An examination of the factors affecting the formation of interest groups in OECD countries*

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1. Introduction

It is now readily accepted by economists that interest groups affect economic outcomes in significant ways. For example, the theory of rent-seeking points out that a large amount of economic activity can be wasted in the pursuit of monopoly rents (Buchanan, Tollison and Tullock, 1981). The capture of such rents is often the goal of interest groups. Both Stigler (1971) on regulations, and Pincus (1975) on tariffs provide evidence consistent with interest group influence. In perhaps the most far-reaching theory, Olson (1982) has sought a general explanation of comparative national economic performance in the conditions which lead to differences in interest group structure between nations.

Given that interest groups are significant political and economic agents, an investigation of the factors affecting interest group formation constitutes an important area of economic research. Building an understanding of such factors enhances our knowledge of the ultimate determinants of economic activity. The aim of this paper, therefore, is to undertake an examination of the reasons why interest group activity varies between polities.

In the empirical sections of this paper, a cross-national measure of interest group activity is used. The properties of this measure are described in section 2. It seems that such quantification of interest group activity constitutes a considerable advance on previous work. For example, Salisbury (1975: 177), in a survey of the interest group literature, declares that there: '... is a nearly total absence of interest group data of even the simplest kinds.' Thus, although the measure is a crude one — a count of the

number of interest groups in a country — its use is justified by the fact that alternatives do not, at the moment, exist. [2]

One can draw on many existing theories in order to identify variables to be tested as possible determinants of interest group activity. These theories are adumbrated in section 3. In one case, the influence of population, existing theory is incomplete and thus an attempt is made to expand on that theory. In sections 4 and 5, the theories are tested. Because the number of variables is large in relation to the number of observations, the standard methodology of multivariate testing was inapplicable. Therefore a variety of tests were applied. The concluding comments summarize the results of these tests.

2. The dependent variable

The concept of an 'interest group' is extremely nebulous and no attempt will be made here to give it a precise meaning. Nevertheless, it is necessary to give some indication of the characteristics of the organizations that are included in the data for the dependent variable. Three important properties of interest groups are the degree of formal organization, the types of activities the group undertakes, and the types of characteristics which the members share (Salisbury, 1975: 173–176). The nature of the groups in the sample can be clarified by referring to these three properties.

The groups included in the data are all formal non-governmental organizations. The types of activities which they undertake are differentiated from those of other economic agents in that the groups' activities are in pursuit of 'goods' which are, to some degree, nonexcludable and nonrival. The nonrivalry means that separate economic agents can increase their welfare by acting together through the interest group rather than individually. The nonexcludability differentiates these groups from 'clubs' (Sandler and Tschirhart, 1980: 1482). Although the activities of these groups are not necessarily tied to the public sector, the nonexcludability characteristic does mean that often the group can best pursue its aims through interaction with the public sector.

To clarify the types of characteristics which the members of interest groups included in the present sample hold in common, it is useful to distinguish between 'sectional' and 'promotional' groups (Salisbury, 1975: 182). Sectional groups represent the economic agents who undertake a specific economic activity: for example, an industry's trade association. Promotional groups are organized to express a particular policy preference: for example, a temperance association. Thus, the goals of the sectional group are much more closely related to the primary economic activities of its members than are the goals of promotional groups. [3] The data source used in constructing the dependent variable lists only sectional groups.

In summary, the interest groups included in this paper's data are non-governmental formal organizations whose members share sectional interests the attainment of which requires the production of goods which have, to some extent, the properties of public goods. However, it must be emphasized that this is an *ex post* description of an existing data set rather than an *ex ante* construction used to guide data collection. The definition is a description of the types of associations listed in the *World Guide to Trade Associations* (1972). This reference work lists the names and addresses of trade associations in many countries in the world. In constructing the dependent variable, all listed associations were included in the data.

The decision to include all associations was made for two reasons. First, a cursory examination of the listed associations reveals that they conform to the above definition. [4] In particular, the overwhelming proportion of the groups are associations formed to promote the collective interests of the enterprises in some particular branch of economic activity or in a specific region. Second, any culling of the data would require the use of informal rules which would leave open the possibility of an introduction of bias. By including all associations, one can ensure that the only biases which could be present are those which might have been introduced by the compilers of the compendium.

The dependent variable is simply the number of interest groups in a particular country in 1970. This variable is obviously not an ideal measure of interest group activity or strength but lack of information precluded the construction of a better measure. For example, in a measure of politico-economic strength one would want to include data on membership and contributions. However, such information is not presently available.

