ABSTRACT

WHOSE PREFERENCES COUNT? A STUDY OF THE EFFECTS OF COMMUNITY SIZE AND CHARACTERISTICS ON THE DISTRIBUTION OF THE BENEFITS OF SCHOOLING

By

George R. McDowell

This thesis examines the arguments and issues surrounding the basis for drawing or redrawing lines of legal authority around groups of people on maps and causing them therefore and thereafter to act together as a body politic--the so-called "boundary question." The major dimensions of communities which can be affected by boundary changes such as size, community homogeneity, and the position and power of groups of diverse preferences are investigated to examine their effect on the articulation of group preferences as seen via the distribution of the benefits of a publicly provided service. The school district was selected as a unit of government amenable to this investigation because it is a single purpose political entity and because measures of the output of schooling are likely as good as measures of any other public output.

A review of the consolidation reform tradition of American political science thought makes clear that the major

arguments on behalf of the consolidation of local government are efficiency in production of publicly produced goods and services and reduced transactions costs between governmental units. Without questioning whether these in fact exist, the economics of public choice approach was introduced and led to questions of the effect of consolidation on the articulation of diverse preferences.

In order to be able to examine and interpret the effects of size and other community characteristics on the distribution of benefits of school districts, a framework of analysis of the schooling process was developed. This analysis led to three assumptions about the current public provision of schooling necessary to an interpretation of this research.

First it was assumed that, whether true or not, there exists a widespread belief that an individual's performance in school makes a difference in future achievements and approach to "success." Secondly, it was assumed that generally under the existing educational norm, children with experiences substantially different from those of the majority middle class are on average disadvantaged in the schools. The third assumption is that parents or groups of parents in a community will seek to make the schools responsive to their preferences and/or particular needs.

Based on the evidence that socio-economic class is a consistant influence on the performance of school children, the conceptual basis for an indicator of school district

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responsiveness to those disadvantaged under the prevailing educational norm was developed.

Drawing on the public choice approach and the analysis of the schooling process, three hypotheses were proposed for testing. The first related to the effects of school district size on the responsiveness to the disadvantaged group. The second argued that as the power of the disadvantaged group increases, school districts would be more responsive to their needs. The third argues that as community concensus with regard to schools is more diverse from the preferences or needs of the disadvantaged, the schools will be less responsive to that group.

A public choice model of school district behavior was developed and proxy variables were specified to approximate the general model in the empirical portion of the research. Using a socio-economic index for individual pupils, a group felt to be clearly disadvantaged was selected. Two direct measures of the responsiveness of school districts to that group were created. One measured the mean level of achievement obtained by the disadvantaged group. The other measured the relative mean achievement of the low SES group to that of the balance of their grademates. In addition to these two direct measures, the Coefficient of Variation of achievement was selected as an indicator of the responsiveness of school districts to socio-economically disadvantaged pupils based on the earlier conceptual analysis.

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Multiple regression equations approximating the model were fitted to data for town and rural districts, urban fringe districts, city and metropolitan districts, and to the pooled data by the ordinary least squares method.

The major data sources were (1) the Michigan Assessment Program results for 1969-70 and 1970-71 obtained from the State of Michigan Department of Education, and (2) U.S. Census Fourth Count (Population) data made to coincide with school districts by the National Center for Educational Statistics.

Results of this investigation indicate that as school districts are smaller, ceteris paribus, they are more responsive to the disadvantaged group of pupils. This is seen as evidence that increases in community size such as are accomplished by the boundary changes associated with consolidation efforts result in a decline in the ability of an individual or a group whose preferences are different from the majority to have their preferences felt in the enlarged body politic.

Support for the second hypothesis could not be clearly demonstrated although there were indications that the hypothisized relationship between group power and distribution of schooling benefits may still be valid.

The results with respect to community concensus indicate that as communities are more heterogeneous the schools are less responsive to disadvantaged pupils. Further, as the

majority position of a community is more diverse from the socio-economically disadvantaged, the schools are less responsive to that group.

These results are seen as implying that while consolidation of communities may reduce the cost of providing a specific service, it will also effect the distribution of the benefits of the service and will influence the character of the demand for that service. Stated again, consolidation may result in lower costs of delivery of public services but may not result in increased community satisfaction with those services.

Those who stand to gain from consolidation are those who are more likely to be closer to the majority of the enlarged community, or those whose relative power in the community will be enhanced. Those who stand to lose are those whose preferences are further from the majority under consolidation, whose relative power is reduced, or whose power is unchanged but who will experience higher costs in articulating their preferences.

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By

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This work is dedicated to Quincy Alonzo McDowell and to William John McDowell. From Quincy McDowell, father and friend, I learned by example of the power of love, of sacrifice, and of personal consistancy, and that I am my brother's keeper. From John McDowell, uncle and friend, who died while this work was in progress, I learned by example a larger definition of who is my brother.

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The history and saga of a PhD program and research is filled with many participants and contributors. This page will acknowledge but a few of those who shared themselves with me in this effort.

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Finally, to Renie, Laura and Kim I owe the most. They

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loved me, supported me physically and emotionally, and mostly cared about me. Thank you.

All these and many more have helped me and sustained me. Such errors of fact, logic, method or omission as remain are mine and mine alone.

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CHAPTER I

COMMUNITY BOUNDARIES AND SIZE - A PUBLIC CHOICE QUESTION

Introduction

This thesis is aimed primarily at issues related to the so-called "boundary question" of the organization of local governmental units. Yet a major part, perhaps even a majority, of the thesis will deal with an analysis of the distribution of the standardized achievement test scores of elementary school children. It is my intent in this introductory chapter to show the relationship between these seemingly diverse questions and how an understanding of the factors affecting the distribution of school children's math scores may shed light on issues of concern in the organization of local units of government.

The "boundary question" as here used refers to the arguments and issues surrounding the bases for drawing lines around groups of people and causing them therefore and thereafter to act together as a body politic. Boundaries are thus seen as the institutional rule or set of rules which determine group membership. Boundaries may have physical and spatial dimensions as in the definition of the physical jurisdiction of a regional government, or may have social, occupational, financial or ideological dimensions as in the case of churches, unions, lobby groups, clubs, and other such

organizations. The clearest effect of the boundary institution is to determine who is in the group and who is outside the group. Thus boundaries are a major influence on the size of groups and on the characteristics of the people who hold group membership. Changes in boundaries may thus result in changes in group size and in the characteristics of the group.

The boundary issue as it is investigated in this thesis pertains to community boundaries as they affect size and population characteristics. To some extent boundaries are only an issue when some effort is made to change them. The most concerted, and perhaps most frustrated, effort at changing community boundaries has been the movement on behalf of metropolitan reform through consolidation of governmental units primarily in urban areas. The effort at consolidation of rural school districts is in the same tradition and has been somewhat more successful.

The arguments for consolidation are those of efficiency in the production of publicly provided services, i.e., an economies of scale argument, and simplicity in the administrative boundaries of governmental units, also an efficiency argument. The latter is directed against the profusion of special purpose districts and other locally empowered units resulting in a multilayered structure with many overlapping jurisdictions.

A major element overlooked in the consolidation literature is the affect of boundary changes on the articulation

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and assertion of diverse preferences for the services of government. In terms of the arguments for consolidation the overlooked question is "on whose behalf is the new efficiency?"

It is the intent of this thesis to examine the effects of various characteristics of school districts which are associated with district boundaries, on the distribution of the math scores of school children. The objective is to seek to understand the effect of boundaries on whose preferences count in terms of a quantified, albeit limited, measure of service output.

The Consolidation Reform Tradition

The "one community--one government" or consolidation thesis for organizing metropolitan areas is a dominant argument in current discussions of local government reorganization. The 1972 Report of the Governor's Special Commission on Local Government in Michigan argues for the consolidation of the smaller units of government (villages) into larger units in the interest of "more effective service areas" [38] with regard to publicly produced services.

In the Fall of 1973 discussants of the commission report in a Public Policy Forum on the Alternatives for Michigan Local Government [50] generally endorsed the consolidation theme of the report. Of the fifteen speakers, among whom were journalists, academicians, and representatives of

lobby organizations, only one explicitly questioned the consolidation aspects of the report.[1]

The consolidation arguments, which are alive and well in 1973 as evidenced in the above discussion, can be rightfully called a tradition of American political science thought. Bish and Ostrom [7] in describing the consolidation approach to government reform attribute its origins to a political science made popular by Woodrow Wilson and his contemporaries nearly a century ago.

Warren in tracing the history of the literature specific to consolidation reform points out that much of the current dialogue is based on assumptions formulated in the 1920s as part of an initial response by political scientists to metropolitanization and the fractionation of municipal government within population centers. According to Warren the recurrent and identifiable assumptions in the literature of this tradition are as follows:

a) "metropolitan areas represent a single community linked by social and economic ties, but are artificially divided governmentally;" [51]

b) "The public needs of such a community cannot be

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[1] It is not the intent of this discussion to indicate that the Report of the Governor's Special Commission on Local Government [22] dealt only with problems where the proposed amelioration was consolidation. It is true that the report was in the consolidation reform tradition.

satisfactorily met by the collective action of numerous units of government, rather chaos and breakdown will result;" [51]

c) "...the welfare of the metropolitan community can only be realized through an integrated governmental structure in which municipal decision making authority is formally centralized in a single jurisdiction [51]."

Bussard in her review of the rural school consolidation movement quotes a 1897 committee of the National Education Association making a very similar argument as follows:

> ...the necessity of adopting a larger unit than the district, as the township or the county, is very strenuously insisted upon by two or more subcommittees....It would conduce to effectiveness and simplicity of organization; to economy in the use and distribution of funds; to the equalization of the burdens of taxation, and to a system of supervision which would produce better results from the instruction given in rural schools [20].

Thus it is that analysts in this reform tradition when considering the problems of local government view small units as unprofessional and inefficient. The commitment of small jurisdictions to local interests is seen as parochial and standing in the way of achieving the overall public interest of the larger community. Fragmented authority and multi-layered overlapping jurisdictions among numerous units of local government are diagnosed as the fundamental sources of institutional failure in the governance of many areas, particularly urban areas.

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From this perspective, overlapping jurisdictions imply duplication of services produced. This duplication implies waste and inefficiency in government. According to these analysts, efficiency is enhanced by eliminating the many small jurisdictions and by consolidating all authority in one jurisdiction with general authority to govern each major urban area as a whole. Such consolidations vest ostensibly enlightened leaders and professional administrators with authority to coordinate all aspects of regional affiars through a single integrated structure of government.

Policy analysts in this tradition assume that in addition to the economies of scale gains to be made, consolidation of all smaller jurisdictions into a single, overall unit of government for each urban region or metropolitan area will clearly fix political responsibility, making it possible for citizens to hold officials accountable for their actions. By contrast the requirement to deal with numerous, overlapping jurisdictions is seen as overloading citizens, confusing responsibility, and frustrating citizens in their efforts to control public policy. Further, efforts to solve regional problems are frustrated by chaotic bickering between these small selfinterested units.

The persuasiveness of this approach to local government policy analysis is indicated by its use in a report by the Committee for Economic Development, Modernizing Local Government, published in 1966. The CED reported the following

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findings as a basis of its diagnosis:

> 1. Very few of the local units [of government] are large enough--in population, area or taxable resources--to apply modern methods in solving current and future problems....Even the largest cities find major problems insoluble because of the limits on geographic areas, their taxable resources, or their legal powers.
>
> 2. Overlapping layers of local government--municipalities and townships within counties, and independent school districts within them--are a source of weakness....This [overlapping] impairs overall local freedom to deal with vital public affairs; the whole becomes less than the sum of its parts.
>
> 3. Popular control over government is ineffective and sporadic, and public interest in local politics is not high....Confusion from the many-layered system, profusion of elective offices without policy significance, and increasing mobility of the population all contribute to disinterest.
>
> 4. Policy-making mechanisms in many units are notably weak. The national government [by contrast] has strong executive leadership, supported by competent staff in formulating plans that are then subject to review and modification by a representative legislative body....
>
> 5. Antiquated administrative organizations hamper most local governments. Lack of a single executive either elective or appointive is a common fault. Functional fragmentation obscures lines of authority....The quality of administration suffers accordingly [23].

Bish and Ostrom in describing this reform tradition point out that the arguments suggest the following causal relationships among variables: "(1) Increasing the size of urban governmental units through consolidation will be associated with improved output of public services, increased efficiency, increased responsibility of local officials and increased confidence among citizens about their capacity to

affect public policies. (2) Reducing the multiplicity of jurisdictions serving an urban area through consolidation will also be associated with improved output of public services, increased efficiency, increased responsibility of local officials and increased confidence among citizens about their capacity to affect public policies [7]."

Before critiquing the arguments of the consolidation reform tradition, it is perhaps useful to examine the performance record of this view in terms of its acceptance and implementation as a basis of governmental reform. Bussard [20] in her discussion of the consolidation of school districts reports the Digest of Education Statistics, 1970 as showing a decline from approximately 127,000 districts in 1930 to an estimated 17,000 districts in 1971. Much of this consolidation activity involved rural districts and that movement appears to have been strongly influenced by the real and argued economies of size related to production of secondary school education.

The record of consolidation reform of metropolitan government is much less clear than that of school district reform. Warren writes, "...the ideal of centralization appears to be deferred rather than compromised. Few large cities and adjacent suburban areas have not been the subject of at least one such proposal. However, the results of these efforts have been exceedingly limited [51]."

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Writing in 1966, Warren reports that of twenty-four Standard Metropolitan Statistical Areas with a million or more inhabitants (1960 Census) only two had any actions taken which could be interpreted as governmental reform. In the other 190 metropolitan regions with populations ranging from 50,000 to 1,000,000 (1960 Census) only three plans of reorganization have been affected according to Warren.

As a result of repeated defeats at the polls and public resistance generally to consolidation reform, the literature in this tradition in recent years has included discussions of strategy aimed at the "successful" implementation of reform adoption.

A good example of this response of political scientists to successive public rejections of their position is a monograph by Booth, "Metropolitics: The Nashville Consolidation" [11]. In the foreward, Charles Adrian, formerly of Michigan State University Institute for Community Development and Services writes as follows:

> "Among the many other questions raised in this study are some related to strategies for metropolitan change. What are optimum strategies for metropolitan change? What are optimum strategies for victory in a metropolitan integration proposal?...Reformers, being educated persons who view their approach as highly rational, have strongly tended to accept the eighteenth century more as a model for the metropolitan voter. The "pro"--who knows better than to do so--thus reached more people and reached them in a telling fashion....No one has yet written a monograph dealing with such questions as: What are the emotional and symbolic assets available to the advocate of metropolitan reorganization? How can they be brought

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> effectively into use in a campaign?.... What aspirations of citizens can be appealed to effectively? That is, how can people be led to believe that there is a causal relationship between an integrated governmental structure and their personal hopes for the future? Some reformers will be reluctant to admit that the ordinary tool kit of the practicing politician should be used to repair metropolitan governmental machinery. The story of Nashville hints that perhaps they would be wise to cease being squeamish [11]."

