the variable ranges from zero to .32, with a mean of .02.

State regulation: dummy variable with a value of one for all industries considered to face significant state and/or local regulation. Such industries are listed in *Appendix B*.

We might expect the coefficients on these variables to take a negative sign, to reflect the opportunity cost of using scarce funds to seek to influence decisions at the Federal level (the level of most contributions in the data set) rather than at the state or local level. On the other hand, some local regulatory decisions and probably more local government purchasing decisions are heavily influenced by decisions at the Federal level (Pittman, 1976, 1977). The best prediction is probably for a negative sign on state regulation and an insignificant result for state government purchases.

1.2.3. *Concentration*

As in my previous paper, I use here for a measure of concentration the four-firm concentration ratio of an industry, corrected (this time by Weiss and Pascoe, 1984) for non-competing subproducts and inter-industry competition. The Weiss/Pascoe computations refer only to manufacturing industries; for nonmanufacturing industries I utilize a variety of other sources, including the

American Bureau of Metal Statistics (1981), the American Petroleum Institute (1983), the Congressional Research Service (1980), *Moody's Transportation Manual*, and the U.S. Department of Commerce (1985).

Because, as noted, I wish to model concentration as a zero-one dummy variable, I calculate the median level of concentration for the firms in the sample – it is 40 percent – and label as concentrated industries with levels above that. I will test the sensitivity of the regression results to the particular concentration figure chosen as the cut-off.

1.2.4. *Firm size*

Finally, firm size is controlled for by including in the model the levels and levels squared of firm employment and sales.

1.3. *Results*

The model summarized as equation (1) is tested using as observations a cross-section of 600 large U.S. firms: specifically, those included in the 1980 *Fortune* 500 industrials, 50 utilities, and 50 transport companies. (Because of some subsidiary relationships within and among the lists, the actual sample size is 584.) Firms are assigned to a 4-digit SIC industry according to the first industry listed for them in *Standard and Poor's Directory of Corporations*.

The dependent variable is the total level of contributions made by the PAC representing a firm in the 1980 election campaign (Federal Election Commission, 1982). Its mean value in the sample is $32,280. The independent variables are those just described for available rents, concentration (these two sets at the 4-digit industry level), and firm size.

Because close to half the firms in the sample had zero levels of contributions in 1980, ordinary least-squares estimation would yield inconsistent coefficients. The Tobit procedure was developed for just such a situation, and it is used here (Tobin, 1958; Maddala, 1983; Amemiya, 1984). The results of the Tobit estimation are shown in Table 1.

As predicted, both Federal government purchases and Federal government regulation are significant positive factors in determining the level of firm campaign contributions, *but only in concentrated industries*. In these industries, a one-percent increase in the level of industry output purchased by the Federal government increases a firm's predicted contribution level by $1,247, while the fact of industry regulation increases the predicted contribution by $40,794. State government regulation increases contributions by $27,356 in unconcentrated industries and by $93,823 in concentrated industries.[6] The size of the firm, as measured by its annual sales, has a significant, nonlinear effect on contributions.

Table 1. Regression results

	Unconcentrated	*Concentrated*	*Both*
Constant	−37,883	−37,044	–
	(4.22)***	(4.27)***	
State government purchases	−224,338	119,034	–
	(1.02)	(.80)	
Federal government purchases	77,722	124,695	–
	(.94)	(2.80)***	
State regulation	27,356	93,823	–
	(1.71)*	(2.07)**	
Federal regulation	19,095	40,794	–
	(1.49)	(3.74)***	
Employment (in thousands)	–	–	135
			(.80)
Employment squared	–	–	.27
			(1.58)
Sales (in millions of $)	–	–	7.04
			(4.48)***
Sales squared	–	–	−.07
			(4.37)***
Log of likelihood function (d.f. = 13)	–	–	190.86***

Note. Figures in parentheses are not true t-ratios, but are asymptotically normal (see Amemiya, 1973). For a description of the likelihood ratio test in the Tobit context, see Witte (1980: 71).

* significant at the .10 level.
** significant at the .05 level.
*** significant at the .01 level.

These results are not particularly sensitive – in terms of either significance or magnitude of the coefficients of greatest interest – to the level of industry concentration chosen as the boundary between concentrated and unconcentrated industries. Table 2 shows the results obtained when the critical concentration ratio is specified as 30 percent, while Table 3 has a critical concentration ratio of 50 percent. The only change of any import is the newly significant value of the coefficient on Federal regulation for unconcentrated industries.[7] For concentrated industries, the effect of a one-percent increase in the importance of the Federal government as a purchaser varies in the three sets of output within the range of $1,083 to $1,247, while the effect of Federal regulation varies between $37,953 and $42,401.