Although not ideal, the dependent variable is, under reasonable assumptions, suitable for testing hypotheses on the determinants of interest group activity. The basic assumption is that when a new interest group is formed it will have new members, elicit new contributions, and undertake new activities and these members, contributions, and activities will not simply replace those of an existing organization. Conversely, if there is a change which causes an increase in interest group activity in existing groups, this change is also likely to spur some previously-latent groups into existence. [5] Under these assumptions numbers and activity will be correlated, at least at an aggregate level.

The number of interest groups was calculated for each of the 24 OECD countries. This study is restricted to those countries due to lack of available data on the independent variables for other countries. To test many of the theories outlined in section 3, one requires variables representing concepts which are difficult to quantify or variables for which it is difficult to obtain comparable measures across countries. Thus, the data have been obtained from a variety of specialized compilations rather than from standard

sources. Use of these compilations dictates restriction of the sample to OECD countries.

3. Theories of interest group formation

In this section, theories of interest group formation are reviewed. Hypotheses which can be derived from these theories and which can be tested given the available data are stated explicitly. The variables used to test these hypotheses are briefly described.[6] Where quantification of concepts is not straightforward, alternative forms of quantification are described.

In the following, most of the theories are explained very briefly because they have been clearly presented elsewhere. However, in one area, the relationship between numbers of interest groups and size of population, the existing literature is very incomplete. In that case, because new material is presented, the description of the theory is more detailed.

3.1 Population

Population is the most obvious variable with which to explain the number of interest groups. However, existing theory does not delve very deeply into the nature of that explanation. Dahl and Tufte (1973: 30–40) present an hypothesis, based on elementary arguments. First, they point out that difficulties of controlling organizations will lead to the creation of sub-units as size increases. Second, some countries may not be large enough to contain certain interest groups. Thus, they deduce that (Dahl and Tufte, 1973: 40): 'Other things being equal … the larger a country … the greater the number of organized interests or interest groups it will contain.' In the remainder of this sub-section, the causal factors leading to this hypothesis are spelled out in more detail.

Countries with larger populations will differ from smaller ones in two important ways. First, if there is foreign trade and there are economies of scale in the production of some goods, a larger country will produce a wider range of goods. That country will have more industries and thus potential for more interest groups. Instead of formulating an indirect relationship between size and numbers of interest groups, one can use a more direct hypothesis:

Hypothesis 1. The number of interest groups increases with the number of industries in a country.[7]

In order to test this hypothesis, a variable, NIND, measuring the number of industries in each country, has been created.[8]

The second way in which larger countries differ from smaller ones is that the former have more regions. More regions implies more interest groups because regions often have separate governments (Dahl and Tufte, 1973: 37) which create a focus for lobbying activities. Also, when there is little trade between regions in a particular commodity or service, optimal provision of interest group activities for the producers of that commodity or service will be through regional interest groups. Hence,:

Hypothesis 2. The larger the number of regions, the larger will be the number of interest groups.

The number of regions is measured by two variables, neither entirely satisfactory. REGD is based on demographic data, while REGP is based on a count of political subdivisions.

An increase in the numbers of groups caused by increases in the number of regions and industries is an indirect effect of an increase in population. In the remainder of this section, it will be argued that there are direct effects of population increases: effects which are due solely to changes in population and not due to the effect of some intervening variable. To make this argument, it is first necessary to discuss the importance of heterogeneity of group membership in group formation and then to build a simple model to show the relationship between heterogeneity, country size, and group size.

The members of any interest group will have heterogeneous characteristics. For example, the firms joining an industrial association will be located in different areas, face different demand elasticities, be of different size, etc. Members with different characteristics will demand different policies from an interest group. The further are the policies from those desired by a particular member, the less benefits will that member obtain from an interest group. As a group becomes more heterogeneous, the policies will lie further away, on average, from the needs of its members. Therefore, as heterogeneity increases, benefits per member will decline. If the group undertakes a rational membership policy in expanding its membership, it will first accept members whose characteristics are closest to those of existing members. Thus, heterogeneity will increase with group size and benefits per member will decrease with group size.[9]

For a group of given size, degree of membership heterogeneity will vary with population. Assume that, as population expands, the degree of heterogeneity of the population remains the same.[10] As population expands, a group can increase its size at the same rate without any consequent decrease in homogeneity. Thus, if, as is likely, the total benefits from the activities of the interest group are proportional to the size of the market, benefits per member will not change if membership rises at the same rate

as population. The benefits per member function then is $B(N/P)$ where N is group size, P is population and $B'(N/P) < 0$.