The committee for Economic Development in their national policy statement Modernizing Local Government, in 1966 made the following exhortation on behalf of consolidation reform: "Each citizen, therefore, has a civic responsibility, as well as an enlightened self-interest, in securing the modernizations now long overdue [23]."[2]

While the consolidation reform tradition represents a substantial school of thought in modern political science, it is appropriate to point out that there are within the main stream of political science those who take a more studied view of the role of community size. The recent (1973) book Size and Democracy [25] by Dahl and Tufte sets the issue of size and democratic objectives in rather clear view. Within the first chapter of their work these authors set forth the following main claims and counterclaims of the respective sides in the small versus large size democratic units of government debate.

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[2] Emphasis added.

ON CITIZEN PARTICIPATION

1. Smaller democracies provide more opportunity for citizens to participate effectively in decisions.

2. But: Larger democracies provide opportunities for citizens to participate, at least by voting in elections, in the decisions of a political system large enough to control all or most of the major aspects of their situation that can be controlled.

ON SECURITY AND ORDER

3. Smaller democracies make it easier for citizens to internalize norms and values, hence to increase voluntary compliance and reduce coercion.

4. But: Larger democracies provide an opportunity to extend the rule of law (as opposed to violence among states) over a larger area.

5. And: Larger democracies are better equipped to prevent damage to the internal life of the society from outside forces-- such as invasion and economic threats.

ON UNITY AND DIVERSITY

6. Smaller democracies are likely to be more nearly homogeneous with respect to beliefs, values, and goals.

7. Conversely: Larger democracies are likely to exhibit more diversity in beliefs, values, goals, social and economic characteristics, occupations, etc.

ON THE COMMON INTEREST

8. Smaller democracies make it easier for a citizen to perceive a relation between his own self-interest or understanding of the good and a public or general interest, the interests of others, or general conceptions of the good.

9. Conversely: Larger democracies provide more opportunity for divergence of views on individual, group, and general interests and goals.

10. And: Larger democracies reduce the likelihood that a single interest of one segment of the members will dominate the whole system (as happens, for example, in company towns).

ON LOYALTIES

11. Smaller democracies are more likely to generate loyalty to a single integrated community.

12. Conversely: Larger democracies are more likely to generate multiple loyalties to various "communities."

ON EMOTIONAL LIFE

13. Citizens of smaller democracies are more likely to invest civic relationships with high levels of affect.

14. Conversely: Citizens of larger democracies are more likely to divest civic relations of affect, to make civic relations more impersonal and emotionally neutral.

15. The citizens of smaller democracies are likely to consider each other friends or enemies, according to whether they agree or disagree on politics.

16. Conversely: The citizens of larger democracies are less likely to consider their fellow citizens either friends or enemies for political reasons.

17. Smaller democracies produce stronger presures for conformity to collective norms.

18. Conversely: Larger democracies weaken presures for conformity to collective norms.

19. But: Alienation and anomie--loss of community--are much more likely in larger democracies.

ON RATIONALITY

20. Smaller democracies make possible greater speed and accuracy of communication among all members of the system.

21. And: Smaller democracies provide more opportunities for all citizens to gain knowledge needed for decisions by direct observation and experience.

22. But: Larger democracies provide more opportunities for all citizens, acting collectively, to exercise control over a broader range of important matters---and hence over their situation.

23. And: Larger democracies provide greater opportunities for individuals to develop specialized skills, hence to develop skills needed for rational solutions to problems.

24. In general, then, citizens in a smaller democracy are likely to understand their political problems better than citizens in a larger democracy (consider propositions 1, 6, 8, 20, and 21).

25. On the contrary, citizens in a larger democracy have greater opportunities for exploring a bigger set of alternatives than citizens in a smaller democracy; hence they are the more likely to understand their political problems better and to control their situations more completely (consider propositions 2, 4, 5, 9, 10, 12, 16, 17, 22, and 23).

ON CONTROL OF LEADERS

26. Leaders are likely to be more responsive to citizen views in smaller democracies (consider propositions 1, 3, 6, 8, 11).

27. On the contrary, leaders are likely to be more responsive to citizen views in larger democracies (consider propositions 10, 16, 18) [25].

Dahl and Tufte distill these claims and counter claims into two major substantive issues or goals which appear in conflict or must be traded off in size considerations. These twin goals are "citizen effectiveness" and "system capacity" in the language of the authors. Thus there appears to be the acknowledgement of the affect of size on the articulation of citizens preferences which is missing in the consolidation reform literature.

Dahl and Tufte proceed to examine some of the influence of size on aspects of these goals using data from a number of small European countries. In general they have used whole

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countries as their units of observation and have attempted to interpret such measures as degree of representation, governmental form, party membership and party competition, and citizens sense of knowing about current issues. While such between countries comparisons are obviously difficult and perhaps suspect in a statistical sense, these writers have nevertheless made some thoughtful observations.

In their conclusions they make clear that their investigation persuades them that no single type or size of governmental unit is optimal for achieving both citizen effectiveness and system capacity. Thus they argue that both large and small units are needed - an argument that would seem to imply the continuation of multilayered government so vigorously opposed by the consolidation reform tradition. Unfortunately these authors offer little in the way of suggesting a basis for determining or debating what activities might be carried out at what level of government organization.

The Public Choice Approach to Governmental Organization

According to Bish and Ostrom [7] the intellectual roots of the public choice "way of thinking" are contained in the essays by Alexander Hamilton and James Madison in The Federalist and the writing of Alexis de Tocqueville in his Democracy in America. The more recent intellectual precursors of the public choice approach are the welfare and political economists concerned with public expenditure and public

investment decisions a la benefit-cost analysis and Program Performance Budgeting (PPB) systems.

Methodological Individualism.--The B/C-PPB analyst and the traditional public administration approach, which argues for clear lines of authority, share a common methodological perspective different from that of the public choice approach according to the Drs. Ostrom [41]. The B/C-PPB analysts and the public administrator take the perspective of "omniscient observer" and assumes he/she can know the will of the state or "the public interest," i.e., the social welfare function. The public choice analyst begins with a methodological individualism.

Buchanan makes this point in contrasting the public choice approach with what he calls the "open" system analyzed in traditional economic theory [17]. According to Buchanan traditional theory is a highly developed system of market interaction. Beyond the limits of market behavior the analysis is left open. "The 'public choices' that define the constraints within which market behavior is allowed to take place are assumed to be made externally or exogenously, presumably by others than those who participate in market transactions and whose behavior is subjected to the theory's examination" [17].

The public choice approach as set forth by Buchanan assumes that the same individual who acts in the market place

also is an actor in the political process. "Individuals behave in market interactions, in political-governmental interactions, in cooperative-nongovernmental interactions and in other arrangements" [17]. Unlike the traditional theory where the behavioral system is artificially closed by some action of an omniscient government or rule maker, the public choice approach with its individualistic methodology is behaviorally closed by the actions of the same people who act in the market place.

The public choice approach is explicitly a democratic model, that is a model where the rulers are also the ruled. In acting or behaving as a "public choice" participant, the individual is presumed to be aware that he/she is in part selecting results which affect others than him or herself.

While the public choice approach goes well beyond the traditional theory of markets it remains nevertheless a construct based on an economic model of behavior. As with the traditional economics as applied to individuals operating in the market, the individual operating as a citizen is assumed to be motivated by the desire to maximize his/her own utility.

In this pursuit different people are assumed to have different preferences. Based on the information available each will weigh and choose between alternative possibilities in relation to their preferences. Since the acts of choosing may in varying degrees affect others, the individual's self-

interest may include a concern for the well-being of others.

The Nature of Goods and Services and the Organization of Their Provision.--As elaborated above, individuals are presumed to assert their preferences both in market activities and as citizens. Among the array of possibilities are choices of different particular goods and services as well as choices as to whether a particular good or service will be produced in the private market or in the public sector. The public choice approach argues that the characteristic of the good itself instructs the choice between government or private provision.

The distinction is thus made between "public goods" and "private goods" as two ends of a continuum. The private good is such that when exchanged the benefits of the good are the exclusive domain of the purchaser. Goods such as apples, bread or automobiles which are packageable can be withheld from all but those who pay the price and thus fit the exclusion definition of a private good. Such goods can be dealt with effectively by the private market with public action required only to assure that contracts are enforced and to resolve disputes between participants in market transactions.

Other goods and services such as national defense and control of disease, among others, are such that when available to one individual are available to all within the community. These goods with the characteristic making exclusive

benefits to a single individual virtually impossible are defined as "public goods."

As stated earlier public goods and private goods are extremes on a continuum. The measure of how "public" or "private" a good is will depend on how costly exclusion will be. For example, highways do have in some degree the characteristics of public goods. Nevertheless, in some situations like limited access toll roads, the exclusion of non-paying individuals is undertaken, albeit not without some additional expense.

The public choice literature argues that the costs associated with exclusion of a particular good or service is a substantial influence on the choice between private or public provision of the good.

If the costs of exclusion are great, private entrepreneurs may simply not undertake to produce the good or service. If payments for public goods are sought on a voluntary basis then each individual will find it in his/her interest to withhold payment while continuing to enjoy the benefit. One response to this "free rider" problem is for citizens through government to use the coercive power of taxation to insure that each individual contributes his/her share.

While the "public good" characteristics of a commodity do seem to instruct the choice between public and private provision, many relatively private goods, i.e., where exclusion is not costly, are also provided publicly. Such is the

case of education where although widely available as a privately produced commodity, it is also generally publicly provided.

The public-private characteristics of goods also are seen by public choice analysts as instructive to the level of government which organizes provision. In addition to being producing organizations of goods and services, governmental organizations are seen as a mechanism through which citizens can communicate their preferences. Thus different goods or services, dependent on the spatial domain of their public good characteristics, will affect different groups. National defense whether produced by an individual, a city, a state or a national governmental body, will affect all within the national boundaries. Aside from production issues, the national level of a democratic government is representative of the "community" affected by national defense and where individual preferences for that service are articulated.

The Effect of Decision Structures on Collective Action and Public Provision of Goods and Services.--As indicated earlier, the costs of exclusion associated with public goods may preclude their private provision. The "free rider" problem substantially works against their continued voluntary collective provision. Yet, many goods and services, both private and public, are provided by collective action through governmental bodies which do not rely strictly

upon the voluntary consent of all who are affected.

The calculus an individual seeking public provision of a good or service would need to go through is developed by Buchanan and Tullock in their Calculus of Consent [18]. According to Buchanan and Tullock such an individual would need to consider two types of costs: (1) political externality costs--the costs which an individual expects to bear as a result of decisions which deviate from his own particular preferences, and (2) decision making costs--the expenditures of time, effort, and opportunities foregone in decision making.

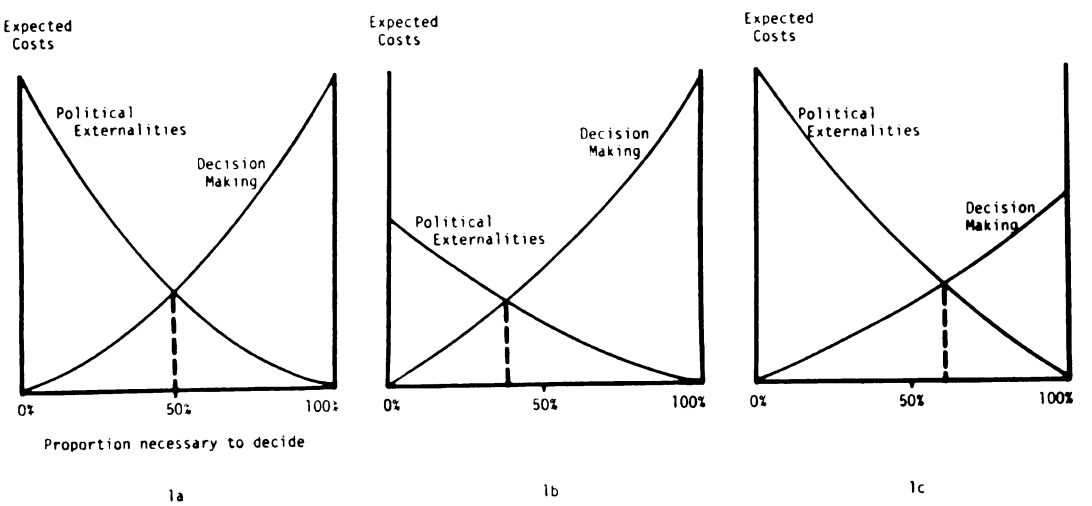
Both kinds of costs are affected by the decision rules which specify the proportion of citizens required to agree to a future collective action-- the constitutional decision rule. Where the rule is one of unanimity, the political externality costs will be zero since any one individual can defeat the decision if his/her preferences are not met. Similarly, the decision making costs will be extremely high in finding that view (or level of service) over which there can be unanimous consent.

Where one individual is permitted to decide on behalf of the group, the opposite would obtain. Decision costs would be low but political externality costs would be high.

The self-interested individual would seek to minimize both of these costs. When, as in Figure la, the two cost curves which the individual perceives are symmetrical, some

form of simple majority rule would be indicated. When as in 1b the opportunity costs involved in decision making are very large in comparison to political externality costs, the individual is expected to prefer a less than majority decision rule. In an extreme case where a rapid decision response is desired decision making even may be vested in a single individual. Similarly, as in 1c when the political externality costs are perceived to be high relative to decision costs, the preferred rule would require a substantial majority.

Figure 1. Decision rules and the costs of collective action.



In commenting on these notions, the Drs. Ostrom write "An optimal set of decision rules will vary with different situations and we would not expect to find one good rule that would apply to the provision of all types of public goods and services" [41].

A logical question following frcm these notions is "does the decision structure affect the articulation of individual preferences and instruct public response to those preferences?" The literature examining voting under majority rule seems to give some insight to this question.

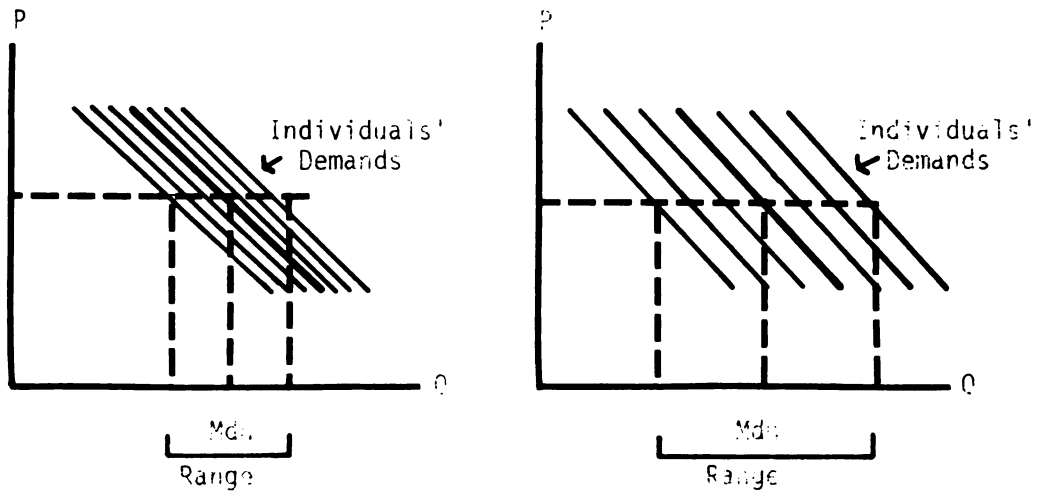
Duncan Black in The Theory of Committees and Elections [8] has demonstrated that if the preference orderings of a community are single-peaked, then a choice reflecting the median preference position will dominate all others in a majority vote. The Drs. Ostrom [41] credit Edwin Haefele among others with pointing out that this solution has implications for the strategy of those who must win approval of an electorate.

