

ECONOMIC COMPETITION AND POLITICAL COMPETITION

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Competition is a central and ubiquitous concept of economic analysis. It is much debated whether there has been a decline of competition in the market place, but assuredly no decline has taken place in its role in economic analysis.¹ Although competition, and more generally rivalry no doubt has a vastly longer history in political than in economic literature, it has received more intensive theoretical and empirical analysis in economics. This paper is devoted to the analogies and contrasts between economic and political competition.

In Part 1 we present a statement of the standard properties of economic competition, which has a direct and literal application to the behavior of local governments. Here competition is between firms (and in analogy, cities) for the patronage of customers (and in analogy, residents).

In Part 2 political competition is defined (as is customary) in terms of party competition: the size and number of parties are taken as given, and their consequences for political behavior investigated. Similarity of party size is often believed to favor competition in the sense of parties seeking closer fulfillment of the preferences of voters. The theory of spatial competition is shown to offer ambiguous support for this belief, and to offer little assistance in developing a theory of party sizes or goals with this approach.

The main theme of the paper is developed in Part 3,—it is that political competition, even between parties, basically resembles economic competition. It is argued that even in a democracy no special significance is to be attached to a majority of the vote (or the seats in a legislature). Just as in economic markets, voters in political “markets” may best achieve their preferences through minority parties. The orientation to rational behavior by voters seeking to achieve preferred public policies is shown in Part 4 to provide a useful answer to the question: what do political parties maximize? The analysis is extended to a reformulation of the paradox of voting in Part 5.

1. *Economic Competition and a Direct Political Analogue*

Consider the production of automobiles. To the economist competition denotes the rivalry of the producers of automobiles for the patronage of automobile buyers. If told only that sales of automobiles in 1969 were divided between the firms as follows:

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¹See the survey by G. J. Stigler, “Perfect Competition, Historically Contemplated,” in *Essays in the History of Economics* (Chicago, 1965).

PUBLIC CHOICE

General Motors	47%
Chrysler	15%
Ford	24%
Other	14%

the economist cannot draw a rigorous inference with respect to the presence or vigor of competition. The firms may be colluding upon price, and have set it at the monopoly level, or they may be competing vigorously in the following specific sense: no firm would voluntarily sell additional units at the existing price because the additional (marginal) cost of these units would exceed the price.²

Several things should be said even at this preliminary level about economic competition:

1. The formal definition—which has not yet been given—turns on the extent of the ability of a firm to influence price. When the firm's influence is zero, the competition is perfect. Competition is usually greater in longer periods (in which new rivals can enter) than in the short run.
2. There are important consequences of competition: the elimination of "profits"—meaning receipts in excess of what the firm can earn in other industries; and the elimination of price discrimination. The competitive industry produces its output with a minimum quantity of resources.
3. The *probability* of the existence of strong competition is believed to be positively correlated with
 - i. The number of rivals.
 - ii. Their similarity of size, and in particular the smaller the share of industry output possessed by the largest firm, the more vigorous competition is likely to be.
4. A measure of "competition" is afforded by either:
 - i. The extent of influence of the firm's output on price (the elasticity of demand), or
 - ii. The relative excess of price over marginal cost. These are analytically equivalent if the firm maximizes profits because

²Competition can also involve style, durability, horsepower, etc., but there is a deep symmetry in the formal theory, so we ignore these other dimensions of competition.

$$\frac{\text{price-marginal cost}}{\text{price}} = \frac{-1}{\text{elasticity of demand}} \cdot 3$$

Economists would generally agree that the automobile industry is concentrated, whatever the decision on competition. Concentration is measured in ways we shall refer to later.

This traditional economic definition of competition applies directly and exactly to one area of political life: local government.⁴ Consider the competition of local governments for citizens—each city of (say) 25,000 in an area competes for citizens by offering various levels and combinations of public services and taxes. If the city size is not too large (and hence the number of cities too small), we may reproduce the standard conditions and results of economic competition:

1. There will be numerous cities offering each class of municipal services for which a demand exists, e. g., per capita expenditures of \$800 per year, few schools, excellent library, etc.
2. The competition of other cities compels each city to supply the services efficiently. Any local party machine will be forced to price (tax) the municipal services at cost.