The cost function per member of the interest group can be written as $C(P)/N^\alpha$, where $C'(P) > 0$. The parameter α measures the degree of publicness of the interest group activities: the interest group supplies a public good if $\alpha = 1$ and a private good if $\alpha = 0$. On the assumption that the interest group decides on its own membership size[11] and that new members must be charged the same membership fee as old members, the group will maximize net benefits per member. N will be chosen to maximize:

$$B(N/P) - (C(P)/N^\alpha).$$

The first order condition is:

$$(B'(N/P)/P) + \alpha(C(P)/N^{\alpha+1}) = 0$$

and the second order condition is:

$$(B''(N/P)/P^2) - \alpha(\alpha + 1)(C(P)/N^{\alpha+2}) < 0.$$

Thus,

$$\frac{dN/dP}{N/P} = \frac{\{-(B''(N/P)/P^2) + \alpha(C(P)/N^{\alpha+2}) + \alpha P(C'(P)/N^{\alpha+2})\}}{\{(B''(N/P)/P^2) - (C(P)/N^{\alpha+2})\alpha(\alpha+1)\}}$$

After some simple algebra, it can be shown that if $\{C'(P).P/C(P)\} < \alpha$ then $(dN/dP)(N/P) < 1$. If this condition holds, then the number of interest groups must increase with population since the elasticity of number of groups is equal to one minus the elasticity of the number of members in a group.[12] Thus, it is important to investigate whether $\{C'(P).P/C(P)\} < \alpha$ is a plausible assumption.

In the following, it will be argued that this assumption will be satisfied for a large class of interest groups. Nevertheless, the reader should be warned against interpreting the following as arguing that the assumption will always hold. It would be easy to think of cases in which the following arguments do not apply. That is why empirical tests are necessary to investigate whether the implications of the assumption do hold in the aggregate.

Consider the case of an interest group whose goal is to obtain government help, say in the form of a tariff. The costs of obtaining the appropriate legislation will be largely independent of group size. Hence, in this case $\alpha = 1$.[13] Thus, one should investigate whether $\{C'(P).P/C(P)\} < 1$ is a plausible assumption.

Analysis of changes in the cost of procuring government legislation depends upon which theory of government one holds. One theory is that the public and politicians are persuaded only by information and ideology. Given economies of scale in informational activities, the cost of persuading the public will not rise faster than population. Similarly, given that legislative size does not rise proportinately with population,[14] the cost of procuring a legislative majority solely through informational activities will not rise faster than population.

An alternative theory of government views legislation as being bought (McCormick and Tollison, 1981). Therefore, one must examine the change in the price of a vote in the legislature when population changes. As population increases, so does legislative size and number of citizens per representative, but neither increases as fast as population.[15] Increases in size of legislature reduce the price of a single vote, due to increasing competition between representatives (McCormick and Tollison, 1981:33.) The price of a vote also falls because, with more voters per representative, monitoring of representatives becomes less beneficial for each voter, making supply of a vote less costly to a legislator (McCormick and Tollison, 1981: 34). With the price of a vote falling and the size of the legislature not rising as fast as population, the cost of a majority will not rise as fast as population. Hence, one can conclude that, independent of whether voters are procured by money or by informational activities, $\{C'(P).P/C(P)\} < 1$.

If the foregoing analysis is accepted, then the immediate implication is that the number of interest groups must rise when population rises. This effect of population will be present even if the number of industries, the number of regions, and the degree of heterogeneity of the population remain constant:

Hypothesis 3. An increase in population will, *per se*, increase the number of interest groups.

The variable POP is simply the population of a country.

3.2 Political system

The ease with which interest groups can form varies with the openness of the political system. This view is most clearly stated by Dahl (1971: 4) whose concept of 'polyarchy' measures the degree of opportunity for contestation and the breadth of the right to participate within a system. An increase in polyarchy increases ' ... the opportunities for effective participation and contestation and hence the number of individuals, groups, and interests whose preferences have to be considered in policy-making' (Dahl, 1971: 4). Hence, one can formulate:

Hypothesis 4. The number of interest groups increases with the degree of democracy.

Since the way in which democracy should be measured is, at best, debatable three alternative measures are used: POLY, Dahl's own measure, DEM1 and DEM2.

Macridis (1961) hypothesizes that there is a parallelism between party and group systems: the same factors that cause divisions between groups[16] cause divisions between parties. However, Zeigler, Harmon, and van Dahlen (1976: 95) found that in the U.S.A. interest group activity increased when party competition decreased. Thus, one can merely state a weak hypothesis:

Hypothesis 5. The number of interest groups is related to the number of political parties.

The variable, used to test this hypothesis, PFRC, is a measure of party fractionalization.

3.3 Size and structure of government

Eckstein (1963: 413) claims that the activity of government is the most obvious determinant of interest group activity. When the government undertakes more functions, there will be more policies which interest groups want to influence.

Hypothesis 6. The larger is the role of government, the larger will be the number of interest groups.