If representatives are aware of their constituents' preferences, the task of developing a winning coalition depends on the formulation of a program which occupies the median position of voter preferences, providing that voters are making a choice between two alternatives. Similarly, political leaders or administrators of public programs would have an incentive to develop programs oriented to the median preference position of their constituents. Voters, if given a choice, would then choose the alternative which most closely approximates the median position.

Bish [6] employs this median position notion to illustrate the effect of a community's homogeneity or heterogeneity of preference for a particular good on the political

externality and decision making costs incurred. Figure 2a represents the individual demands of a homogeneous group and Figure 2b illustrates the demands of a heterogeneous group.

Figure 2. Median demand for services in homogeneous and heterogeneous groups.



Homogeneous Group

2a

Hetrogeneous Group

2b

While this analysis based on voting behavior and constitutional rules is instructive, it assumes that the major means of expressing preferences is via citizens' voting. Implicit, therefore, is the assumption that the power to assert preferences is uniformly distributed within the relevant community. More on this issue will be discussed subsequently.

Public Supply of Goods and Services.--Previous discussion of the public choice approach has dealt with issues which instruct the choice between public versus private

provision of goods and services, the level of government which defines the community of affected citizens, and the articulation of citizen preferences. In addition to these, public choice analysts include supply and management considerations when assessing the organization of governmental units and public service delivery.

Again a characteristic of some goods is instructive to both the public versus private provision choice and to the scale of production. Some goods, such as electrical power, telephone service, and sewer service, have the characteristic associated with their production and delivery such that the marginal cost to an additional user is very small or negligible. Many such goods are produced under technologies which are highly capital intensive and require a large market to justify their provision as either a publicly or privately produced good. Since in the case of many such goods, exclusion is feasible, their production under private circumstances is possible. However, because of the declining marginal cost to additional users, production is profitable at prices below private market equilibrium conditions. This is the natural monopoly argument and is the analytical basis for many "regulated industries." It also serves to introduce the economies of scale argument.

Public choice analysts and economists generally would argue that economies of scale are very much a function of the technology employed in the production process, i.e., are

a function of the physical and technical input-output relationship. As such, in a society with a rapidly changing technology, the particular optimal scale of production of a particular good is of a rather transcient nature. Similarly, in a public sector which provides a large number of goods and services which are characterized by a high degree of interpersonal interaction, the possibility exists for diseconomies of scale to occur.

Finally, each product or service produced will have its own technical production relationship; each will have its own optimal scale and that scale will change as technology changes.

The Boundary Issue--A Public Choice Critique of Consolidation Reform

Thus far an effort has been made to present synopses of the Consolidation Reform Tradition and of the Public Choice Approach to governmental reform. The former has been, as is representative of that literature, an argument for primarily one solution--consolidation. The public choice approach has been a setting forth of a number of analytic principles and propositions. It is the intent of this section to make explicit some of the conflicts between the two approaches and to make clear the context of the research undertaken and presented in this thesis.

Multilayered and Overlapping Governmental Jurisdictions.--As set forth earlier, the consolidation reform tradition sees the fragmentation and overlapping of governmental jurisdictions as a major source of inefficiency and institutional failure in the governance of many areas. Improvement of government performance is only possible in this context if, for the region concerned, an integrated governmental structure is developed in which decision making is formally centralized in a single jurisdiction.

The public choice approach challenges both the proposed solution and the analysis of the problem.

As is pointed out by the Drs. Ostrom [41], from the logic of constitutional decision making, public agencies are not viewed simply as bureaucratic units which perform those services which someone at the top instructs them to perform. Rather, they are viewed as a means for allocating decision making capabilities in order to provide goods and services responsive to the preferences of individuals in different social contexts. That is, they are not simply supplying or producing organizations but are for the purpose of facilitating citizens' articulation of preferences.

While, according to the Ostroms centralized decision making may have the potential of reducing substantially decision making costs, the possibility of reducing the expected political externality costs under such circumstances can be realized only if the following conditions are met:

1) "appropriate decision-making arrangements are available to assure the integrity of substantial unanimity at the level of constitutional choice."
2) "methods of collective choice are continuously available to reflect the social preferences of members of the community for different public goods and services [41]."

While the possibility of reducing decision making costs by consolidation may exist, there are those who would argue that there is no a priori basis for expecting intergovernmental transactions to be more costly (pre consolidation) than intragovernmental transactions (post consolication) [47].

Using these arguments directed at the consolidation "solution" to multilayered and overlapping jurisdictions, and adding to them the notions of 1) public goods affecting different communities, and 2) different optimal scales for different goods in production, the public choice approach could argue that further decentralization would lead to more effective government.

Economies of Scale.--Much of the consolidation argument is based on a notion of economies of scale in production of goods and services. Implicit in this notion is an assumption that the consuming or demand unit of government must also be the producer of the service. Indeed, this is the general practice and experience of most U.S. communities.

The experience of the Lakewood Plan communities in the Los Angeles area of California as described by Warren [51] and Bish [6] is seen by public choice analysis as a prime example that this need not be the case. In the Lakewood Plan area, consuming communities of varying sizes purchase many or even all of their public services by contract from nearby producing communities. This suggests that in order to capture such gains as are available under economies of scale in production, a community need not give up its local identity through annexation or consolidation.

Although not based on economies of scale, there is an additional potential gain that public choice analysts see to the contracting approach. As generally practiced, the production and marketing of publicly provided goods and services is under local monopoly conditions. The potential for management inefficiencies under this price giving situation is at least conceptually greater than under competitive conditions. The contract purchasing of services by nearby communities introduces some potential competition among producers and therefore can result in improved performance of producing agencies.

Articulation of Preferences.--A major dimension of the public choice approach to the organization of local government which has been repeatedly included in the previous discussions is that government is a mechanism for the articulation of citizens' preferences; a product of citizens'

actions; a dependent as well as an independent variable. The omission of this proposition or any related notion is a major criticism of the consolidation reform tradition coming out of the public choice frame of analysis.

It seems in fact a strange irony that the political science tradition of metropolitan reform should be based on "efficiency" in production arguments and apparently not until economists focused on the problem was there much of a notion of articulation of citizens' preferences explicitly introduced.

In his "General Paradigm of Choice and Power," Samuels [45] sets forth several notions of relevance to understanding the conceptual issues involved in the "articulation of citizens preferences." Samuels first of all makes clear that society--presumably also communities--operates under conditions of scarcity and that actors in society are interdependent. Thus the conduct or choices of one group of individuals has an impact on other groups. In the process of choosing, individuals do not choose from among only those realistic or available alternatives--the opportunity set.

Samuels points out that traditional economic theory and welfare economics have concentrated on the choice of individuals from among the alternatives of their respective opportunity sets where each alternative has its opportunity cost. The individual's welfare is attained by maximizing within the constraints of the opportunity set. In a process of

public choice this traditional analysis is inadequate because it says nothing to the structure of the opportunity sets which in fact comprise the decision making process.

In developing his notion of interactional choice, Samuels argues that the way in which one individuals choice affects the choices of others is by changing the structure or array of those other persons' opportunity set. This impact of the behavior and choices of others on the structure of one's opportunity set is coercion--a neutral term in Samuels usage. Thus society is a system of mutual coercion in which the choices of each individual have an impact on the opportunity sets of others and therefore on the range of possible choices available to them.

Finally, Samuels defines power as "the means or capacity with which to exercise choice, with which therefore to coerce." The reciprocal of power is the exposure to others' coercive capacity or power. By "means or capacity" Samuels means "the de jure or de facto bases by, with, or on which one acts as a chooser." This could include a person's property, position in an organization, accumulated human capital, or skill at negotiation among others.

"The articulation of preferences" is seen as a process of interactional choice where when one person or groups's preferences count, those of another will not count.

It is the intent of the research reported on in this thesis to explicitly examine the effect of community size,

community homo or heterogeneity, and other associated characteristics on the articulation of citizens' preferences. In this regard, public school districts are seen as political systems in addition to being organizations for the production of educational experiences for the children of the district.

Unlike multiservice governmental units, school districts purport to have a single function--the organization and delivery of educational experiences. This characteristic suggests that school districts may be particularly useful in examining the responsiveness of governmental units to preferences and diversity of preferences for its services in the community.

Thus it is that much of the remainder of this thesis will deal with the distribution of the performance of elementary school children on standardized achievement tests.

CHAPTER II

THE BENEFITS OF EDUCATION - A PUBLIC CHOICE QUESTION

Introduction

As described in the preceding chapter, the historical record of movement toward consolidation of governmental units as well as current moves in that direction have been undertaken based substantially on arguments of economies in production of services. This view of the size of self-governing communities and implicitly of the redrawing of community boundaries, completely ignores the issues related to the articulation of preferences and the effects that such boundary changes may have on whose preferences will count.

In the area of education, the past movement by the lower courts toward redistricting of school districts to achieve racial balance was substantially a movement towards consolidation. Decisions to that end either ignore or accept the effects that such a move will have on the articulation of diverse needs or preferences for schooling experiences within the consolidated district. Since, in this case, the consolidation is being undertaken on the basis of a racial composition formula, the clear implication is that parents of children of color will send their children to public schools in districts where, with respect to color, they can never be anything but a minority.

It is interesting to note that the redrawing of Congressional districts was undertaken explicitly because of a recognition that existing boundaries gave inordinate weight to the preferences of rural people in the body politic at the federal and state levels.

Research Objectives

The objectives of the research here reported is a study of the institutional boundary issue through an examination of the ways in which characteristics of school districts associated with present boundaries affect the distribution of benefits of schools as measured by standardized achievement test scores. It is believed that this examination will shed light on the institutional performance implications of changing boundaries. It may be suggestive of alternatives to current institutional settings and arrangements in which activities organized by governmental units can better meet the diverse preferences and expectations of citizens who consume the goods and services thus produced. While the "Pareto better" type of outcome implied in the above statement may not be attainable, it is believed that the results of this research may at least be suggestive of the directions which individuals and groups should go in seeking redress of grievances with regard to increasing their share of the benefits of publicly produced goods and services.

A further objective of the research is to add to the body of knowledge on social indicators, specifically with regard to their distributive dimensions. To this end the conceptual basis for employing measures of the dispersion of achievement test scores as a new social indicator will be developed. Further, a model will be advanced and empirically tested which will attempt to explain in part the public choice implications of variations in the magnitude of the new indicator.

Such an exercise, in addition to shedding light on the boundary question and the distribution of educational benefits, may suggest ways in which greater insight may be obtained from existing and future indicator data. Further, the notion that the investigation of a clearly institutional question such as that of boundaries may be amenable to reasonable quantitative analysis, may suggest ways of approaching other institutional questions which have so long eluded analysis.

The Educational Problem Setting

While the objectives of this research as stated deal with the boundary question, many of the measurements, models and research assumptions are explicitly about the schooling process. It is appropriate, therefore, to make explicit the context and perspective of the schooling process which has influenced this research.

Do Schools Matter?--Ever since the early 1960s there has been a sustained political assault against economic inequality in the United States. Blacks, women, poor people, students and workers have brought the issue into the streets, forced it onto the front pages, and thrown it into the legislative bodies and the courts. A major response to this assault has been to focus on the schools as a major societal institution thought capable of ameliorating the widespread inequality of opportunity. Implicit in this focus was the recognition that the schools seemed to serve some groups in the society better than others.

The basis of this attention to the schools rests on the belief that performance in schools is in some way related to subsequent personal success. Indeed, investigations and research in the economics of human capital formation have been able to show that as the amount of schooling as measured in years increases, so does the subsequent stream of income [4].

Based on this belief and on the empirical evidence supporting it, massive governmental programs were undertaken to improve the ability of schools to correct the unequal distribution of economic opportunity. Where the resources of the schools themselves appear to be distributed on the basis of race, school integration through busing and redistricting are ordered by the courts. Where school resources appear to be distributed on the basis of economic

class, funds are spent on compensatory education and Head Start, and court decisions are made requiring equal school financing.

Major research efforts to evaluate the effects of the various reforms have been either inconclusive, or have indicated the reforms have been of no effect. Thus, Averch, et al. [2], concluded their survey of the efficacy of educational programs with: "Virtually without exception all of the large surveys of the large national compensatory education programs have shown no beneficial results on average." Other efforts to investigate the relationships between educational inputs and outputs, i.e., educational production functions, have been totally frustrated. The conclusion is widely accepted that the means to making the influence of schools more egalitarian in American society is not known.

Genes or Social Class? An Educational Norm.--Some recent attempts to explain the process whereby inequality is perpetuated have focused on the genetic inheritance of IQ. Out of such efforts as that of Jensen (1969) [32] new life has been given to the old theme that the poor are poor because they are intellectually incompetent and their incompetence is rooted in the genetic structure inherited from their poor and also intellectually incompetent parents.

Brookover, et al. (1973) [14] points out that contemporary educational norms generally accept this perspective to differences in achievement. Thus the explanation for the

failure to educate some students and a rationale for selecting students to be educated to different levels and for different positions is based on such an assumption of innate ability. According to Brookover, this process of identifying and labelling students who can learn and those who cannot has become a major function of schools and is particularly true of those schools which have a highly differentiated (also known as "individualized") program.

Perhaps in response to this theme there is yet another explanation set forth to explain the intergenerational reproduction of economic inequality. This position argues that in a capitalist oligopolistic society with its large bureaucracies, the requirements for success of workers is established by that structure and its institutions and these requirements become the output of the schools. These outputs would include orderliness, docility, discipline, sobriety, and humility among others. The children who learn these lessons best are those whose parents also learned them best and have, therefore, gained the greatest fruits of the system. Thus the argument is one of class structure perpetuating class structure. The role of the educational system within this point of view is not only to reinforce and further rigidify the class structure but to legitimize the process. The latter takes place when the schooling process <u>appears</u> to reward not only ability, but such personality facets as motivation, drive to achieve, and perseverance,

but in fact generally rewards those responses least likely to offend either the school system or the production process of the society. Thus, a high school drop out is not a risk on the production line because he lacks the requisite skills but because he may be angry at his lot in life and might throw a wrench into the working of the line. He is thus "unqualified" for the job. Among the leading advocates of this position are Bowles and Gintis [12] [13] [27].

Consistent with the idea that the schools perform a legitimizing function in a basically class ordered process is the view that school achievement tests have been used in a perverse manner. The development of tests and measurements designed to measure presumed differences of ability provide a means for differentiating between pupils on the basis of ostensibly objective and universalistic criteria rather than on such factors as wealth or ethnic identity. Such tests have become the proof of differences and implicitly place the burden for learning on the pupil rather than being a means for schools and teachers to evaluate their response and responsibility. This use of the tests has become the means to codify or formalizing the educational norm described by Brookover.