We may go a step farther and deny the existence of qualitative differences between the competition of private enterprises and public enterprises. There is no element of durable compulsion in the local governments: if any city sets its services or prices at levels to which some of its citizens object, in the long run they can migrate to more congenial governments. The time necessary to reach long run equilibrium, and the extent of the interim burdens on dissatisfied citizens, will be governed by two circumstances. First, the greater the accuracy with which citizens predict the future services and costs of government, the less the short run situation can depart from long run equilibrium. Second, the lower the costs of migration, the less persistent any departure from long run equilibrium. These factors do not differ in principle from those encountered in the economic theory of long and short run decisions (as in long term investment or occupational choice).

In this regime of local competition, it is not apparent that political parties will have an important role in the political process. The cities will tend to be fairly

³The elasticity of demand—the percentage change in quantity divided by the percentage change in price with which it is associated along a demand curve—is *negative*, and hence the minus sign on the right side of the equation.

⁴See Charles M. Tiebout, "A Pure Theory of Local Expenditures," *Journal of Political Economy*, October 1956.

homogeneous if there are economies in specializing upon one type of city services, as seems probable, or if the citizens prefer to flock with others of similar feather. Multiple local parties are likely to emerge only if new conditions pose policy issues not contemplated by the citizens in making their original municipal choices.

As one moves up to larger cities and to states, the number of rival government decreases and the conditions for inter-governmental competition are departed from in increasing measure. The reduction in number of cities means that fewer varieties of city services are available. A greater variety of citizens dwell in larger cities because the economies of localization and scale which create large cities require a variegated labor force. The costs of migration presumably also increase—a longer move is necessary on average to change one's public services—so larger departures from long run equilibrium are possible. Even at the international level, however, some element of inter-governmental competition will be found.⁵

2. Party Competition and its Economic Analogue

The concept of party competition as it is developed in the literature of political science, is directed to the closeness of the outcome of elections. A state has a *competitive* party structure, when

1. Victory (in the legislature, say) is won by even the less successful party in a substantial share of elections (25% in the original Ranney-Kendall article), or what is related, the average share of votes of the losing party is not *much* less than 50%.⁶
2. The parties do not have long runs of electoral success or failure.⁷

It is commonly asserted that the more competitive the parties in this sense, the more responsive the political system will be to the desires of the majority. In this section we shall examine and question the theory of spatial competition, which gives ambiguous support for this assertion, and in the next section raise a more fundamental question about the role of a majority in public policy formation.

⁵More mobile occupations and groups will receive selective attention: witness the concern in Great Britain during the 1960s over the "brain drain".

⁶This first condition is generally invoked. See A. Ranney and W. Kendall, "The American Party System", *American Political Science Review*, June 1954, for references to the later literature, see D. G. Pfeiffer, "The Measurement of Inter-Party Competition and Systematic Stability", *American Political Science Review*, June 1957, and R. I. Hofferbert, "Classification of American Party Systems", *Journal of Politics*, August 1964.

⁷See J. Schlesinger, "A Two-Dimensional Scheme of American Party Systems", *American Political Science Review*, 1955.

There is a model of spatial competition in economics due to Harold Hotelling which bears a close resemblance to the foregoing view of party competition.⁸ The movement of party platforms and promises *toward* voters, which is one possible direction of definition of political competition, is obviously analogous to the market-oriented movements of two firms located on a road along which customers are distributed. Using a very simple model (with customers distributed uniformly along the road), Hotelling developed an analysis which we briefly restate in political terms.