Two measures of governmental size were used. Given that tax revenues indicate the ability of the government to dispense favors, TAX, total tax revenues as a percentage of GDP, may be the correct measure. However, this measure may exaggerate the influence of government due to the presence of revenues earmarked for transfer payments. Thus, a second measure, GEMP, the share of the public sector in total employment, was also used.

Salisbury (1975: 200) has claimed that decentralization of political power centers will lead to more interest groups.

Hypothesis 7. The more decentralized is government, the greater will be the number of interest groups.

Decentralization is measured by the proportion of total tax revenues collected at the state and local level: DCNT.

3.4 An accumulation hypothesis

Olson (1982) has used his earlier analysis of interest group formation (Olson, 1965) to build hypotheses about the number of interest groups in a country. Interest groups will form only under the most propitious circumstances, but when formed they will develop means, such as selective incentives, to stay in existence. Thus, countries experiencing periods of freedom of organization will gradually accumulate more groups. The number of interest groups will only be reduced by totalitarian government, revolution, or foreign occupation. Hence,:

Hypothesis 8. The number of interest groups in a country is positively related to the length of time that the country has had freedom of organization.

Hypothesis 9. Countries which have recently experienced totalitarian government or foreign occupation will have fewer groups.[17]

To test hypothesis 8, one needs a variable which measures the length of time during which interest groups could have formed. Two conditions are necessary for formation. First, the existence of a modern political system receptive to groups. Second, the existence of economic activities which lead to group formation. The first refers to modern political development, the second to modern economic development: the two processes which together are usually called modernization. The variable DATE gives an estimate of the beginning year of this process. A dummy variable, NDFO was created to test hypothesis 9. As an alternative to these two measures, the variable ELCT combines elements of both hypotheses, by measuring the length of time that a country has continuously held popular elections.

3.5 Socioeconomic development

A familiar theme in the political science literature is that higher levels of socioeconomic development lead to greater numbers of interest groups (Blondel, 1969: 77). As social differentiation increases during modernization, a wider variety of interest groups is created (Salisbury, 1975: 178). On the basis of a historical analysis, Tilly (1981: 17–22) claims that, as capitalism developed, the forms of protest became increasingly formalized through special interest organizations. Therborn (1978: 224), using a Marxist analysis, suggests that as capitalism develops the state creates a multiplicity of groups in order to divide the opposition. These theories lead to the same prediction:

Hypothesis 10. The number of interest groups increases with the level of socioeconomic development.

Per capita income, INC, measures socioeconomic development. However, for statistical reasons to be elaborated later other variables should also be tried. Two alternative variables, suggested by Adelman and Morris' (1967: Chapter VII) study of socioeconomic development are percentage of male labor force in agriculture, AGRI, and newspaper circulation per capita, NEWS.

3.6 Diversity

Schelling (1969) has examined the separation of a population into groups when there are tastes for association. A simple extension of his theory would predict that changes in the heterogeneity of a population lead to changes in numbers of groups. The same prediction has been made in the political science literature: that political ideologies and religious divisions destroy the unity of sectional groups and lead to the creation of a number of organizations within a single sector (Macridis, 1961).

Hypothesis 11. The number of interest groups will be related to the amount of diversity in a society.

Some variables relevant to this hypothesis have already been introduced. NIND measures industrial diversification; REGP and REGD measure regional diversification. Heterogeneity also results from ethnolinguistic diversity which is measured by EFRC and LING.

4. Testing the hypotheses: Separate tests

The previous section has left us with a large number of testable hypotheses and an even larger number of independent variables. Given the small number of observations, there are transparent problems of testing. Standard statistical methodology, which requires a single simultaneous test of all hypotheses, is inapplicable. Thus, a second-best approach must be taken. This approach involves testing the hypotheses in a variety of ways and forming conclusions using an accumulation of results. These conclusions must be drawn from the results with caution: the omitted variable problem may be a significant source of error. However, this problem is inescapable in the present situation given the lack of degrees of freedom. The choice is either to test, and acknowledge the existence of possible errors, or not to test at all.

In the present section, the hypotheses are tested sequentially without taking into account inter-relationships between independent variables. Table 1 lists the simple correlations between numbers of interest groups and the independent variables. The signs of all the coefficients are as predicted by the relevant hypotheses. The two sets of theories which perform least well are those on the political system and on the size and structure of government. The variables with the largest correlation coefficients are the ones which measure socioeconomic development, time period of interest group accumulation, and country size.