Conclusions from efforts to understand educational production functions are that the means to making the schools influence more egalitarian is not known. The conclusions of

the proponents of the latter position based on class is that even if you could make the schools more egalitarian, the all pervasive influence of capitalistic institutions in the society are such as to make the influence of the schools of little consequence in reducing inequality. Such is the position of Jencks [31] who argues that in the absence of a major redistribution of income, the effects of reform in schools on income or economic opportunity will be negligible.

What Does Schooling Produce?--In summary of the above discussion, there are those who argue that schools can have a significant role in correcting inequality in society but do not really know how to accomplish the necessary reform. The other view is that schools, even if reformed, will not be a significant influence on inequality because of the nature and structure of the society as a whole.

A major distinction between these two views of the schools is a disagreement as to what is the important final output of schools and implicitly, in what is accomplished in the process of schooling. One view holds that a substantial portion of the important output of schools has to do with cognitive ability and is thus an element of human capital. This capital may be used either in the further accumulation of human capital or in exchange for some form of income. The other view of school output is that it is substantially a credential -- a diploma indicating attendance,

a recommendation, a reputation -- and that that credential is distributed on the basis of class.

The notion of "Credential" is perhaps best understood as a property right analogous to the rights acquired through union membership, credit worthiness, or riparian rights to a stream. The accumulation of a particular amount of human capital may be a sufficient condition for the acquisition of the credential but may not be a necessary condition. Like the human capital product, the credential or property right from schooling can be exchanged for some form of income.

The Schooling Process - A Perspective.--If the output of schools are purely elements of human capital, then there is logically a production function or functions for the production of this capital in pupils. If, on the other hand, the product of education is purely a credential and, in the extreme case, is awarded without regard to the accumulation of human capital, there is then substantial reason to expect that its distribution of the credential may be seen as a formalized process, albeit requiring a somewhat longer period of time than that of acquiring the rights associated with union membership or ownership of property adjacent to a stream.

The notion that the schooling process can be viewed as a ceremonial laying on of a credential suggests a further insight to the educational process. If, as has been suggested, the accumulation of human capital may be sufficient

condition for the acquisition of the school credential, then the production functions involved are those of the individual pupil. Given a limited quantity of total school resources, then the way in which those resources are allocated to the separate production functions of individual pupils is of interest. Might not the same formal process as is used in laying on the nonhuman capital dimensions of education be employed in allocating inputs between individuals' production functions? Perhaps the notion of a formal laying on of a property right has two dimensions. One is the acquisition of the final credential and the other is the access to the inputs, e.g., the teachers' time and positive attention, necessary in the accumulation of human capital may be a sufficient condition to acquiring the credential. The view of those who argue the futility of school reform would be that the access ceremony is substantially a class phenomenon.

Perhaps an example will illustrate some of these ideas. Consider the pupil in the parochial school class attempting to learn addition. His comment to the teacher on making an error is "Jesus Christ, Sister, I can't get it right." One can imagine that his violation of the etiquette of such a classroom may somewhat postpone his receiving assistance on 2 + 2 = 4 and that subsequent objective tests will affirm his failure to develop mathematical skills.

Within the above analysis it is possible to understand the difficulty of specifying aggregate educational production

functions and of undertaking effective educational reform programs. Further, this framework of analysis itself suggests the general direction of educational reform necessary to render the schools an effective institution in ameliorating inequality in American society. For this to be possible the schooling process must not distribute a credential which may be unrelated to the accumulation of human capital. Further, in order that the schools be at least class neutral, the application of inputs and the rate of accumulation of human capital must be independent of class.

Having entered this discussion of the educational problem setting in part by describing and analyzing the positions of the debators over school reform it is appropriate to make a last comment on the debate positions. While the evidence and analysis of those who argue that the explanation of intergenerational income is substantially a class phenomenon may indeed be quite accurate, the tendency of this position to justify the abandonment of the schools as an institution for change, flies in the face of the importance they place on the schools as a legitimizing function in the total process of promoting class differences.

Much of the preceeding discussion has focused on the process whereby educational inputs and the non-human capital dimensions of education are allocated between pupils. Because a part of this process may be seen as ceremonial and involves the relationship between the actors in the ceremony,

i.e., the pupils and the teacher, the classroom and the individual teacher are here seen as the major locus of this particular allocation process. The classroom is the scene of the ceremony and the teacher is, in the case of public schools, the publicly employed priest or priestess as well as an input in the production process, i.e., teachers are both the allocator of resources, and one of the inputs allocated.

Decisions or practices that affect the allocation of resources between children may also take place at the school (principal) and at the district (superintendent and board) level. Included at these levels would be the kinds of teachers employed, choice of curricula, and other educational strategy decisions such as streaming and individualization. The educational norm emphasizing differentiation discussed above would have an impact on between-pupil allocations through decisions and practices at these levels as well.

The argument of this portion of the discussion is essentially that schools in American society generally serve the middle class majority better than they do any other group. Implicit in this is a a priori notion about the way in which the benefits of education will be distributed. It is the intent of this research to examine whether local (school district) distributions of class which diverge from that of the society as a whole do indeed affect the local distribution of achievement scores. In terms of the parochial school illustration above, one can imagine that the very same teacher

may respond differently to swearing in the classroom if during a parent conference time a substantial number of parents say to her, "Jesus Christ, Sister you gotta do something about my kid. He don't know yet that 2 + 2 = 4."

Socioeconomic Status and Educational Cognitive Styles - A Plausible Explanation of the Role of Social Class in Classroom Resource Allocation

The consistancy with which socioeconomic characteristics of children are identified as variables explaining pupil performance has been discussed and several perspectives to this phenomenon have been set forth. In the course of this research an opportunity presented itself which made possible more direct evidence to understanding the role of social class in the allocation of school resources between pupils.

A Michigan school district involved in a program aimed at improving the ability of teachers to distinguish differences between children which are related to ways in which they derive meaning, undertook to train teachers in the educational science of cognitive style mapping. In cooperation with administrative leadership of the school district and the project leader, an elementary school was identified which served two socioeconomically disparate residential communities.[1] Collective educational cognitive style maps of

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[1] Local real estate firms estimate the November 1974 average market value of homes in the low socio-economic community

children by residential area were prepared from the individual maps of the children and compared with a collective style map of a group of teachers from the whole district who volunteered their individual maps.[2]

Although not without its detractors, the techniques of educational cognitive style mapping appear to this writer to be a reasonable first effort at systematically identifying and describing individual differences in the ways in which meaning is obtained. According to Hill [28] an individual's educational cognitive style is determined by the way he/she takes note of their total surroundings -- how one seeks meaning, how he/she becomes informed. It recognizes differences between listeners and readers; between those who are concerned primarily with their own point of view and those who are influenced by family or associates. It attempts to distinguish between those who reason as would a mathematician, a social scientist or an automotive mechanic.

Educational Cognitive Style as developed by Hill identifies three major sets of influences on personal cognitive

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to be about $12,000. with a high of $18,000. Their estimate of the average market value (for the same time period) of homes in the high socio-economic community was about $45,000 with some homes in the $150,000 range.

2 Because the number of project teachers in the involved school was small, and because the school district did not want this particular analysis to in any way be construed as a reflection on those particular teachers as a group or as individuals, a decision was made to use a district-wide collective style map of teachers -- a decision in which this researcher concurred.

style. The first set relates to the individual's tendency to use certain types of symbols, the ability to understand words and numbers, the ability to perceive qualitative meaning from stimuli via the various senses, the ability to physically respond to various stimuli in various ways (e.g., the ability to walk and chew gum at the same time), and the qualitative responses to various cultural codes or role and situational expectations.

The second set of individual cognitive traits distinguished relate to the influences the individual brings to bear in deriving meaning from symbols. The sources of these influences would derive mainly from (1) the person's assertion of individuality; (2) his/her associates; or (3) his/her family.

In the third set of cognitive traits mapped as part of the individual's cognitive style are indications of the manner in which the individual reasons. Does a person think in categories or in terms of differences? Does he/she tend to synthesize multiple relationships or perhaps use a combination of styles of reasoning?

For each element in each of the three sets comprising the map an individual is determined to have a "major", a "minor", or a "negligible" orientation. In the mapping of college students, using a standard instrument, these levels have a statistical base. In the case of the elementary school children involved in the program described here, the

maps were prepared on the basis of both testing and observed behavior by their teachers. Verification of the maps prepared by teachers was accomplished by the independent mapping of a sample of the pupils by specialists.

The preparation of the collective cognitive style maps in this analysis and their interpretations were done under the guidance of Dr. Joseph Hill and the project leader of the project in the school district. The method employed, according to Hill, is a modified Flanagon technique. Under this method, if for any element in the map 70% of the individuals forming a group were found to have major orientations in an element, then the collective style map for the group was "major" in that element. If for any element not already a "major", greater than 70% of the individuals were "major" or "minor", the element in the collective map was considered a "minor". The assignment of elements of the collective style map as "negligible" was similarly accomplished. For a number of the elements included in cognitive style, either the element was not mapped at all or too few individuals in the group were mapped with respect to that element to have it appear in the collective map. The pupils mapped were in kindergarten, first, second, and third grade.

The results of this analysis are presented in Tables 1 and 2. Since the results of this analysis constitute a single observation, i.e., a case study, the method employed to point out differences and comparisons is as simple as

possible. The values 3, 2, and 1 were assigned to those elements in the collective maps which are major, minor, and negligible, respectively. The total of the absolute value of the difference between teachers and pupils for each element ($\Sigma|\ T-P|$), was used as a measure of disparity between collective cognitive styles. The scale implicitly weights equally the differences between the respective levels of each element for all elements.

The tables indicate clearly a greater degree of commonality of cognitive style between the high SES children and their teachers than exists between the low SES children and the teachers.

Several items from the tables are worth noting. In a school district emphasizing individualized instruction consistent with a general educational norm which rewards individualistic behavior, the low SES children are clearly less individualistic (I) in their proclivities than are the teachers or the high SES pupils.

According to the mapping, individuals are described in terms of their ability to enjoy the beauty of an idea or object, (Q(CES)). Both tables indicate the low SES children to have a lower proclivity in this regard. One can, however, speculate that the difference may be that the teachers and high SES pupils have a greater degree of agreement as to <u>what</u> is beautiful. It should be mentioned that there is within the low SES residential area a substantial Latino

Table 1. Comparisons of Collective Cognitive Styles of Elementary Teachers with Collective Cognitive Styles of Elementary Pupils (K-3) by Pupils' SES as Determined by Residential Areas.

	Teachers	$Pupils_H$	$\lvert T\text{-}P_H \rvert$	$Pupils_L$	$\lvert T\text{-}P_L \rvert$
Number of Individuals	26	41		28	
Cognitive Style Element					
Symbolic Orientations					
T(AL)	2	2	0	2	0
T(AQ)	2	2	0	1	1
T(VL)	3	2	1	1	2
T(VQ)	3	2	1	1	2
Q(A)	3	2	1	2	1
Q(O)	3	-	-		-
Q(S)	3	-	-		-
Q(T)	3	2	1	2	1
Q(V)	3	2	1	2	1
Q(P)	3	-	-		
Q(PK)	-	-	-		
Q(PTM)	-	-	-		
Q(CEM)	3	2	1	2	1
Q(CES)	3	2	1	1	2
Q(CET)	3	2	1	2	1
Q(CH)	2	1	1		-
Q(CK)	3	2	1	1	2
Q(CKH)	2	1	1		
Q(CP)	3	2	1	2	1
Q(CS)	3	2	1	1	2
QCT)	3	1	2	1	2
Q(CTM)	-	-			
Cultural Determinants					
I	3	2	1	1	2
A	2	2	0	1	1
F	3	2	1	3	0
Modalities of Inference					
M	3	2	1	1	2
D	2	2	0	2	0
R	3	-	-	1	2
L	3	-	-		
K	1	-	-		
			16		24
Total $\lvert T - P \rvert$					

3 = Major, 2 = Minor, 1 = Negligible

$Pupils_H = P_H$ = High SES Pupils

$Pupils_L = P_L$ = Low SES Pupils

Table 2. Comparisons of Collective Cognitive Styles of Elementary Teachers with Collective Cognitive Styles of First Graders by Pupils' SES as Determined by Residential Area.

	Teachers	$Pupils_H$	$\lvert T-P_H \rvert$	$Pupils_L$	$\lvert T-P_L \rvert$
Number of Individuals	26	41		28	
Cognitive Style Element					
Symbolic Orientations					
T(AL)	2	3	1	2	0
T(AQ)	2	3	1	2	0
T(VL)	3	2	1	3	0
T(VQ)	3	2	1	3	0
Q(A)	3	3	0	2	1
Q(0)	3	-		-	
Q(S)	3	-		-	
Q(T)	3	2	1	3	0
Q(V)	3	3	0	3	0
Q(P)	3	2	1	2	1
Q(PK)	-	-		-	
Q(PTM)	-	-		-	
Q(CEM)	3	3	0	2	1
Q(CES)	3	3	0	1	2
Q(CET)	3	3	0	2	1
Q(CH)	2	1	1	2	0
Q(CK)	3	3	0	1	2
Q(CKH)	2	2	0	1	1
Q(CP)	3	2	1	2	1
Q(CS)	3	2	1	2	1
Q(CT)	3	3	0	1	2
Q(CTM)	-	-		-	
Cultural Determinants					
I	3	2	1	1	2
A	2	2	0	1	1
F	3	3	0	3	0
F	3	3	0	3	0
Modalities of Inference					
M	3	3	0	1	2
D	2	2	0	2	0
R	3	2	1	1	2
L	3		-		
K	1		-		
			11		20
Total $\lvert T - P \rvert$					

3 = Major, 2 = Minor, 1 = Negligible

$Pupils_H = P_H$ = High SES Pupils

$Pupils_L = P_L$ = Low SES Pupils

community which might clearly have different tastes in "beauty."

Another element in which there is an indication of the teachers being in greater harmony with the high SES pupils than with the low SES pupils is in the area of capacity for nonverbal communication (Q(CK)).

The indications from Table 1 are that the low SES children have less capacity in visual comprehension of words and numbers (T(VL) and T(VQ)) and in dealing with quantitative symbols which are heard (TAQ)). The high SES first graders (Table 2) were in fact more orally oriented to words (T(AL)) and numbers (TAQ)) than were the teachers or the low SES pupils. Both tables indicate that the low SES children had less capacity for categorical reasoning (M) -- the capacity to classify items into categories-than did the high SES pupils or the teachers.

Most of the differences in "style" identified in this last paragraph could represent the same or similar skills as those measured on achievement tests--reading, word relationships, and mathematical skills--and may reflect the past, including preschool, experiences which the children from the respective communities have had in these areas.

One last item of cognitive style difference is worth noting. Table 1 indicates that the low SES children are more influenced by their families (F(major)) than are the high SES children (F(minor)). In this regard the low SES pupils

exhibit a greater degree of harmony with the teachers than do the high SES pupils. Since most schooling situations in the U.S. emphasize individualistic behavior, in which regard high SES pupils are "advantaged", the greater harmony of the low SES children and teachers in their family orientations would appear not to be an advantage to those children.