Let voters (or buyers) be distributed uniformly along a scale of preferences (a road) from A to B (see Figure 1). The point A might represent zero expenditures on welfare, the point B, 8 percent of national income. With two parties, collusion such as commercial firms might engage in, would involve locating at points M and N, where each party received the vote of that half of the customers which found the respective platforms (2 percent and 6 percent spent on welfare) more palatable, and divide by agreement the benefits of holding office. The actual law passed would fluctuate randomly between M and N.⁹ This—the very maximum of conventional party competition—would be labeled zero competition by the economist because there is no attempt by one party to attract voters from the other. If party M now increased its platform offer to M' (say 2.4% of national income for welfare expenditures), it would attract a few voters to the right to Q (the mid-point of the line), who would now find its position closer to that which they prefer.¹⁰ N could retaliate by reducing its platform offer to 5.6%—and a process of “competition” would continue until both parties arrived at Q—the paradox which Hotelling presented in his analysis. Again votes would be equally divided, and parties would achieve small majorities in random sequence. The same observed equality of vote as we observed with collusion would now obtain with one form of competitive behavior.

Figure 1



Of course this model is austere simple. If parties, by moving away from A and B, led citizens at these points to abstain from voting, this would deter the parties' approach to a common platform at Q. If more parties enter, the platform promises will also begin to spread out. This model does not naturally generalize to

⁸See H. Hotelling, "Stability in Competition," reprinted in *Readings in Price Theory* (edited by G. Stigler and K. Boulding); also A. Smithies, "Optimum Location in Spatial Competition," *Journal of Political Economy*, June 1941.

⁹Or with rigid 50% shares of seats, a compromise of N (4%) would be reached—virtually a single party result.

¹⁰Since one-fourth of the voters are between N and Q, over a range of 2% of spending, voters in a range of .2 of spending or $1/10$ of $1/4 = 1/40$ of all voters would shift to M, and the vote would be M', 52.5%, N, 47.5%.

deal with parties of different sizes, nor to non-uniform distributions of voter preferences.

The Hotelling form of competition, we observe, is extremely limited in form. Each party takes the other's location as fixed, even though a sequence of counter-moves should reveal the interdependence of positions to the slightest intelligence. Nor is there any explanation, if we shift back to economics, of where the price will be set by the two firms (duopolists). If each firm takes the output of its rival as fixed, in extension of the assumption it makes about the rival's location, we would arrive at a price between competitive and monopolist levels.¹¹ The corresponding political proposition would presumably be that the emoluments of the party functionaries—office holders and members of political organizations—would be larger than was needed to attract them from rival occupations. Such a proposition, however, has shifted the nature of the political competition from catering to voter preferences to seeking gains from party electoral success.

If we attribute two reasonable characteristics to the political process, namely

1. Only one party can win the election (a self-evident fact that we shall deny in the next section),
2. The party machinery is essentially neutral, and its personnel wish merely to win elections,

then there is no reason, at this level of abstraction, why there should be more than one party, which carefully seeks out the position of the median voter and promises—and delivers—his preference. A rational single party (or tyrant) which seeks to maximize the emoluments of office will not defy the majority wish, although it may pocket vast gains from the control of the process—just as a profit-maximizing monopolist will not deny consumers the product they desire (at a monopolistic price). Indeed the argument is stronger: if the single party does not seek the most popular policy, and the monopolist the most popular product, they reduce the amount of their return (more self-defensive costs for the tyrant, less profits for the monopolist). The role of competition, at this level, is not to please voters or customers—it always pays to do that¹²—but to eliminate unnecessary returns to the party or enterprise functionaries.

¹¹See George Stigler, *The Theory of Price* (New York, 1966), Ch. 12. A more interesting economic model would allow each firm to open several stores, but in deference to the analogy to the political process we pursue, this option is not explored.

¹²If the monopolist is also a censor (imposing his own tastes), he may make a less preferred product that pleases *him*, but only at a cost in profits. A comparable sentence holds for the tyrant, assuming that he wishes to maximize his utility rather than his emoluments (e.g., set lower welfare expenditures to please himself than the public wishes).