One hypothesis could not be tested using only correlation coefficients. Hypothesis 3 requires comparing the effects of variables.[18] The hypothesis claims that population will affect numbers of groups over and above its effect through other variables. Thus, in testing the hypothesis, one must control for the variables which change with population and which also affect

Table 1. Individual tests of the relationships between the independent variables and the number of interest groups

Theoretical source of hypothesized relationship	Variable used	Correlation coefficient with number of groups
Political system	POLY	−.192
	DEMI	.160
	DEM2	.190
	PFRC	.017
Size and structure of government	TAX	.242
	GEMP	.317*
	DCNT	.385**
Size of country	POP	.776***
	NIND	.408**
	REGD	.129
	REGP	.349**
Accumulation	DATE	−.582***
	ELCT	−.417**
	NDFO	−.347**
Socioeconomic development	INC	.540***
	AGRI	−.520***
	NEWS	.115
Diversity	EFRC	.39**
	LING	−.13

***, **, * indicate significance at the 99%, 95%, and 90% levels respectively.

the numbers of interest groups. The effect of population on numbers of regions and industries has already been discussed. Oates (1972: 201) shows that decentralization increases with population. It might also be argued that ethnolinguistic diversity increases with population.[19] Thus, one must ascertain whether population has an effect after the influences of NIND, REGP, REGD, DCNT, EFRC, and LING on the dependent variable have been removed.

The approximate test for hypothesis 3 examines whether POP increases the explanatory power of a regression in which the six variables which population influences are already included.[20] The appropriate test statistic is simply POP's t-statistic in the regression in which all seven explanatory variables are included. This statistic equals 3.69 and is significant at the 99% level. The test supports the hypothesis that changes in population affect the number of interest groups directly as well as, perhaps, through changes in other variables.

5. Testing the hypotheses: Joint tests

In the present section, the hypotheses are allowed to compete against each other in explaining interest group activity. Of course, the inclusion of all variables in a multiple regression has already been ruled out as a statistical tool. Thus, stepwise regression was used.[21] Before presenting the results, it is necessary to say a few words about the use of stepwise regression and the interpretation of its results. Stepwise regression is used because, given the number of variables to be tested, a choice has to be made between an *ad hoc* variable selection procedure and some formal procedure. Formal procedures have the important advantage that the way in which variables are selected is absolutely clear to the reader. The main disadvantage of stepwise regression is that repeated application of tests invalidates the probability statements which are implicit in the tests. However, the test statistics are still presented in this paper. These statistics can be regarded as informational in nature, indicating the relative explanatory powers of the variables but not absolute levels of significance.

The theory gives no indication of the functional form which should be used in the regression. Thus, in the initial phase of multi-variate testing several forms were tried. Each can be regarded as an approximation to some true functional form. By seeking results which are consistent between several approximations, one ensures that the final conclusions are not unduly affected by the choice of a particular approximation. Three of the functional forms have an untransformed NIG as the dependent variable. These three forms are linear in the levels, the squares, and the square roots of the independent variables allowing for the possibility of constant, in-

creasing, or decreasing partial derivatives. The fourth function is the constant elasticity or log-linear form. The results obtained from applying stepwise procedures to these four functional forms are presented in Table 2.

The results in Table 2 present a consistent pattern. POP and DATE are included in all regressions. As ELCT measures the same phenomenon as DATE, its inclusion in one regression does not upset the consistency. DCNT and TAX are each included in only one regression because there is an arbitrary cut-off point in the stepwise procedure. In three regressions TAX would be the next variable entered and in two regressions DCNT is the variable with the second highest entry criterion. Thus, if one were to use the consistent patterns in the stepwise analyses in order to form a function explaining NIG, that function would have as its arguments POP, DATE, TAX and DCNT. Give that there is little difference between the explanatory power of the four functional forms, the results which follow will be presented only for the linear form. Thus, the equation which summarizes the foregoing analysis is:

$$NIG = 8583 + 19.6POP - 11.2DATE + 32.8TAX + 15.4DCNT$$
$$(2.47) \quad (7.10) \quad\quad (-3.09) \quad\quad (1.62) \quad\quad (1.66)$$

$$R^2 = 0.85$$

Table 2. Summary of stepwise regression results

Transformation of variables used — Dependent	None	None	None	Log
Independent	None	Square	Square root	Log
Variables selected				
Intercept	12194 (4.41)	7412 (5.56)	26690 (4.09)	50.6 (1.83)
DATE	−14.22 (−4.44)	−0.009 (−5.13)	−481.9 (−1.83)	−7.88 (−2.03)
POP	18.04 (6.68)	0.101 (7.78)	257.4 (5.77)	0.471 (4.87)
DCNT	18.33 (1.94)			
TAX			−429.0 (−2.38)	
ELCT				0.710 (3.1)
R²	0.83	0.83	0.76	0.75

Notes

1. The values of the coefficients are listed in the table with t-statistics in parentheses underneath.
2. See note 21 for inclusion and exclusion conditions.
3. Where no coefficient is listed for a variable, that variable was not selected for the equation.