The findings of several other research efforts of relevance to this analysis are worth mentioning. Wasser [52] undertook a study of the effect that educational cognitive styles of teachers and students have on the grades given and obtained. The results indicate a definite relationship between the degree of harmony of cognitive styles of students with those of teachers and the grade administered. According to Wasser, there is clear evidence that those students who share more communication channels or cognitive style elements with their teachers obtain better grades on average than those students who do not have the same degree of commonality of educational cognitive style with their instructors.

DeLoach [26] in an analysis of the amount of cognitive style disparity as an influence on the outcomes of evaluations of teachers qua teachers by administrators in a community college setting found similar results to those of Wasser.

In general the evidence from this brief analysis and the reported findings of Wasser and DeLoach support the notions set forth earlier that behavioral styles associated

with social class is a plausable explanation of the allocation of resources between pupils in the classroom. A part of those resources may be simply the positive attention of the teacher in response to a "beautifully" turned phrase or sketched landscape, or the willingness to work alone.

Research Assumptions

The preceding discussion of the educational problem setting suggests two of three assumptions employed in the development of this research. The third assumption is a direct restatement for the school district context of the methodological individualism characteristic of the public choice approach as described in Chapter 1.

Assumption 1.--There exists a widespread belief within American society that the educational experiences acquired in schools can make a difference to an individual's future achievements, stream of income, and approach to some cultural definition of "success." The very existence of public schools and universal compulsory education is evidence of this belief. The rising furor over school busing, equality in education, and parochial schools is current evidence of this belief. The literature on investments in human capital provide some evidence that the belief is valid.

It is here assumed that the perception that school experiences are important is widely held throughout American society.

Assumption 2.--In general, the schools in American soc-society serve better the middle class majority than they do any other group. Thus, children with middle class experiences are on the average "advantaged" within the school systems and those with other than middle class experiences are "disadvantaged" within the schools.

The use of "majority" in this context refers to society as a whole as distinct from that of any particular community. The argument that this definition of "advantage" and "disadvantage" is a societal wide phenomenon is based in part on the earlier discussion of the prevailing educational norm. Additional support for this assumption was presented in the results and discussion of the study of educational cognitive styles.

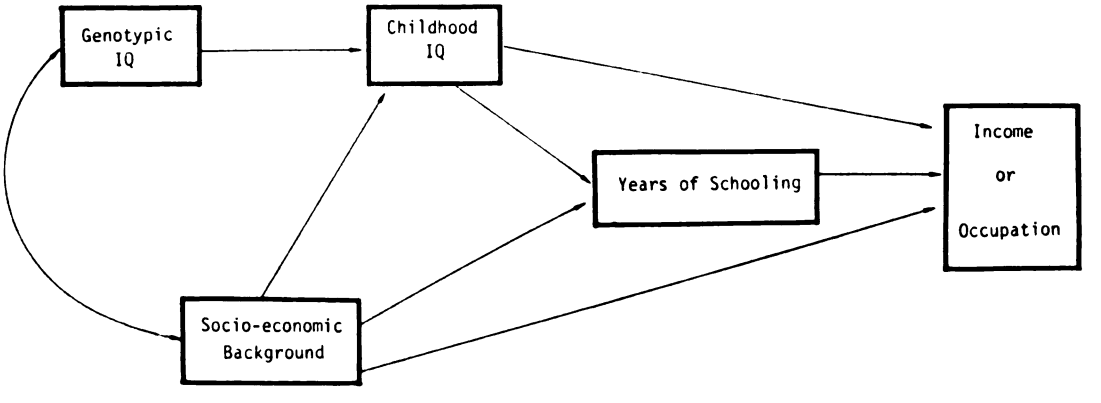
Assumption 3.--It is assumed that parents and/or groups of parents in a community will seek to make the school system responsive to the particular needs of their children. This is true of parents of "disadvantaged" as well as "advantaged" children. However, all parents may not seek this end with equal vigor, nor would all parents have equal resources with which to pursue a response from the schools.

The means that parents employ to bring their concerns to bear on the system may include political activity within or without the school district, interaction with school officials (e.g., via PTA or school boards) or with individual teachers. The particular mechanisms employed are not

essential to the proposed study nor are they subject of the study. What is important is the recognition that a variety of efforts are made to assert and articulate diverse preferences and needs for school experiences. The efforts to have black cultural studies included in schools, and the existence of community debates on the nature of discipline in schools are offered as evidence of such assertions of preferences.

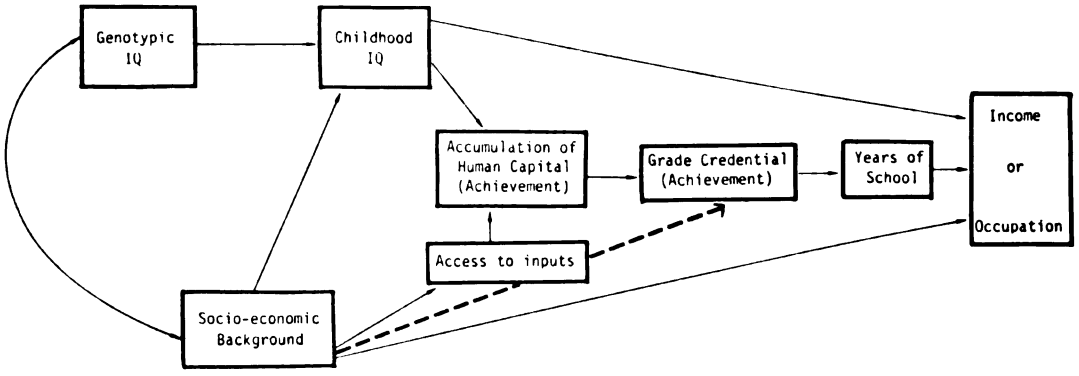
The Assumptions in Perspective.--Bowles [12] in his discussion of the intergenerational reproduction of inequality sets forth a model of the intergenerational effects on income or occupation. The Bowles model shown in Figure 3 below suggests and perhaps clarifies the context of this proposed research.

Figure 3. Recursive model of intergenerational effects on income or occupation. (Bowles 1973)



The following modification of the Bowles model in Figure 4 may assist in making clear the role of the assumptions in this research.

Figure 4. The Bowles model of intergenerational effects on income or occupation modified to illustrate research assumptions.



Under the assumptions of this proposed research the following notions about this model are held:

1. The pathway between years of schooling and income or occupation is a widely accepted relationship within the society.

2. The pathway between socio-economic background and access to inputs is substantially influenced by the prevailing educational norm described and discussed earlier.

3. The possibility exists that there is a pathway directly from socio-economic status to grade credential or achievement.

4. The implications of 2 and 3 above are that the middle class majority are advantaged in both the accumulation

of human capital and in the obtaining of school credential.

5. That parents of children will seek to influence the rate at which their child accumulates human capital and/or gains the school credential.

This research will examine whether the mix of socio-economic class and size are associated with the distribution of performance measures. The exact production and institutional factors that constitute this association are probably many. They have been and will likely be for some time the subject of much research in education processes. For the purpose of this study, knowledge of the exact mechanisms involved is not necessary. It is sufficient to establish, as has been done in this chapter, that there are plausible explanations for such an association. If systematic associations are found, it will enable further investigation of the educational production function and institutional factors affecting the access to resources to be more focused than is presently the case.

As Others Have Seen It - A Review of the Literature

There are two major areas of literature which are of interest to the emperical portion of this research. First is the literature on investigations of the effect of school inputs on pupil outcomes. Second is the public finance literature which has investigated the effect of various school and community characteristics on expenditures for schools

and subsequently on some measure of school output. Both bodies of literature have been involved in the investigation of educational production functions although with somewhat different objectives.

Most of the input-output studies where the objective is to better understand the educational process per se have been aimed at identifying and quantifying the relationships between educational inputs, particularly those which are seen as amenable to policy manipulation, and the outcomes of the schooling process. The latter is usually measured by scores on some kind of standardized achievement test. Although some of these studies have used and infact would prefer to use individual pupils as the unit of observation, many if not most, have used schools or school districts as the unit of analysis usually because of data limitations.

In the school finance literature where the major interests are identifying the determinants of educational expenditures, the associated question of specifying educational cost functions, and investigations of size or scale economies, similar measures of school outcomes are used to control for quality of education or schools. In virtually all of these investigations the unit of analysis has been the school or school district.

In both types of studies where the unit of analysis has been the school or the school district the models employed have either implicitly or explicitly viewed the schooling

unit as a firm, the output of which is measured by the mean level of achievement. This issue will be discussed in some detail in the following chapter. Many of these studies have included a large number and variety of community and population characteristics along with such input or expenditure measured as are available. In general the population and community variables are included in order to separate out their influence so that the influence of the school input variables may be more easily and accurately detected.

A rather thorough review of the input-output literature is contained in How Effective is Schooling? by Averch et al., [2]. In addition to their discussion of the literature, there is presented the detailed summary of nineteen specific studies which had undertaken to examine the impact of a school resource while simultaneously taking account of the impact of other school resources and background factors. According to the authors studies "...that grossly misused statistical estimation proceedures" were excluded.

Of the nineteen studies reported on by Averch et al., eight dealt explicitly with some measure of school, school district, or school community size. Eight of the studies (not the same eight as for size) dealt with other characteristics of the school or school district community, usually including some characterization of the population with regard to incomes, years of education, and occupations.

The Influence of Size.--The results of these reported investigations with respect to size is not consistent and results even within a particular study are contradictory. Thomas [48] examined the influence of a large number of input and discriptive variables on eighteen different mean output measures of highschools. The output measures ranged from tests of abstract reasoning to mechanics skills. The size of the 12th grade class was consistently significant and positively related to the output measures. However, the population of the community was consistently non-significant. Benson et al., [5] in a study of California school districts found that in three size groupings based on average daily attendance (ADA) the effect of ADA was quite different. In the smallest districts size was significant and a positive influence on reading achievement; in the middle-sized districts the influence was significant but negative; and in the largest the influence of size was non-significant. Burkhead et al., [19] found no significant influence of size as measured by average daily attendance on a variety of output measures of large city highschools. Katzman [34] on the other hand found that the size of the area served by an elementary school was positive and significantly related to median reading scores, attendance rate, and the continuation rate of elementary school alumni.

In the studies reported on above size was not the major focus of the research. There are, however, a number of

studies in which the size of the school or school district has been a major focus. Such is the case of the literature which has investigated the question of economies of scale in the production of education. Some of that literature is reported in Averch et al., and some is not included there. Again there is no clear agreement in the literature on the existance or non-existance of a economies of scale influence of size in districts although there may be scale advantages in individual schools.

The two major elements in the debate with regard to size in this literature revolve around the unit of observation, i.e., school or school district, and the means for accounting for quality differences between units. Hirsch [29] found that there was no basis for economies of scale in school districts when quality was controlled for using an index for quality basec on a variety of teacher qualifications, pupil/teacher ratios, school program as measured by credit units, and percent of highschool seniors entering college. Schmandt and Stevens [46] in another study of school districts found that there was a basis for an economies of scale argument, i.e., a significant and negative relationship between size and per pupil current expenditures, when quality was measured by an index of the variety of subfunctions performed in each district. Kiesling [36] on the other hand found no evidence for economies of scale in school districts when achievement scores were used as output measures.

Riew [44] in an examination of schools by observing only districts with one high school found evidence for economies of scale when quality was determined by teacher qualifications, class size, breadth of program, and degree of specialization of instruction. Cohn [21] in his study of economies of scale in Iowa high schools found that average daily attendance was not significant in influencing achievement mean. When cost curves were estimated and school achievement means were included as an estimate of quality differences, that variable was not significant. Cohn did find evidence in the relationship between size and costs to lead him to conclude that economies of scale exist in Iowa high schools and that the least cost size is in the order of 1500 pupils. Osburn [41] found similar results to those of Cohn with data on Missouri high schools. Osburn, however, used only three quality classes based on the breadth of school curriculum.

White and Tweeten [53] in a relatively recent article (1973) on the issue as it pertains to rural areas dissect the cost function into three component parts. The identification of costs associated with instruction, those associated with overhead and facilities, and those related to transportation permitted these investigators to detect the influence of student density on transportation costs. They present evidence that differences in high school curriculum and student density cause significant differences in the optimal school size as measured by minimum attainable costs.

While one may conclude from the recitation of this literature that per pupil cost economies of school size may indeed exist, this review also makes clear that this literature has not dealt with the possible influence of size on the distribution of the outcomes of schooling. Since the output measures of schools, i.e., achievement scores, are generally better than are measures of other publicly provided services, the literature with regard to education and schools substantially represents the literature of this nature for public services generally.

The Influence of Community Population Characteristics.-- Consistant with education production function models where characteristics of individual pupils which may account for performance differences are included, these studies where whole schools or school districts are the unit of analysis have often used a variety of population characteristics in a similar manner. Among the most frequently used population characteristics are measures of the central tendency of family or household income and of adult years of schooling. A variety of other characteristics have also been used including unemployment rate, occupational groups as a percentage of the work force, and some socio-economic index or index of cultural advantage.

The findings of this literature including that reviewed by Averch et al., [2] is that the most consistently significant of these characteristics of communities in explaining

mean output is the measure of income level. Although somewhat less consistent than income measures, the measures of adult education attainment are often found to be a significant variable in the same context. Both are usually positively related to the measure of mean output, e.g., mean achievement. The experience with other community population characteristics is quite varied. In general the studies employing such variables are seen as giving results consistent with those where individual pupils are the unit of analysis. In the latter type of investigations the socio-economic status of the individual by one measure or another is the most consistently found predictor of pupil performance. Thus, investigators using the more aggregate data appear to interpret the various population characteristics for communities in much the same way as socio-economic measures are understood for individuals.

Within this rather formidable body of literature there has not, to this writers knowledge, been any attempt to use these or other characteristics of communities in an investigation of their affect on the distribution of a publicly provided service within the community.

CHAPTER III

THE DISTRIBUTION OF SCHOOL DISTRICTS BENEFITS (A MEASURE OF SCHOOL DISTRICT RESPONSIVENESS)

Introduction

The Coleman Report [22] and other studies which have attempted to examine the relationship between educational inputs and outcomes have consistently identified background factors and the socio-economic status of a student's family and community as important determinants of educational outcomes.[1]

Unfortunately most of this literature has not been consistent in its identification of significant inputs to an educational production function. This has led some to the rather astonishing conclusion that inputs to education make no difference in the performance of students.

As pointed out in the preceeding chapter, most of the work on educational production functions has employed socio-economic and other background variables with a view to controlling for such influences while seeking to quantify the causality relationships between educational outcomes and inputs which are amenable to manipulation by administrative policy decisions. While some work has been done to examine the different responses to school inputs by children of

[1] See H. Averch, et al. [2], for a comprehensive reivew of this literature.

diverse social classes [49], work which has undertaken to employ such variables in studying the political economy of educational outcomes has not been found.

As stated earlier, it is the purpose of this research to explicitly examine the relationship between characteristics of communities affected by boundaries and the distribution of benefits of education as measured by achievement tests.