2. The Esty and Caves and Zardkoohi results

As noted earlier, the results of Esty and Caves and of Zardkoohi differ from

Table 2. Regression results, critical concentration ratio = 30

	Unconcentrated	*Concentrated*	*Both*
Constant	−42,125	−36,154	–
	(3.71)***	(4.65)***	
State government	−88,232	891	–
purchases	(.24)	(.01)	
Federal government	−38,369	108,282	–
purchases	(.09)	(2.68)***	
State regulation	32,776	−1,847	–
	(1.65)*	(.09)	
Federal regulation	20,865	37,953	–
	(1.37)	(3.75)***	
Employment	–	–	161
(in thousands)			(.94)
Employment squared	–	–	.32
			(1.89)*
Sales	–	–	6.87
(in millions of $)			(4.19)***
Sales squared	–	–	−.07
			(4.19)***
Log of likelihood	–	–	183.01***
function (d.f. = 13)			

Note. See Table 1.
* significant at the .10 level.
*** significant at the .01 level.

Table 3. Regression results, critical concentration ratio = 50

	Unconcentrated	*Concentrated*	*Both*
Constant	−41,548	−30,474	–
	(5.36)***	(2.99)***	
State government	122,794	−385,520	–
purchases	(.96)	(1.51)	
Federal government	46,857	121,040	–
purchases	(.59)	(2.67)***	
State regulation	13,474	99,741	–
	(.94)	(2.20)**	
Federal regulation	21,644	42,401	–
	(1.94)**	(3.42)***	
Employment	–	–	168
(in thousands)			(1.00)
Employment squared	–	–	.24
			(1.41)
Sales	–	–	7.00
(in millions of $)			(4.49)***
Sales squared	–	–	−.07
			(4.40)***
Log of likelihood	–	–	191.69***
function (d.f. = 13)			

Note. See Table 1.
** significant at the .05 level.
*** significant at the .01 level.

mine in important ways. Esty and Caves find that their potential-rent variables have erratic and often insignificant effects on behavior, depending on the exact nature of the independent variable specified, and that concentration has a positive effect on political spending (as they measure spending)[8] but no significant effect on political success. Zardkoohi finds that his potential-rent variables have a positive effect on contributions, regardless of industry concentration, and that concentration itself has no effect. Is there any reason that my results should be believed rather than theirs? I believe that there is.

Both of these papers appear to me to suffer from errors which at best obscure the true relationship between concentration, rent potential, and political activity and at worst bias the results against the finding of a significant effect for concentration. These errors may be labelled as errors of model specification and sample selection.

2.1. *Model specification*

Neither Esty and Caves and Zardkoohi model concentration as behaving interactively with the level of potential rents to determine political activity. Rather, they include concentration as a linear (Zardkoohi) or quadratic (Esty and Caves) right-hand-side term standing alone. This specification implies both (1) that an increase in the level of rents available to an industry has the same effect on rent-seeking regardless of industry concentration, and (2) that an increase in industry concentration has the same effect on rent-seeking regardless of the level of rents available.

The first assumption would seem to contradict the 'free-rider' hypothesis for which both papers are testing. The second would seem to violate the principles of rationality underlying these examinations of political behavior. Both assumptions seem undesirable, and they are avoided with a model specified as mine is.[9]

2.2. *Sample selection*

More seriously, neither the Esty and Caves paper nor the Zardkoohi paper appears to use a sample selection process which insures an adequate representation of firms which do *not* participate in the political process.

This is certainly true of Zardkoohi, since he begins his process of sample construction with the list of firms whose PACs made contributions in 1980.[10] It is apparently also true of Esty and Caves, since they do not mention this kind of representation as one of their criteria for selecting industries for their sample and since only six of their thirty-five observations have spending values

at or near zero: in this and my previous papers, I have consistently found a ratio of non-participants to total firms or industries in the sample close to one-half.

The omission (or under-representation) of zero observations is important because it is likely to bias the results away from finding a significant influence for concentration. If, as Zardkoohi speculates, 'high concentration may be seen to stimulate political investment by the firm,' we would expect those firms which do not contribute to represent disproportionately unconcentrated industries. The small number of such firms in the Esty and Caves and Zardkoohi samples makes the true relationship of concentration to contributions more difficult to detect.

3. Conclusion

The results of this paper support the results of my previous paper: the level of rent-seeking by firms is closely associated with the level of rents available to them, but only in concentrated industries. Conflicting findings by other authors are shown to be based upon erroneous model specification and sample selection.

This is decidedly not to say that these articles are without merit; on the contrary, both contain valuable insights concerning the political behavior of firms. The Esty and Caves attempt to measure political success as opposed to political effort is likely to be especially influential.