Up to the present juncture, ordinary least squares has been used. However, in the case of one variable included in the equation simultaneity problems may be present. Mueller and Murrell (1983) have shown that TAX will be influenced by NIG. Thus, a simultaneous-equations estimating technique should be used. Mueller and Murrell (1983) have identified three variables which are exogenous to the present analysis and which help to explain TAX: VOTE, the proportion of the population voting, PFRC and EFRC. Unfortunately, VOTE is only available for 18 countries. Hence, two two-stage least-squares estimates were produced: the first with 24 observations, using PFRC and EFRC as exogenous instruments and treating TAX as endogenous; the second with 18 observations, using PFRC, EFRC, and VOTE as exogenous instruments and treating TAX as endogenous. The estimated equations were:

$$NIG = 14292 + 17.1POP - 16.0DATE - 19.1\ TAX + 20.0DCNT$$
$$(2.77) \quad (4.91) \quad (-3.20) \quad (-0.50) \quad (1.81)$$
$$R^2 = 0.79$$

$$NIG = 14311 + 17.2POP - 16.3DATE - 9.27TAX + 19.7DCNT$$
$$(2.56) \quad (4.44) \quad (-3.07) \quad (-0.22) \quad (1.64)$$
$$R^2 = 0.82$$

The t-statistics for TAX's coefficient are now not significant. Even more important is the fact that the sign of the coefficient is reversed. Given that both theoretical arguments and empirical results (Mueller and Murrell, 1983) show that PFRC EFRC, and VOTE are the appropriate instruments to use, the two-stage least-squares estimates point strongly to the conclusion that increases in government size do not spur the formation of interest groups.

Having found the most important variables affecting interest group activity, one can counteract the worst effects of the omitted variable problem by controlling for these variables when testing hypotheses. Thus, each of the remaining variables is added separately to the equation which has been estimated above. The resultant coefficient estimates are presented in Table 3. The t-statistics for the coefficients are presented solely to judge the relative explanatory power of the variables. Two versions of the results are presented: one version including TAX as a dependent variable, one without. Even though the reason for the difference in TAX's performance in the ordinary least squares and two-stage least squares equations is clear, the two versions of the results are presented to show that conclusions concerning other variables are independent of TAX's status in the regression.[22] The most significant aspect of the results in Table 3 is the number of times that the signs of the coefficients fail to support the relevant hypo-

Table 3. Estimated coefficients and t-statistics when each variable is added separately to the regression equations in which DATE, POP, DCNT, and TAX are already included

Theoretical source of hypothesized relationship	Variable used	Coefficient and t-statistic when TAX is in regression		Coefficient and t-statistic when TAX is not in regression	
Political system	POLY	16.8	(0.91)	−2.16	(−0.13)
	DEM1	−0.56	(−0.81)	0.12	(0.20)
	DEM2	−8.5	(−1.86)	−1.20	(−0.30)
	PFRC	−7.3	(−1.29)	−1.66	(−0.31)
Size of country	NIND	−1.69	(−1.29)	−1.31	(−0.95)
	REGD	114.8	(0.25)	23.9	(0.05)
	REGP	−0.29	(−0.038)	−3.62	(−0.47)
Accumulation	ELCT	−0.22	(−0.08)	−1.86	(−0.7)
	NDFO	−275.	(−1.00)	−176.	(−0.62)
Socioeconomic development	NEWS	−1.29	(−1.29)	−0.65	(−0.68)
	AGRI	14.05	(−1.07)	7.1	(0.53)
	INC	−0.85	(−0.72)	0.21	(0.20)
Diversity	EFRC	10.5	(1.52)	3.58	(0.53)
	LING	−6.05	(−0.61)	0.29	(.03)

theses. For the variables characterizing the political system, 6 out of 8 signs are incorrect; for variables measuring socioeconomic development 5 of 6 are incorrect; for the variables characterizing size of country 4 of 6 are incorrect. Only the variables relating to Olson's accumulation hypothesis and ethnolinguistic diversity have the correct signs.[23]

Finally, hypothesis 3 must be tested. The testing method has already been discussed in section 4; the only difference here is that the tests control for the effects of other variables. Thus, the relevant statistic is POP's t-statistic when it is added to a regression which already contains DATE, DCNT, and the variables which POP influences. This, a t-statistic with 15 degrees of freedom, is equal to 6.03 and is obviously highly significant. (The statistic, now t_{14}, equals 4.86 when TAX is included.)

6. Conclusion

Perhaps the best way to summarize the empirical results is to classify the hypotheses into three groups: those which can be readily accepted because they are supported in all tests; those which can be readily rejected because no test results support them; and those upon which one should remain agnostic because the test results are not consistent. In the first group are population (POP), decentralization of government (DCNT), and length of time of modernization (DATE). One can state quite confidently that these three variables are determinants of interest group activity. In the second group are the variables measuring characteristics of the political system (POLY, DEM1, DEM2, PFRC). One can with ease reject the hypotheses to which these variables are relevant.