The Level of Benefit Versus The Distribution of Benefits--The Brown-Saks Model

In the rapidly growing literature which attempts to apply economic concepts to the analysis of education, the school or school district is thought to be a firm whose output is measured by the mean score of its pupils on some standardized achievement test. Most of these studies have employed regression techniques to estimate the productivity of various school inputs. The conclusion of reviews of this literature is that there is no consistently identified school input which appears to matter. As stated earlier, a growing number of educators and researchers have agreed in fact that school inputs do not matter.

Brown and Saks [16] have re-examined the microeconomics of the problem by viewing the school or school district as a multiproduct firm where each pupil's performance is of interest to the school. Within this perspective, the central questions relate to the allocation of resources between

individual pupils. Further, Brown and Saks argue and demonstrate that in such a model, the mean of pupil performance can be unaffected by variation in inputs even when those inputs are productive.

As set forth in the Brown-Saks explication, the school's decision regarding the distribution of outputs will depend on the following variables:

a) the marginal products of the available inputs when applied to particular pupils;

b) the marginal utility of particular pupil's performance as evaluated by the school authorities or the community; and

c) the amount of any input exhausted when that input is applied to a particular pupil under the existing production conditions.

in dealing with the community preferences for trade offs between the level of achievement (mean) and the dispersion of achievement (variance), Brown and Saks have borrowed from notions set forth in portfolio theory. This borrowing is possible if individual pupil scores enter the social welfare function in quadratic form which can be re-expressed in terms of the mean and standard deviations.

Figure 5 sets forth the possible general welfare indifference in curves in mean and standard deviation space.

The upward sloping curves, W_L and W_L', represent the preferences of a school district which in selecting between policies A and B which result in the same mean performance but different dispersions, prefers the policy with the smaller dispersion, polity A. (W_L' being a higher indifference

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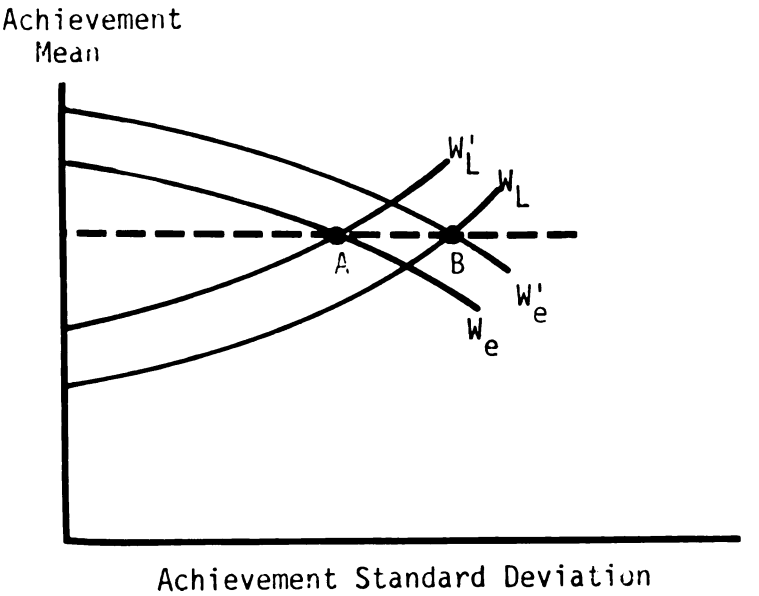
curve that W_L.) Brown and Saks dub these types of districts as "levelers" and point out their similarity with rist-averters in the parlance of portfolio theory.

Figure 5. Types of welfare indifference curves for achievement mean and standard deviation.



Similarly, the downward sloping curves W_e and W'_e represent the preferences of districts which when choosing between policy A and B prefer policy B and its associated greater dispersion. (W'_e being a higher indifference curve that W_e.) Brown and Saks designate this type of district as "elitists."

These authors point out that indifference curves could be straight horizontal lines implying that a school district pays no attention to the dispersion of its students' performance.

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Having thus set forth the possible utility functions, the authors develop the arguments necessary to depict the production choices in mean-standard deviation space as follows:

Consider a school or school district with just two pupils[1] who differ in their achievement levels at the beginning of the school year. Consider further that there will be a different marginal productivity of inputs when applied to the two pupils and that the production relationships for the pupils are linear. The district is limited in total inputs available. Figure 6 illustrates the case.

The ordinate and abissa of the figure measure the achievement of the respective pupils. The triangle ABC represents the production possibilities given the initial achievement levels of the two pupils. If all of the limited inputs were applied to pupil A, point B would be obtained. If all of the resources were applied to pupil B, then point C would obtain. The line BC represents the production possibilities if none of the school's resources are wasted. It is from this set that the school must choose. As drawn the absolute value of the slope of the line BC is greater than one implying that the marginal physical product of the inputs are greater when applied to A than when applied to B.

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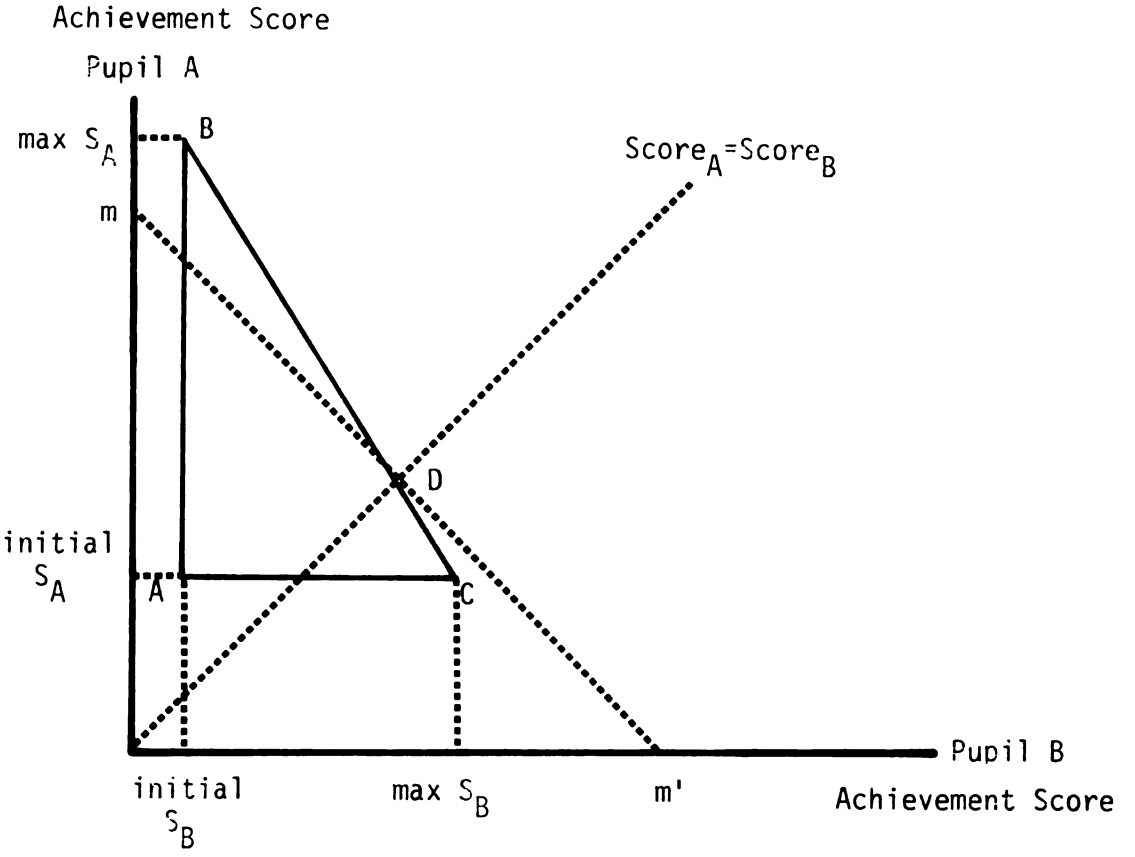
[1] The analysis is unchanged if, rather than two pupils, two homogeneous groups of pupils are used.

Figure 6. Production possibilities set for two pupils.



The next step is to map the production possibilities set into mean-standard deviation space. In order to accomplish this, two additional lines are drawn on the figure. The 45^{o} line from the origin represents all points where the scores of the two pupils are equal. This also represents the locus of points where the standard deviation of their scores are zero.

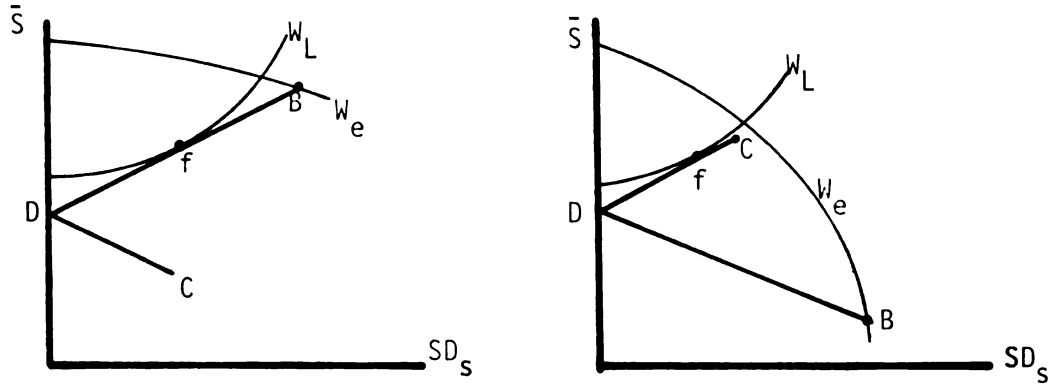
The line mm' drawn perpendicular to the 45^{o} line and intersecting point D on the production possibilities curve, represents a locus of points with a constant mean. Lines

parallel to mm' further from the origin would have higher means and those closer would have lower means. Thus line mm' represents a whole family of isomean curves.

As we move away from point D toward C along the production possibilities curve, the standard deviation increases and the mean decreases. Similarly, movement from D toward B results in a rise in the mean and an increase in the standard deviation of achievement. It is thus now possible to transfer the production possibilities set into mean-standard deviation space.

Figure 7a illustrates the choice situation in mean-standard deviation space for the conditions set forth in Figure 6.

Figure 7. Production choices under elitist and leveler preferences with two alternative educational technologies.



7a 7b

When the indifference curves are added to the graph only the D-B portion of the production set is relevant. If the school board of a district were elitist then their highest level of welfare would be obtained by applying all their inputs to pupil B. If the district was made up of levelers, then resources would be employed to produce both a lower mean and lower dispersion of outcomes as represented by point f.

In the case where the marginal productivity of the input is greater for the pupil with the lower initial starting point (Pupil B), the production set BC will be flipped about point D as in Figure 7b. In this case only the D-C segment of the production set is relevant except for the case where the district is sufficiently elitist to still choose to devote all resources to the pupil starting off with the highest score (Pupil A).

Brown and Saks point out two extensions of the model worth noting. First, if the number of inputs are increased and they possess differing comparative advantages, the possibility that a school will specialize in better students is reduced regardless of how elitist the district is.

The second extension of the model is to increase the number of pupils considered. According to the authors this creates a situation where there is no longer a one-to-one mapping between student achievement space and mean-standard deviation space. Under this circumstance the production set

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becomes an area in mean-standard deviation space. The utility function does guarantee that only points on the boundary of the area need be considered.

A major contribution of the Brown-Saks explication beyond enlightening the debate over the productivity of inputs, is the clear demonstration that measures of the dispersion of pupil achievement are of considerable consequence.

The authors make clear that even if a school district had a "leveling" set of goals, it could, if faced with a particular technology and student body, still end up producing a wider dispersion of outputs if that were the effect of the available technology. Thus they argue, the separating out of the dispersion effect in production from the consumption effects is extremely difficult if at all possible.

Several comments on this latter point are appropriate. The earlier discussion of the differentiating educational norms as set forth by Brookover, et al., [47] is evidence that current educational technology embodied in the training of teachers, classroom materials and acceptable teaching practice may well be biased towards pupil differentiation regardless of the desires of communities.

While this model views the consumption and production biases as distinct and separate phenomenon, it is, I believe, logical to argue that the choice of a particular type or combination of inputs is itself a function of the preferences of the community. The introduction of black studies and

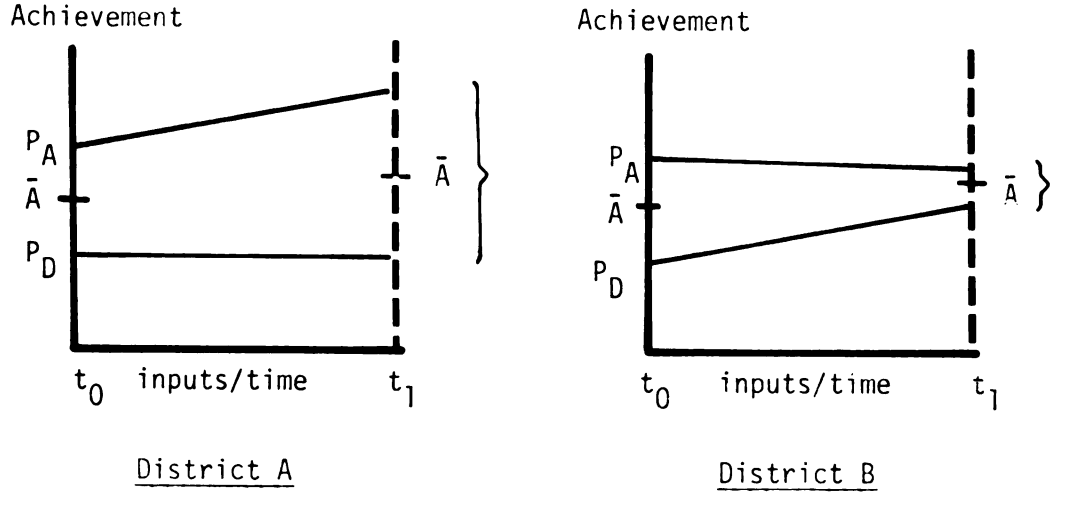
other special interest programs are evidence in support of this argument.

The Distribution of Achievement--A Measure of School District Responsiveness

An extension of the Brown-Saks model by including the evidence associating social-economic status and achievement, leads to the use of measures of the dispersion of achievement as indicators of the responsiveness of school districts to groups other than the middle class majority.

Consider two school districts, each with two pupils. One pupil is advantaged and the other is disadvantaged. The definition of "advantage" is that used earlier in the second general assumption of this research. Figure 8 illustrates the model.

Figure 8. The effects of alternative educational strategies on pupil outcomes.