Political literature has apparently paid little attention to the return to party functionaries (spoils system) as an *aspect of political competition*.¹³ If this route is pursued, the main result in economic theory is that the magnitude and duration of non-competitive returns to a dominant party (monopolist) will be governed primarily by the ease of entry of a second party. If the second party can enter, one would expect it to compete, less by the ideology of party platform than by the offer of economy and efficiency in performing the desired governmental functions. This threat is itself sufficient to moderate the exactions of a dominant party.

If we add one element of realism to the model, the role of multiple parties will be restored in a measure. Consider the problem of information: how are the desires of the public ascertained? The Hotelling model dismisses this question by its formulation—customers are uniform in intensity of desire, and uniformly distributed along a road (scale of preferences) of known length. In both economic and political life the length of the road and the location of individuals change, and need to be ascertained periodically. The rivalry of parties is then one, and in certain respects an extremely persuasive, method of registering the ruling electoral consensus. On this view, parties are more important, and shifts in political victory more frequent, the more rapidly and unpredictably the preferences of voters change.¹⁴

In summary, the spatial model of competition sheds little light upon the effects of number and size of parties (or votes) upon the positions taken by parties with respect to voter preferences. Indeed at the level of abstraction at which most discussion of the Hotelling theory has proceeded, there is no reason for the existence of a second party. These limitations arise from the failure to analyse the relationship of voters' preferences to parties and public policies, to which we now turn.

¹³James Q. Wilson, "The Economy of Patronage," *Journal of Political Economy*, 1961, in fact implicitly postulates non-competitive conditions in much of his discussion.

¹⁴The closeness of the platforms of the parties could be measured by the stability of the share of votes received by each party, just as in economic competition this measure is used to measure consumer loyalty. In the two-party case, the shares of the parties are s and $(1 - s)$ and the variance of the share of either party is $ns(1 - s)$, where n is the number of elections. A popular economic measure of *concentration* is the Herfindahl index,

$$H = \sum s^2.$$

i.e., the sum of the squares of the shares of the firms, which has a maximum value of 1 and a minimum value of $1/n$ with n enterprises. With two parties,

$$H = 2s^2 - 2s + 1,$$

so the sum of the variances of the shares is:

$$2ns(1 - s) = (1 - H)n.$$

This measure of concentration readily generalizes for more than two parties or firms. For a discussion of the economic measures of concentration, see G. J. Stigler, *The Organization of Industry*, Ch. 4; and G. Rosenbluth, "Measures of Concentration", in *Business Concentration and Price Policy* (National Bureau of Economic Research, 1955).

3. *The Basic Similarity between Political and Economic Competition*

The analogy between economic competition and non-local political competition cannot be carried far before a fundamental difference is encountered: political products (namely, public policies) are usually treated as mutually *exclusive*, whereas economic products (goods and services) are seldom if ever mutually *exclusive*. If we have a social security system with a tax rate of 6 percent on employers, we cannot simultaneously have a system with a different rate. In contrast, the provision of one size and type of house or automobile does not preclude the simultaneous provision of other sizes and types. It is the essence of the political process that its policies be coercive in the sense that many voters may prefer other policies. In economic life such "coercion" arises only when economies of scale prevent an article from being produced to the specifications of an idiosyncratic group. As a result of exclusivity in policies, there is a strong tendency to label the winning of 51 percent of legislative seats a victory and 49 percent a defeat. In economic life the firm which sells 49 percent of a product is no failure, and indeed may be more profitable than a rival selling 51 percent of the product.

From the difference in apparent exclusivity flow certain other differences between political and economic rivalry. Every patron of a business enterprise receives a product, and in the absence of error or fraud it is the product which was covenanted for. The voter for a party may receive nothing: no representative in the government, or one who is unable to achieve the promised policy. Again, the larger the number of enterprises, in general the larger the number of products and the more closely each consumer can match his preferences. The larger the number of political parties, the less the probability that any party will achieve its platform: coalition governments will perhaps be unable to adopt any policy which departs much from the status quo. So goes much political writing.