There is a large group of variables which stand in the middle group. However, for these variables there are gradations of success in the tests. The variables on socioeconomic development (INC, AGRI, NEWS) and number of industries and political subdivisions (NIND, REGP) are only significant in the one variable tests. Especially important is their failure to obtain the correct signs in the tests reported in Table 3. The variables on ethnic fractionalization (EFRC) and Olson's hypothesis on destruction of groups (NDFO) have the correct signs in Table 3 and are significant in Table 1. Thus, it is more difficult to reject EFRC and NDFO as determinants of interest group activity than INC, NIND and REGP. Finally, it should be mentioned that once appropriate simultaneous equations techniques are applied, government size is no longer supported as a significant variable.

This paper will conclude with comments of a more conjectural nature on the implications of the results in the case of three specific variables. First, the results on hypothesis 3 suggest that population affects the number of

interest groups independently of indirect effects through other variables. This direct effect occurs because groups become proportionately smaller and more homogeneous as population increases. Hence, one can expect the political economy of larger countries to be significantly different from that of smaller countries. The results suggest that larger countries will have a denser array of interest groups and that these groups, because of their homogeneity, will find it easier to decide on and pursue policies in the narrow interests of their members. Secondly, the results support Olson's claim that there will be a gradual accumulation of interest groups in developed democracies. Given that Olson attributes to interest groups a large role in determining the economic fortunes of a country, the fact that his accumulation hypothesis is supported is a result of some significance.

Finally, if one accepts the two-stage least squares results, it has been shown that changes in government size do not induce changes in interest group activity. An important conclusion can be reached when this result is taken in combination with the results of other studies which show that interest groups induce changes in the size of government (McCormick and Tollison, 1981; and Mueller and Murrell, 1983). These results do not support the 'capture' theory of government – that governmental institutions are created, perhaps in the public interest, and then dominated by interest groups. Rather the results support the theory that the institutions themselves are the creatures of interest group activity.

Appendix: The variables

NIND   A measure of the degree of industrial diversification of a country. The U.N.'s *Yearbook of Industrial Statistics* has data at the 6-digit ISIC level. NIND is equal to the number of industries for which there was a positive production level in 1970 in a particular country.

REGD   A measure of the number of distinct regions in a country. Taylor and Hudson (1972: 222) provide a measure of concentration of population, the inverse of which proxies regionalization.

REGP   Also a measure of the number of regions, REGP gives the number of political subdivisions given in the description of government in the *Europa Year Book*.

POP   Population in millions in 1970 taken from the U.N. *Demographic Yearbook*.

POLY   Dahl's (1971: 232–234) quantification of 'polyarchy,' i.e., a measure of the degree of democracy in a country. The variable calculated for 1969, is a linear combination, with essentially arbitrary weights, of variables measuring freedom to form organizations, freedom of expression, right to vote etc.

DEM1 (Bollen, 1980: 387). A measure of the extent to which citizens participate in democratic decision making. A combination of variables measuring press freedom, government sanctions, freedom of group opposition, etc. The data is for 1965.

DEM2 (Neubauer, 1967: 1008). A measure of the extent to which citizens participate in democratic decision-making. A linear combination of variables measuring eligibility to vote, equality of representation etc. The data is from 1940–1961. As this measure is available for only 18 countries, the remaining scores were interpolated from DEM1.

PFRC (Taylor and Hudson, 1972: 48). Measures the degree of political fractionalization within a country's legislature. A measure of the probability that two randomly selected members of the legislature come from different parties. The data refer to some point in 1963 to 1968.

TAX Tax revenues as a proportion of GDP: a measure of government size. Comparable figures for 23 countries for 1970 were available in OECD (1980). These were supplemented by an estimate for Iceland taken from OECD (1981b).

GEMP Employment in government as a percentage of total employment: a measure of government size. Comparable figures for 21 countries were available in OECD (1982). Rough estimates for Greece, Iceland, and Turkey were obtained from OECD (1981a).

DCENT Percentage of tax revenues collected at the state and local levels (OECD 1980): a measure of the degree of decentralization of government. The data is for 1973 the earliest year for which it was available. Greece and Iceland's figures were obtained from OECD (1981b).

DATE A measure of the age of political and economic institutions in a country. Black (1966) has identified the years in which the 'consolidation of modernizing leadership' and 'economic and social transformation' began. DATE gives the average of these two years.

NDFO A dummy variable which equals 1 if the country has experienced nondemocratic government or foreign occupation in the twentieth century.