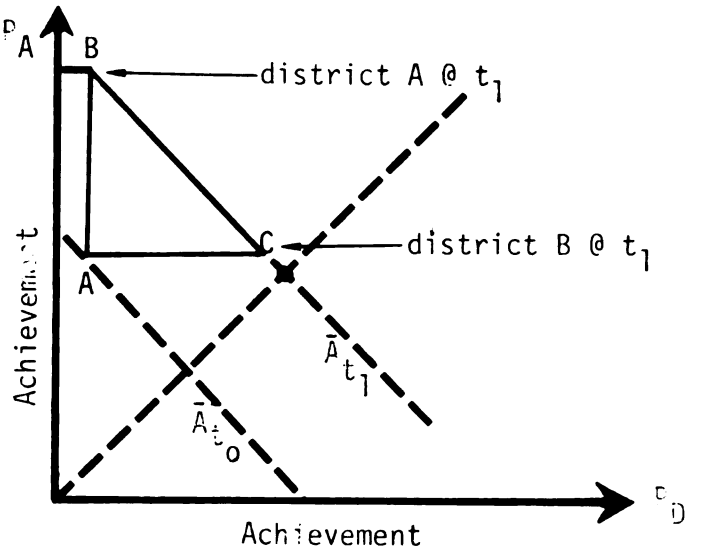


The difference between the two districts is that District A employs an educational strategy which serves only the advantaged pupil, while District B employs a strategy which serves only the disadvantaged pupil. As illustrated, if the growth in achievement of the two affected pupils in the respective districts are equal, then, given the starting conditions, the means of the districts at time t_1 will be identical. The distribution of achievement will, however, be quite different.

It will be recognized that this model when presented in the context of the production possibilities portion of the Brown-Saks Model represents a case where the marginal productivities of the inputs are equal in the two pupils but where, because of the achievement differences at the initial conditions, the entire production possibility set occurs in the achievement space above the zero variance line (45^{o} line). Figure 9 presents the same analysis as Figure 8 in the manner of Brown and Saks.

This is obviously a special case both in terms of the starting conditions and in terms of the marginal productivity of the inputs. It does, however, begin to develop some notion of the ends which parents of disadvantaged children would seek and the directions that school districts would go in responding to the wishes of these parents. For both, as argued thus far, this would represent a reduction in the dispersion of achievement.

Figure 9. The effects of alternative educational strategies on pupil outcomes.



The goals of the parents of disadvantaged children or of the school system responding to those parents can be further defined by making two additional assumptions and by reworking the Brown-Saks model in the light of these assumptions.

The first additional assumption is the elimination of the "elitist" type preference function. While communities may vary considerably in the degree to which they are adverse to inequality of educational outcomes, i.e., leveling, the extreme solutions implied by the "elitist" indifference curves do not appear reasonable within a democratic society. Even under the most elitist conditions of racially segregated schools in recent history, there did not appear to exist the extremes of resource allocations implied by the "elitist" solutions of the Brown-Saks model.

The second additional assumption is that the marginal productivity of inputs applied to advantaged children will be greater than or equal to their productivity with disadvantaged children. Thus, the model is restricted to cases where in student achievement space the negative slope of the production possibilities set is greater than or equal to that of the isomean lines.

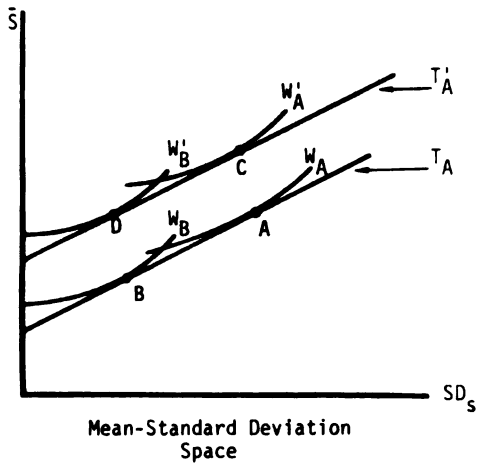
This assumption is intended to reflect the view that there is not presently available educational inputs which serve the children of disadvantaged parents better than those of the advantaged. Some may view this as a heroic assumption particularly when viewed from the common experience of clearly observed differences among children, with regard to proclivities for different skills and activities. However, when it is considered that this assumption is with regard to the inputs employed in the instruction of a particular set of skills, i.e., cognitive academic, and is here considered at elementary school levels, it is not particularly unreasonable given the technology available at that level. Brookover's contention of a differentiating educational norm is supportive of this assumption. The evidence that the impact of Sesame Street, an effort at developing an instructional technology specifically designed to meet the special needs of disadvantaged children, has had an even greater impact on advantaged children, further supports the assumption [3] [10].

One of the implications of these additional assumptions to the model is that they restrict the area of choice to the portion of the production area which falls above the zero variance line (the 45 degree line out of the origin of the achievement axes) in student achievement space. Several other implications of the additional assumptions will be developed as strategies available to parents of children who are disadvantaged within the schools are examined and explained within the model.

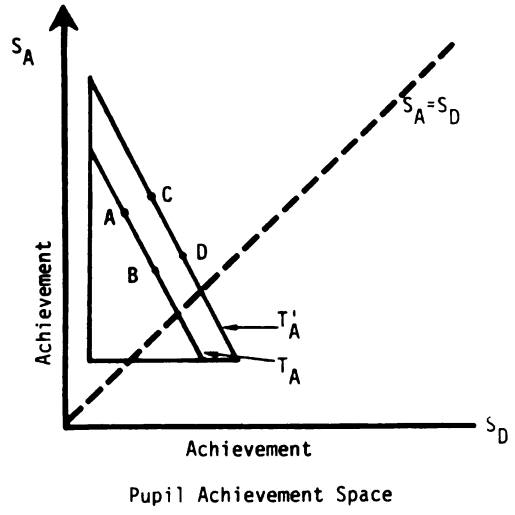
Within the context of this model parents of disadvantaged children have several alternatives available in seeking to obtain improved levels of achievement for their children. The alternatives are discussed here under circumstances where either community preferences are fixed or where the educational technology is fixed. The purpose of using these two circumstances is illustrative and is not intended to represent this writer's view of reality. The latter is that reality likely lies somewhere between the two extremes.

If faced with a fixed educational technology which generally serves their children less well than other children, parents of children who are disadvantaged within the schools have two types of strategies open to them. They can seek to change the preferences of the community such that more of the elitist inputs are allocated to their children; they can seek an increase in achievement outcomes of all pupils; or they can support both strategies. Figure 10 illustrates these alternatives.

Figure 10. Strategies available to parents of disadvantaged pupils where educational technology is fixed and is marginally more productive on advantaged pupils.



10a



10b

As Figure 10b shows, a movement from starting position A to either point B, point C or point D represents an increase in achievement for the disadvantaged pupil or group of pupils. Figure 10a demonstrates that movement from point A to point B would be accomplished by a change in community preferences (W_A to W_B). Such a case might be where disadvantaged parents organize to get a person sympathetic to their needs or preferences elected to the school board. Figure 10 also illustrates that an overall increase in output (T_A to T'_A), i.e., an expansion of the production possibilities, will result in improved achievement of the disadvantaged pupil as represented by movement from point A to point C. Movement from point A to point D as the figure makes

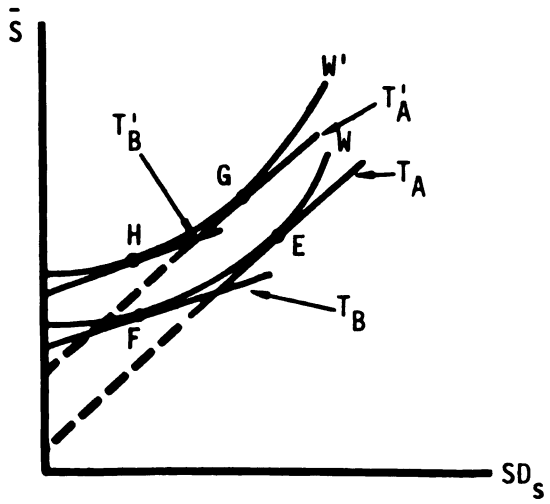
clear, is accomplished by both a change in preferences and an expansion of the production possibilities.

If faced with a situation where community preferences are fixed, and the educational technology employed serves their children less well than the advantaged children in the schools, parents of disadvantaged pupils again have several strategies available to them within this model. They can seek to change the instructional technology employed to one that is more productive with their children. Such a change might be represented by the persuading of school officials to employ a workbook for reading which is more representative of the experiences of disadvantaged children than that previously used, or by advancing the class through reading materials at a pace more conducive to disadvantaged pupils.

A second strategy available to the parents of disadvantaged pupils under these circumstances is to support efforts which result in an increase in achievement of all pupils, i.e., an expansion of the production possibilities. A third alternative is a combination of both of the first and second strategies. Figure 11 illustrates these cases.

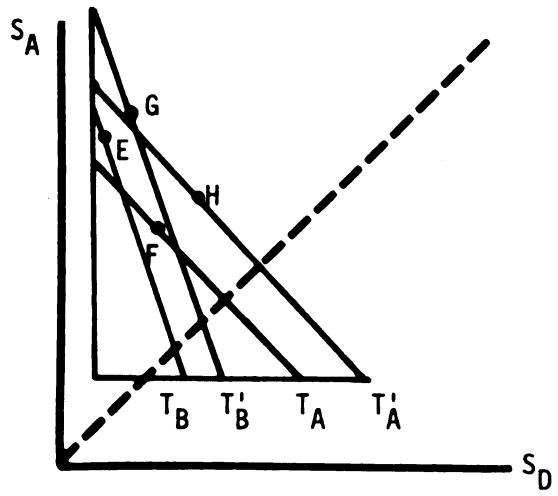
The movement in Figure 11a from point E to point F represents the strategy of obtaining a change in the instructional technology to one which is relatively more productive with the disadvantaged pupil, (T_A to T_B) given the fixed preferences as represented by W - W'. As Figure 11b makes clear the shift from E to F represents a gain in achievement for the disadvantaged pupil.

Figure 11. Strategies available to parents of disadvantaged pupils where community preferences for pupil achievement mean and standard deviation are fixed.



Mean-Standard Deviation Space

11a



Pupil Achievement Space

11b

Similarly, the movement from point E to point G in Figure 11a and 11b represents the strategy of accomplishing an increase in the achievement of all pupils by an outward shift of production possibilities from T_A to T'_A (W' indicates a higher preference indifference curve). The movement from point E to point H in Figure 11 represents the results of both modifying the instructional technology employed and of expanding the production possibilities.

What is apparent in both of these illustrations is that a reduction in the dispersion of pupil achievement scores represents a schooling situation more responsive to the disadvantaged pupil. It is likely that parents of disadvantaged

children who are dissatisfied with the treatment of their children in school will seek both greater community acknowledgement of their child's right to more equal achievement and the employment of inputs in the schools which are more appropriate to their children's special needs. The reality of the situation is likely that a parent or group of parents seeking a more responsive school system will raise their concerns in a variety of ways in a variety of situations. Such activities may raise the consciousness of the community to the problem, may simply cause school officials or teachers to change their instructional approaches, or both may occur. The aggrieved parents need not know the specific inputs which are more appropriate, they may need only make clear that they want something done.

Within this argument it is not necessary to distinguish between the influences of a shift in community preferences and those of changes in technology since the effect of both influences are measured by changes in the dispersion of achievement. Therefore, it is the argument of this section that ceterus parabus, the lower the dispersion of achievement, the more responsive a school district to the educationally disadvantaged children and their parents in the community. The balance of this thesis will seek to examine the community circumstances under which this will occur.

It is appropriate to point out that of the six strategies discussed in the preceeding paragraphs as available to

parents of disadvantaged pupils in seeking to obtain improved achievement for their children, only four can be considered as "Praeto better" states within this model. Thus, it seems clear that there is the potential for substantial conflict between those whole interests are improved achievement for disadvantaged pupils and those whose interests are on behalf of those already advantaged within the schools.

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CHAPTER IV

WHOSE PREFERENCES COUNT? - A PUBLIC CHOICE MODEL

The previous chapters have described the major intellectual views of the boundary question and have argued in a set of research objectives that an examination of the political economy of schooling at the district level may shed light on that issue. A perspective to the schooling process has been set forth as a basis for a set of assumptions which it is believed will make the original objective empirically testable. The conceptual basis for an indicator of school district responsiveness to the socio-economically disadvantaged has been developed and will be employed in the empirical work.

Much of the empirical investigation of this research is exploratory and does not fit a strict hypothesis testing framework. There are, however, several hypotheses which suggest themselves and in order to test them some kind of model is required. It is the objective of this chapter to make explicit the hypotheses to be tested, the models to be employed and the additional areas of investigation.

The Development of Hypotheses

The public choice approach set forth in Chapter I argues that the individual in seeking public provision of a good or service would need to consider both political externality

costs and decision making costs. So too, a group seeking to obtain a larger share of the benefits of publicly provided services would consider both of these types of costs.

Within this framework of analysis the notion of "disadvantaged" as used in this thesis and research is to have a greater than average political externality cost imposed by the structure and processes of society. In the case of the group disadvantaged within a particular school district, this would be a group per capita share of benefits less than the mean for the school district. While, as Chapter II argues, this is generally true for those disadvantaged under the educational norm, it is likely that there will be some community circumstances under which they will fare relatively better and other circumstances under which they will fare relatively worse.

The objectives of this research are to examine those circumstances insofar as they relate to or are affected by changes in boundaries. The hypotheses here developed are predictions about the effect of those circumstances.

Under the public choice approach two major factors would be identified as influencing the ability of a group seeking to increase its share of the benefits of publicly produced goods and services. These would be the decision making costs they face and the power the group can muster in the body politic within which they act. The notion of decision making costs is here seen as including the costs of

"voice" set forth by Hirschman [30]. The idea of group power may include the power deriving from coalitions, but the costs of the formation of coalitions would be included in decision making costs.

The notion set forth by Buchanan and Tullock that decision making costs will rise increasingly as the percentage of a group required to decide increases is suggestive of several ideas about the community circumstances which are more or less favorable to the group seeking a change in the delivery of public services. It suggests that, as the proportion a group is of the total community remains constant and the size of the community increases, the numerical size of the group will increase and will thus face higher decision making costs. This could mean that other things constant, smaller groups may be proportionately more effective in obtaining a response from the body politic than larger groups.

The Buchanan and Tullock notion is suggestive but somewhat less than complete on the issue of size. Bish [6], in discussing the size of school districts identifies an increase in bureaucratization of school administration and an increasingly dominant role of professional educators as size increases. Such circumstances could make "voice" more costly. Similar arguments could be made with regard to the organization of other publicly produced goods or services besides schools.

Spatial dimensions of size, both with regard to distances

between group members and distances between individuals and the locus to which they must exercise their voice, would also suggest increased costs as size increases.

Samuels [45] in describing his general paradigm of choice and power defines power as "the means or capacity with which to exericse choice." By means or capacity is meant the de jure or de facto basis by, with, or on which one acts as a chooser. Thus one's property, position in an organization, accumulation of human capital, occupation, skill at negatation, etc. would have an influence on the individuals resource of power. As pointed out in Chapter I, the voting models and constitutional rule paradigms assume implicitly that power in a community is distributed on the basis of "one person, one vote"--a highly unlikely circumstance. The notions set forth as to the ways in which influence may be brought to bear on a school system includes more than voting or electoral activities. While the estimation of an individual's or a group's power is extremely elusive, the notion of power as set forth by Samuels is nevertheless useful.

With regard to the response of the body politic to the preferences of individuals or groups, the power idea argues that, other things constant, as power increases the expected response would be greater. Since the notion of power is a relative one, efforts to express power would be in proportionate terms to the relative whole, e.g., a group's voting

power in a community would be approximated by the proportion the group is of the total electorate.

The combining of decision making cost notions with the power concept is suggestive of several hypotheses about the size of communities and thus the boundary question which are worth testing.