It *is* to say that the theory I presented nearly ten years ago of business attempts to influence government seems as valid today as it was then, and that – as the pioneers of industrial organization used to emphasize – concentration matters. In particular, Buchanan (1980) has suggested that one way in which society might reduce the waste involved in rent-seeking is to reduce the level of government interference in the market process; my results suggest that another way is to maintain a vigorous antitrust policy. That such a policy would reduce the waste of rent-seeking in the context of oligopolistic and monopolistic markets was a clear implication of Posner's (1975) analysis; my results imply additional gains in the context of government-induced rents.

Notes

1. The literature is large and diverse and need not be summarized here. One interesting volume which has received perhaps less attention than it merits is the collection edited by Siegfried (1980).
2. Three recent papers examine the structural determinants of the decision by a firm to *create* a political-action committee (i.e., regardless of the amounts of contributions disbursed). The

models in these papers are not designed to test precisely the hypotheses described above. Andres (1985) and Heywood (1985) report positive and statistically significant coefficients on variables measuring industry concentration and government regulation; they do not include a government-purchases variable. Masters and Keim (1985) report a positive and significant coefficient on a government-regulation variable and an insignificant coefficient on a government-purchases variable; they do not include an industry-concentration variable.

3. See Stigler (1974) for an interesting discussion of the free-rider problem in this context.
4. For example, a larger firm may have more executives and stockholders, raising the likelihood of random 'ideological' contributions as opposed to systematic 'quid pro quo' contributions (to use Welch's, 1974, terminology).
5. A problem with both these variables is that they are to some degree endogenous: successful PAC contributions may purchase (say) more lenient treatment by EPA. Indeed, this sort of endogeneity is the purpose of the rent-seeking behavior. However, it seems reasonable to assume that the nature of an industry (e.g., high fixed costs for railroads, high pollution levels for pulp and paper) is the most important determinant of these variables. For an interesting theoretical discussion of the endogeneity issue and its broad implications, see Bhagwati, et al. (1984).
6. The fact that state government regulation has an effect twice as large as Federal government regulation in concentrated industries is at first glance puzzling, but not too much should be made of it. Only one industry, representing four firms in the sample, is both concentrated and regulated at the state/local level: the telephone industry. (It is also regulated at the Federal level.) Thus the coefficient on this variable could be interpreted as the coefficient on a dummy variable for industry 4811, an industry facing special government influence in recent years.
7. An interpretation of this change consistent with the model presented is that with a critical concentration ratio as high as 50 percent, the set of 'unconcentrated' industries includes some industries in which the free-rider problem is overcome. Note also in Table 2 above the effect on the coefficient for concentrated, locally-regulated industries of the inclusion of other industries besides telephone service (see the previous note).
8. Esty and Caves attempt to measure total industry resources devoted to the political process by supplementing PAC contribution figures with estimates of lobbying expenditures. These estimates are, in the words of the authors, 'rough.'
9. In a supplemental table, Zardkoohi uses a concentration-regulation interaction term and finds its effects significantly positive. However, he does not test a similar specification for government purchases. Nor is it clear that he considers this result important when he summarizes the conclusions of his research: 'The concentration ratio and the Herfindahl Index do not seem to have any significant effect on campaign contributions ... [M]arket power, obtained through the process of market competition, is a substitute for favors received from the political process (pp. 814, 816).' On the other hand, he goes on to stay that 'the effect of market power of the firm on campaign contributions primarily depends on whether the firm is regulated (p. 816).'
10. As noted above, I begin my sample construction with a sample of large firms and *then* look for political activity. In this respect Zardkoohi's estimation process is equivalent to one which, when faced with a truncated dependent variable, drops the limit observations rather than using the Tobit procedure (though I emphasize that this is not what Zardkoohi did). The problem with this process is that the 'zero' observations contain information. 'The Tobit technique uses all observations, both those at the limit and those above it, to estimate a regression line, and it is to be preferred, in general, over alternative techniques that estimate a line only with the observations above the limit,' (McDonald and Moffitt, 1980; see also Murrell, Swartz, and Vavrichek, 1980).

Appendix A. Regulated industries, Federal

Non-EPA	*EPA*	
1311	1011	2865
2911	1021	2869
40, all	1031	2873
4131	1099	2879
42, all	1211	2892
44, all	2011	2911
45, all	2033	2999
46, all	2046	3241
47, all	2075	3296
48, all	2079	3312
4911	2262	3321
4922	2272	3325
4923	2436	3331
4924	2611	3332
4925	2621	3333
493, all	2631	3334
	2812	3339
	2816	3341
	2819	3691
	2833	3711

Partial source: U.S Department of Commerce (1981).
Note. Listing for industries subject to EPA regulation for SICs below 2000 is not intended to be complete, as only those industries represented in the sample were considered for inclusion.

Appendix B. Regulated industries, state or local

2911	4911	493, all
4111	4923	494, all
4121	4924	495, all
4811	4925	496, all

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