ELCT A measure of the age of political institutions. Rustow (1967: 290) lists the year since which a country has continuously had popular elections. Suspension of democracy in Norway, Belgium, The Netherlands, Denmark, Luxemburg, and Finland during 1939–1945 is ignored.

INC GDP per capita in 1970 as a proportion of U.S. GDP per capita (Kravis, Summers, and Heston, 1978: 232–7, column (5)).

AGRI A proxy for the level of development. Percentage of male labor force in agriculture at some point during 1961–5 (Taylor and Hudson, 1972: 332).

NEWS An alternative proxy for the level of development. Newspaper circulation per 1000 population in 1965 (Taylor and Hudson, 1972: 242).

EFRC A measure of ethnolinguistic fractionalization. (Taylor and Hudson, 1972: 271–274) The probability that two random people will not be from the same ethnolinguistic group. (The measure used is that based on data from the *Atlas Narodov Mira*.)

LING A measure of linguistic fractionalization. (Rustow, 1967: 284) The proportion of the population whose mother tongue is that of the largest group in the country.

VOTE The proportion of the adult population which voted in an election in the 1960's (Taylor and Hudson, 1972: 57–59).

NOTES

1. Similarly, Dahl and Tufte (1973: 39), after presenting a hypothesis on the relationship between population and number of groups, declare that: '... there seems to be no satisfactory way at present to test this hypothesis.' In fact, this is one hypothesis which is tested in the present paper.

2. McCormick and Tollison (1981) employ a similar measure in their study of regulation in American states.

3. A more precise definition of the difference between the primary economic activities of the members would focus on the relationship between promotional and sectional groups and the group's goals. Here a precise definition is not needed.

4. Of course, it is not possible to say whether all the excluded associations do not conform to the definition.

5. Of course, the variable which changes must be of some significance for the whole system. The assumption in the text will not necessarily hold if the variable is only relevant to a small area of economic activity.

6. Precise descriptions of the data are in an appendix which contains a list of variables and data sources.

7. Here, and in all statements of hypotheses, the necessary ceteris paribus clauses are omitted.

8. The variables are given simply mnemonic names for the sake of brevity. See the appendix for variable definitions.

9. Oates (1972) makes use of the inverse relationship between heterogeneity and benefits per citizen in discussing the factors affecting the size of local jurisdictions.

10. This is solely a ceteris paribus assumption for the argument and is not intended to be a factual claim.

11. The fact that new members can be excluded is not inconsistent with the non-excludability characteristic of the interest group's product. The excluded members are excluded only from voting in the group's decisions, not from consumption of the group's product.

12. Invoking the ceteris paribus condition that there is no change in the probability that a particular economic agent will join an interest group.

13. It must be emphasized that it is not being argued here that $\alpha = 1$ for all interest groups. However, since the goods which interest groups supply are, by definition, to some extent public goods, assuming $\alpha = 1$ is a reasonable first approximation.

14. For 29 democracies, Dahl and Tufte (1973: 81) found a population elasticity of parliamentary size of 0.41.

15. This follows trivially from the information in the previous note.

16. Some of these factors are discussed in section 3.6.

17. The difference between hypotheses 4 and 9 must be noted. The former refers to freedom of organization at present. The latter refers to a suspension of freedom of organization in the past.

18. Even though the following test examines several variables, it should be included in the present section because no attempt is made to control for other independent variables.

19. Dahl and Tufte (1973: 35), in fact, claim that ethnolinguistic diversity does not increase with population.

20. The reader will have noticed that, in two cases, two variables which measure the same concept have been included. However, this presents no problems in the tests. The inclusion of too many variables in the tests solely biases the results toward acceptance of the null hypothesis (rejection of hypothesis 3). Given the results of the tests, no ambiguity in the results is consequent on the inclusion of all six variables.

21. See Maddala (1977: 125-126) for a description. The program used was SHAZAM (White, 1978). Variables were included in the equation if they passed a 10% significance test and excluded if they failed the same test. Given that all included variables had the correct sign, the testing procedure was equivalent to one which uses 5% one-sided tests. (The one-sided tests were preferred but were not available on SHAZAM).

22. Ordinary least squares was used whether or not TAX was included, since if TAX is included one is assuming that the two-stage least squares procedures do not give reliable results.

23. There is a possible simultaneity bias for one of the variables included in Table 1. Olson (1982) has claimed that interest group activity will affect the present level of income. This problem can be shown to have no effect on the results. First, AGRI and NEWS are used as alternative measures of socioeconomic development and the results are consistent with those for INC. Second, AGRI and NEWS were used as instruments for INC in two-stage least-squares estimates of the equation including INC. The estimates obtained were completely consistent with those in Table 3.

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