This approach is unappealing: if nature abhors a vacuum, man at least despises all-or-none alternatives. It is not useful to characterize the outcome of a political rivalry as failure (-1) or success (+1) for a party: in an important sense, political outcomes range continuously from failure to success. Even in an algebraic sense this is true: if a party wins an election by one legislative seat, it is probable that it will soon lose an election, so if success has a time dimension, success is a quantitative, not a qualitative, outcome of political rivalry.

The "outcome" or product of political competition is public policy, legislative and executive and judicial. A voter wishes representatives only as agents, agents to procure and insure the policies the voter prefers. The policy the voter wishes is an actual operating policy: it is not the schedule of enacted personal income tax rates, or even this schedule suitably qualified with loopholes and peculiarities of income definition, but the levels of taxes ultimately collected,

taking due account of the degree of vigilance of enforcement. Realized policy is inherently a quantitative notion. The content of policy is determined by appropriations, enforcement, the attitudes of bureaucrats and citizens (who enter enforcement also in the legal process), as well as by the so-called governing legislation.

Full success, 100 percent success, in a policy is presumably achieved when *every one* favors it. Short of this unanimity, there will be violations and more or less incomplete enforcement, and even serious restrictions upon the legislation. One does not simply pass a law of aid to dependent children, the actual policy depends upon numerous variables: residence requirements, schedule of payments, administration (speed of processing, investigation of claims), appropriations, speed of adjustment to new conditions, etc. Exclusivity of public policies does not create a basic difference between political and economic competition. The party with 51 percent of the vote in one election can do very little; that with 65 percent in two consecutive elections can do considerably more. At least as a first approximation, an economic firm with 49 percent of output exerts $49/51$ as much influence on price as its larger rival. The situation in political parties is not much different.

That political effectiveness is a more or less smoothly increasing function of the size of a party is so important a proposition as to deserve elaboration. In the appendix (Note A) a statistical investigation is made of one instance: the effect of minorities which do not use public schools upon the level of public school expenditures. This study offers a measure of support for the present argument: as the minority grows in relative size, the level of expenditures per pupil in public schools *declines*.

A minority that feels intensely the need for a particular policy can pay a sufficient price to obtain it even with normal, legal democratic procedures. The method of payment is primarily vote-trading: the minority may vote for programs it is less opposed to than the one it seeks, and if the minority becomes larger, the number of sub-coalitions of the "majority" it must persuade to join it on the desired issue diminishes, and the cost of getting their support becomes less.

Secondly, all political systems contain some element of division of power so a minority will hold a share of minor offices which responds to its relative size. This element is obvious when the system is explicitly federal, as in the United States or Switzerland, but it holds also in centralized state such as England and France. An element of division of power is introduced, for example, by having different terms for various political offices.

Thirdly, the minority, even when each member acts only as an individual, imposes costs upon the majority in enforcing policies to which the minority is

opposed. These costs will be larger, the larger the minority and the more intense its opposition. A democratic system cannot, indeed, resolve issues when the minority is (say) one-fifth or more and fervent in its desires: one must resort to partition (Belgium) or civil war (United States) when minority and majority are adamant.

If political effectiveness were not positively and more or less continuously related to party size, it would be impossible to explain important political phenomena. Consider only two.

1. Particular industries and occupations obtain from the state a variety of economic privileges which are injurious to the vast majority of the population. Farm subsidies, oil import quotas, tariffs, and occupational licensing are examples. These small minorities achieve their effectiveness primarily because it is uneconomic for the majority to oppose them.¹⁵
2. Minority parties often persist for long periods—for example, the Federalists lost power in 1801 but survived for a quarter century. One explanation (the simple Downsian version) would be that these parties incorrectly predicted voter preferences in a long sequence of elections. It seems much more reasonable to interpret these periods differently: the minority is more effective in achieving its ends as a homogeneous minority than as a more heterogeneous majority.

This second example suggests that persistent minority parties must have one central policy preference to unify them. If they do not have a paramount issue, but instead have many distinctive preferences, they could not engage in vote-trading.

4. *What Should Political Parties Maximize?*

When Anthony Downs brought the theory of industrial organization to bear upon political parties, he postulated as the goal of a political party a maximum of votes at the next election.¹⁶ The distinction between a maximum of votes and a maximum plurality was not clearly drawn.¹⁷ Riker proposed an alternative goal: the minimum size necessary to electoral victory, so that the beneficiaries of political

¹⁵See George Stigler, "The Theory of Economic Regulation", *The Bell Journal of Economics and Management Science*, Spring 1971.

¹⁶*An Economic Theory of Democracy* (New York, 1957) pp. 31, 35.

¹⁷This distinction is elaborated by M. J. Hinich and P. C. Ordeshook, "Plurality Maximization v. Vote Maximization: A Spatial Analysis with Variable Participation", *American Political Science Review*, September 1970.

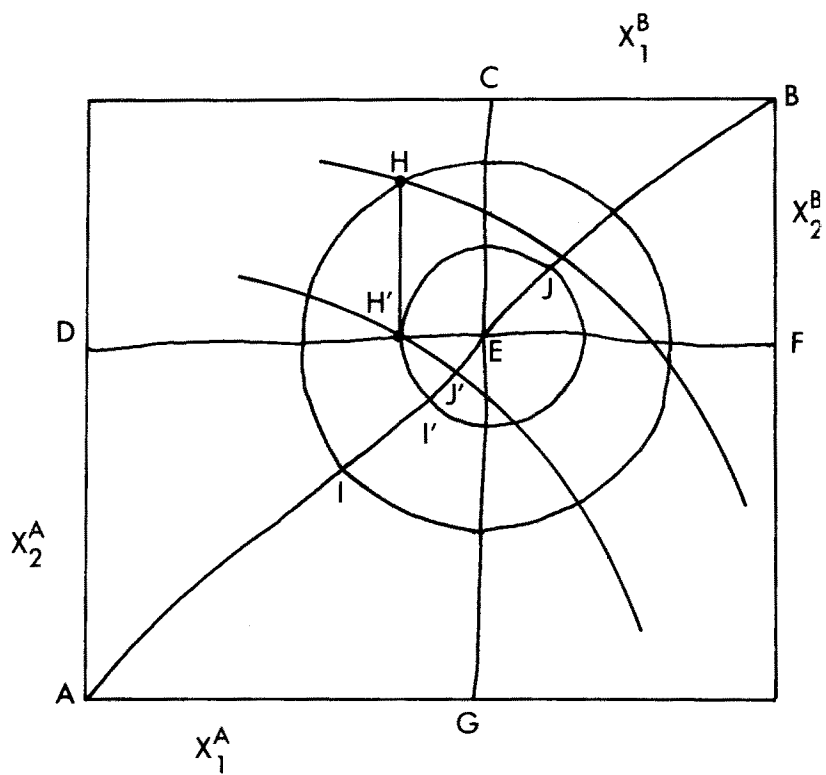


Figure 2

power (the members of the successful party) be as few as possible, and its victims (the non-members of this party) be as numerous as possible.¹⁸ We can resolve this question by taking account of the relationship between party strength and political influence argued for in the preceding section.

Two basic postulates may be proposed with respect to political parties:

1. The larger a party's plurality (or majority) in the legislature, the greater its control over the government. The influence function of a party, its probability of determining public policy,¹⁹ say $I(s)$ where s is its share of legislative seats, is a monotonically increasing function of s throughout the entire range of s from 0 to 1. However, there is probably diminishing returns to increments of s beyond some level, so $I'(s) > 0$, $I''(s) < 0$.
2. The larger the share of people (resources) outside the coalition, the greater the opportunity for the use of the machinery of the state to benefit the party members—this is Riker's Postulate. The gain to each member of a coalition from a *given* use of political power—say, the passage of a tax or appropriation act—decreases as the ratio of coalition to population rises. This gain function, $G(s)$, therefore decreases monotonically as s rises. If outsiders are chosen properly, the most vulnerable will be admitted last, e.g., if a redistribution of wealth from the rich is contemplated, the very richest would be the last to be admitted to the party. Hence $G'(s) < 0$ beyond a certain s_0 .

The objective of a political party must then be, for given cost, to maximize the expected gain of its members, or

$$I(s) G(s).$$

The functions are illustrated in Figure 2. The political party will seek to maximize not its *net* gain, which is $I(s) G(s)$ minus costs, $C(s)$, of achieving the given share of legislative seats. Since the marginal cost of a share of legislative seats is positive and for most party sizes probably increases with s , it serves to reduce the optimum size of party.

Of course this is a much simplified version of the party decision function, and it could readily be extended. For example, the probability of obtaining desired legislation, $I(s)$, is also a function of the shares of seats held by each other party if

¹⁸*The Theory of Political Coalitions* (New Haven, 1962).

¹⁹The "probability of determining public policy" is easily definable only for the set of alternatives under a single, one-dimensional policy choice. In complex choices, it may not be useful to distinguish influence and the policy achieved.

there are three or more parties. Again, the basic goal of the party is not to pass legislation in one biennium, but to maximize the present value of all future legislation. The goal of the party, even in these more complex cases is a direct extension of the present formulation. The merit of this formulation of the goal of parties is precisely that it invites the more complex and subtle analysis which will surely be necessary to understand real political behavior.

5. *The Voters' Paradox*

The so-called voters' paradox is simply that rational conduct will normally lead to non-voting, yet the majority of the population (surely by definition, rational) voter. The expected gain from voting is the product of

1. The probability that the vote will change the outcome, and
2. The benefit to the voter of having his preferred party or issue win.

Unless this product exceeds

3. The cost of voting (which includes becoming sufficiently informed to vote appropriately to one's interests),
the rational voter should stay at home.²⁰ The formulation of an empirical problem should not contain its answer, but in the present instance little more is required. The conventional argument is that the benefit from victory is some finite sum, and that the probability that one's vote will be effective is approximately

1

Expected Vote Difference Between Victory and Defeat

which in large constituencies is of course in general a negligible quantity (in recent extremely close presidential elections approximately 10^{-6}). This probability is so small that plausible estimates of gain and voting cost lead to non-voting as rational conduct. The chief escape from this paradox and explanation for the observed turnout of many voters is usually sought in the fulfillment of a sense of civic duty.²¹

²⁰See, e.g., A. Downs, *An Economic Theory of Democracy*, pp. 36-50, 260-76; and W. H. Riker and P. C. Ordeshook, "A Theory of the Calculus of Voting", *American Political Science Review*, March 1968.

²¹Four of the five satisfactions offered by Riker and Ordeshook are of this sort; the fifth is that going to the polling station may be pleasurable; *ibid.*, p. 28.

The explanation of what it is that coalitions and parties seek to maximize leads us to question this easy argument. If election outcomes are *not* all-or-nothing (forty-nine percent is defeat) and instead influence is a monotonically increasing function of vote share, then the probability that one's vote will make a difference is *unity*, not some infinitesimal fraction. This restatement does not in turn magically dispose of the paradox, because the additional influence achieved by one more vote for one's party is usually "small." The cost of voting is also tolerably "small," however, and no conclusion can be drawn at this level of generality with respect to the rationality of voting.

Perhaps the closest analogy to voting to affect public policy that arises in the private market is the task of changing a product to better satisfy consumers. How does one automobile buyer affect the design of future automobiles, given that large economies of scale require that a substantial number of customers are needed to justify a change in design? Presumably the individual buyer communicates some small message by the type of automobile he chooses from the existing variety, at a definite cost in search and experiment with new goods. It is presumably often rational for the buyer to make a search intended to influence future production,²² and incur the costs of experimenting with a new product.

The additional influence a party achieves by having $(n + 1)$ rather than n votes no doubt varies (and eventually diminishes as n increases), and is larger the larger the number of other parties and the less their intensity of opposition to the policy desired by the given party. It is premature to assert that this self-interest (investment) motive is insufficient to cover the costs of voting for most citizens, so that a utility of voting for its own sake (consumption) needs to be added. The investment motive is rich in empirical implications, and the consumption motive is less well-endowed, so we should see how far we can carry the former analysis before we add the latter.

²²More precisely, if the variety of automobiles was fixed forever, a given amount of search would be undertaken by the buyer. If desired changes in future products can be encouraged, larger amount of search is justified. See my *The Organization of Industry*, p. 178.

²³If E is total expenditure on public education,

e_i is proportional to

$$\frac{E}{N_n}$$

the factor of proportionality being $1/\lambda$,

where λ is school children per family.

Taxes per family are proportional to

$$e' = \frac{E}{N_n + N_c} = \frac{E}{N_n} \cdot \frac{N_n}{N_n + N_c} = \frac{e_i}{N_n + N_c} \cdot \frac{N_n}{N_n}$$

Let the demand for an average family utilizing the public schools of state i be

$$(1) \quad e_i = f(p, y_i) = p^\alpha y_i^\beta, \text{ say.}$$

where e_i = total expenditure per pupil in public schools

y_i = average income per family

p = cost of units of quality of education,

and this cost, p , is assumed to be the same in every state. The actual cost to patrons of public schools will be less than p , however, because some families send their children to parochial and private schools but pay taxes for public schools. As a first approximation, the price to a family using the public schools will be

$$\frac{N_n}{N_c + N_n} \cdot p$$

where N_c is the number of families using Catholic (and private) schools and N_n is the number of families using public schools. Then the demand of families using public schools in state i becomes

$$(2) \quad e_i = \left(\frac{N_n}{N_c + N_n} \right)^\alpha p^\alpha y_i^\beta.$$

If the public school families in a state could choose the level of taxation for schools, they would choose that rate implied by (2). The tax would be proportioned to expenditures per family of all types (since all pay equal taxes by hypothesis), and expenditures per family are proportional to

$$(3) \quad e_i' = \frac{N_n}{N_n + N_c} e_i = \left(\frac{N_n}{N_c + N_n} \right)^{\alpha + 1} p^\alpha y_i^\beta.$$

The elasticity of e_i' with respect to $\left(\frac{N_n}{N_n + N_c} = s \right)$ is

$$n_{e's} = 1 + \alpha < 1.$$

To the extent that the political power of the Catholic families is effective, however, taxes are lower, the lower is s , implying that $n_{e's} > 0$. The demand effect (equation 3) will lead to a negative elasticity only if α is numerically larger than unity, i.e., if the demand for quality is elastic. Only if the observed elasticity $n_{e's}$

significantly exceeds unity, therefore, can we infer that the direct political influence of the Catholics dominates the demand effect. There is also some question as to how families without present or prospective school age children should be introduced explicitly into the analysis.²⁴

For the 48 states in existence during the school year, 1954-55, we have calculated the regression equation

$$\log e'_i = a + b \log s + c \log y$$

For the 48 states we obtain the following results with e'_i measured by total public expenditures per (public plus private) pupil²⁵

$$(4) \quad \log e'_i = -4.74 + 1.09 \log s + 1.22 \log y, \quad (R^2 = .659)$$

(3.12) (9.03)

the t-values being given below the regression coefficients. If we measure e'_i as total expenditure per household, we obtain

$$(4.1) \quad \log e'_i = -4.64 + 1.96 \log s + 1.20 \log y. \quad (R^2 = .590)$$

(5.18) (8.01)

Both equations yield an elasticity of e' with respect to s greater than unity, and significantly so in the second equation, so it appears that the political power of the non-Catholics increases with their share of the population, and overwhelms the influence of subsidy from the Catholics.

²⁴They need not be introduced if each state has a similar family life-child pattern, but their omission will bias the results if older families systematically migrate to communities providing less school service.

²⁵In both equation (4) and (4.1) income per household is calculated for 1950. Our use of pupil enrollments rather than adult population to measure s is preferable because those numerous Catholic families which use public schools are then implicitly reclassified.