Hypothesis 1.--As the size of a school district increases, ceteris paribus, the share of the benefits a particular societal minority within the community obtains will decrease.

Restated in terms of the indicator of school district responsiveness to the disadvantaged, this hypothesis would be as follows: As the size of the school district increases while other things are held constant, the school district responsiveness to disadvantaged pupils would decline as indicated by measures of the dispersion of achievement.

Hypothesis 2.--As the power of a societal minority within the community increases, other things constant, their per group member share of the benefits of education will increase.

Restating this hypothesis in terms of the pupils disadvantaged under the educational norm and the indicator of school district responsiveness to that group would give the following: As the power of the disadvantaged group in the community increases, the schools will be more responsive to that group as indicated by the measure of the dispersion of achievement.

Hypothesis 3.--The more diverse the preferences and/or needs for educational experiences, i.e., the greater the degree of school district heterogeneity, ceterus paribus, the less responsive the schools will be to societal minority groups within the community.

Beyond Hypothesis Testing

In addition to explicitly testing the hypotheses set forth, the following additional question will be included in the investigation: The Sponsors vs. the Consumers of Public Education.

In Michigan and in most other states in the U.S. local school boards are empowered to organize public education in the community by general election and referendum approval. The sponsors of public education are thus the electorate of the school district community. The consumers of public financed education can be viewed as parents of public school children--a subset of the electorate.

It would be interesting to know to what extent the consumers of public school education differ from the sponsors of education and if school systems are more responsive to one or to the other. Further, it would be of some interest to examine the general direction of that influence in context of the questions being raised in this thesis--i.e., does the influence of the nonconsuming sponsors cause the schools to be more or less responsive to the disadvantaged.

While no particularly definitive answers to these questions are expected from this research, these notions are relavant in examining the responses of communities to citizens' preferences and will be included in the empirical investigations.

The Model

A general model is proposed to examine the political economy of the response of school districts to the disadvantaged and to test the hypotheses set forth. In the sense that the model here described sets forth an argument for the inclusion of certain variables in the investigative work it is a "model" in the usual sense of the word.

A further comment is appropriate before presenting and discussing the model. The individual and aggregate achievement outcomes of the schooling process which are used in this research as a measure of the benefits of schools are the result of technical production relationships, i.e., production functions. The Brown-Saks paper discussed in the previous chapter is a substantial contribution to a better understanding of how to approach investigations of that process. The model described here and the empirical research employing the model are not viewed as describing the production of achievement--they are <u>not</u> seen as descriptive of the educational production function. In large part the actual technical production function (functions--one for each

pupil) is viewed in this research as a black box, the workings of which are extremely uncertain. The black box is under the management of a heirarchy of teachers, principals, district administrators and school board members, and is influenced by both the sponsors and the consumers of public education. The social-economic-political behavior of the community is viewed as a constraining influence on the behavior of those who manage the black box. Neither the behavior of school district staffs or that of the sponsors or clients of the schools have been observed directly in this research. Some general assumptions about behavior of the respective groups have been made and some predicitions (hypotheses) about the effects of their behavior under certain circumstances have been set forth.

An analogy may be helpful. There is within this writer's experience at least one dairy farmer in the U.S.--there may be others--who does not make silage out of "grass" substantially because his wife cannot stand the smell of grass silage in her house during much of the winter months.[1/] A preliminary investigation of the influence of attitudes towards the smell of grass silage held by farmers' wives on the management choice between grass and corn silage would not require full specification of the respective production

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1/ Grass silage, usually made from a mixture of a leguminous crop such as alfalfa and grass has a particularly pungent odor which is picked up by any material such as shoes or clothing which comes in contact with it.

functions (corn and grass) in order to be useful, however more desirable the complete model may be.

The model here employed is as follows:

$$R = f(N, C, P, S)$$

where:

R = responsiveness of school district to the disadvantaged under the educational norm.

N = the degree of implementation of the norm in the management of schooling experiences.

C = the degree of community consensus, i.e., the heterogeneity of the school district community.

P = the power of the disadvantaged group in the school district community.

S = size of the school district community.

Each element in the model has been discussed in some depth elsewhere in the thesis. The model is primarily a behavioral one and, as was pointed out above, no direct observation of behavior has been made in this research. Thus the empirical application of the model must be based on proxy variables which infer behavior rather than measure it directly. The choice of proxy variables is constrained by the availability of data and its form.

In specifying this model it is assumed that the independent variables employed are determined substantially outside of the system which is being described. That is, the independent variables are predetermined.

The degree of implementation of the educational norm is substantially a function of the educational strategies chosen

by school system administrators and of the behavior of staff, particularly teachers. In fact, some of the specific strategies such as the employment of nonteaching instructional staff are often chosen ostensibly to serve the disadvantaged but, as is argued later, may actually operate in the opposite direction.

The characteristics of the school district community are determined by a large number of influences probably even the performance of the school system itself. However, the major determinants of family locational decisions are more likely to be such as employment opportunities or family circumstances. This would be particularly true for the disadvantaged under the educational norm.

The size of school district appears rather clearly to be determined outside of the behavioral system being here described.

There is a real dilemma in specifying a static model of a highly dynamic process where, in a general equilibrium sense, everything is in part a function of everything else. In that sense the model here specified can be viewed as a reduced form of a larger system of relationships, the structures of which are generally unknown.

Data Sources

Data on pupil achievement is from the 1969-70 and 1970-71 records of the Michigan Educational Assessment Program

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obtained through the State of Michigan, Department of Education. Records of individual pupil achievement scores were for the 1969-70 school year and district summaries from both periods were used.

Data on population characteristics for school district communities is from the 1970 Census Fourth Count (Population), which was made to coincide with school district boundaries by the National Center for Educational Statistics.

The data covers 500 of the more than 600 school districts in the state of Michigan for which there was both assessment information, census information, and which had a full kindergarten through twelfth grade (K-12) program in the 1969-1970 school year. Because several isolated data items were missing for some variables, fewer than the full 500 districts were used for most aspects of the empirical work.

Because the Detroit Metropolitan School District was in the order of 9-10 times larger than the next largest district in the data base, it was eliminated in order to avoid the tendency of that observation to dominate all investigations related to size.

Measuring the Output of Schools -- The Benefits of Education

Cognitive and Affective Skills.--Educational outcomes to individuals are, in the literature of education, generally divided into two categories--"cognitive" and "noncognitive"

(affective) skills.[1/] Noncognitive factors are said to include maturation, attitudes, learning styles, social skills, self awareness, and other such vague concepts as happiness and quality of life. Cognitive skills are generally defined as those skills measured by standardized achievement tests and include mathematics, reading, writing, and other language skills.

That there is not clear agreement on what is cognitive and what is noncognitive is illustrated by the kinds of items included in the "cognitive style mapping" described earlier. Further, there is considerable disagreement by educators as to whether cognitive or affective skills are the more important effect of schooling. One view holds that noncognitive skills are important because they are a major determinant of cognitive achievement. Another view holds that docility and sobriety may be more important to subsequent success than reading and writing and such "skills" may be the more important product of schools. As mentioned in an earlier chapter, the literature on human capital which indicates a relationship between the amount of education and the amount of income earned has not shed any light on this debate over the content of education.

[1/] Averch, et al. [2], devote a section of their review to to a discussion of this distinction between educational outcomes.

What remains is a general acknowledgement that non-cognitive or affective skills are important but little research is devoted to their measurement or to discovering their determinants. Most educational effectiveness research is, according to Averch, et al., directed almost entirely towards explaining cognitive skills, which are in fact defined by the tests that measure them.

Standardized Achievement Tests.--The first constraint on the use of standardized achievement as a measure of the benefits of education is the point made in the preceding section--those effects of schooling measured by such tests are by no means the only outcomes or benefits of the schooling process. Michaelson [49] in a study of the association of teacher characteristics with the achievement test performance of children of different characteristics, goes to some pains to make this precise point. He points out that in a production analysis of multiple products, variations in inputs do not correlate with either output when the other output is not accounted for.

On the other hand, the argument regarding the access to school inputs set forth in Chapter II is basically that affective skills are a substantial determinant of which pupils will be served in the acquisition of the cognitive skills measured by achievement tests. Such measures would thus reflect both the cognitive skills attained and the influence of affective or noncognitive skills on their acquisition.

Several other issues with regard to the use of achievement test scores are important. Of particular concern is the question of cultural bias embodied in such tests. A nationally normed achievement test is one that is based on a sample representing the characteristics of the national population. To be accurate the sample population on which the test is developed must be stratified by race, income, and other such characteristics in the same proportion as those characteristics appear in the general population. As pointed out by Averch, et al., "This means that any nationally normed test primarily reflects the characteristics of white, middle-class America, simply becuase there are so many of them" [2]. When such tests are used on groups which do not reflect the normative population on which the test is based, the best that one can say is that the test measures how well the particular group has achieved U.S. average goals which to some means white, middle-class goals.

Another issue in the use of standardized achievement tests is the degree to which the test is consonant with the objectives of the instructional program employed. That is, does the test actually measure what has been taught. One criticism of standardized tests in this regard is that they tend to emphasize some outcomes at the expense of others, such as abstract reasoning or creativity, which are not measured by the tests. Further, standardized tests may cover all of the objectives equally, or may include objectives

not included in the instructional program at all. Thus the summary test score may misrepresent the actual performance of the instructional program in meeting its objectives.

In summarizing their view of the use of standardized achievement tests, Averch, et al., wrote as follows:

> Using standardized tests to evaluate student achievement has become a major enterprise in the schools; but in spite of the wide use and reliance on these tests, they are generally inadequate. This is alarming in light of the growing activity in evaluation of educational outcomes based on standardized test scores. Standardized tests, even when properly used and interpreted, evaluate only a limited number of educational objectives. At best, generally used tests measure only limited aspects of cognitive performance, while higher cognitive abilities and achievements go untested. Noncognitive achievement is sometimes talked about, but the evaluation of these factors is still in a very crude state. Inasmuch as schools and innovative education programs are being evaluated in terms of such limitations, there is a crucial need for immediate improvements in test design, concept, scoring interpretation, and administration [2].

To Use or Not To Use -- No Question.--While acknowledging the severe limitations of standardized achievement tests to measure in any complete way the output of schools and thus the benefits of schooling, the output measures of other publicly provided services appear to have even more serious limitations. Further, in terms of the objectives of this research, the examination of the boundary question employing some multipurpose governmental unit would require the use of a large number of such output measures, most, if not all, of which would be considerably less reliable than achievement test scores.

Thus, the decision to use the results of the State of Michigan, Department of Education, state-wide assessment program as a limited measure of the benefits of education was in fact no decision at all. The phrase "benefits of education as measured by standardized achievement tests" is widely used in this writing to acknowledge the limitations discussed above.

The Michigan Assessment Program.--In the 1969-70 school year the State of Michigan Department of Education initiated a state-wide program of testing of all fourth and seventh graders. Tests were developed by the State Department of Education and the Educational Testing Service, Princeton, New Jersey, in the area of 1) verbal analogies, 2) reading, 3) mechanics of written English, and 4) mathematics. The tests were normed on the Michigan population and were based on educational objectives of the State Board of Education. The tests were constructed to be made as consistent as possible with the various curricula employed in the schools of the state.

In reporting on the results of assessment tests the Department of Education reports scores for each of the aforementioned tests plus a composite score composed of the scores in reading, mechanics of English and mathematics.[1/]

1/ This information is by way of personal conversation with Mr. Robert Huyser, Director of Assessment Programs, State of Michigan Department of Education, Lansing, Michigan.

In determining which of the available measures to use as a measure of the benefits of schools, a natural candidate is the composite achievement score. This measure has also been used by other researchers as a measure of the output of schools [15] [16].

However, a New York Times article reporting on a conference held at Harvard University suggests that other measures may be more appropriate [42]. The conference held in November 1973 was a discussion of the preliminary results of an international study of education conducted by the International Association for the Evaluation of Educational Achievement (IEA). According to the newspaper account and from personal discussion with a conference participant, early results indicate that achievement in science and foreign languages are less influenced by the home environment and more by the school than is achievement in reading, literature and civics. While no measure of science achievement is available, the logic of the argument would seem to extend to mathematics. Therefore, that score was seen as perhaps a better measure of learning which actually was accomplished as a result of schooling. Throughout the empirical portion of the research, both mathematics and composite score results were used for fourth graders.

The choice between grade 4 and grade 7 was rather arbitrary. There was some notion that if, as has been argued, schools tend to widen class differences, the identification

of such a trend in the earlier of the two grades is strong evidence of that influence throughout the schooling process.

Development and Discussion of Proxy Variables

Responsiveness to Disadvantaged Under Educational Norm.--Chapter 3 has set forth the theoretical argument for the use of an indicator which combines the mean level of achievement and the dispersion of achievement scores as an indicator of school district responsiveness to the disadvantaged under the prevailing differentiating educational norm. Several conventionally used measures of inequality combine the mean with measures of dispersion. Among the more commonly used measures are the following:

1. The coefficient of variation
2. The relative mean deviation
3. The Gini coefficient
4. The standard deviation of logarithms

Much of the work on measuring inequality, usually with respect to income, where these measures are commonly used, has concentrated on the relative merits of one index as over against another. Frequently the debate relates to issues of ease of computation or the particular ordering of disbributions obtained by one measure or another.

In a recent article, Atkinson [1] points out that the conventional approach in most empirical work is to adopt some summary statistic or index of inequality with no

particular reason being given for choosing one measure over another. In his article he makes clear that underlying any summary measure of inequality there is implicit an assumption about the nature of a social welfare function.

In developing this notion Atkinson draws on the work being done in the area of decision theory and demonstrates from that literature that the notion of risk aversion in its various forms (relative and absolute) has analogous application to measures of inequality in terms of "inequality-aversion."

In his examination of several of the popular measures of inequality in terms of the implicit assumption about inequality aversion, Atkinson demonstrates that the use of the variance implies increasing inequality aversion as income rise. Other measures which employ the mean of the distribution in their estimation, e.g., Gini coefficient; standard deviation of log; coefficient of variation; and relative mean deviation; imply a welfare function with a constant inequality aversion.

Atkinson then compares several of the measures having constant inequality aversion with indeces of his own where he is able to specify the degree of constant inequality aversion employed in the index. The long-known characteristics of the Gini coefficient, the standard deviation of logs and the coefficient of variation are thus seen as implicit assumptions about the degree of inequality aversion of the

associated social welfare function.

The coefficient of variation which attaches equal weight to transfers at different income levels and the Gini coefficient which attaches more weight to transfers affecting middle income classes are seen to give rankings of income distributions similar to those given by Atkinson's indices which had a relatively low degree of inequality aversion. The standard deviation of logs ranked income distributions consistent with a much higher degree of inequality aversion. Atkinson pointed out that if the degree of inequality aversion were equal to zero that distributions would be ranked on the basis of total income alone.

Atkinson's paper makes clear that in the absence of empirical knowledge of the nature of a society's social welfare function with respect to inequality aversion, the choice of an index or measure of inequality is a highly normative issue. To the extent that the researcher has either empirical evidence or indications from the body politic as regard inequality aversion, he can take those normative questions as given. It may be, for example, that the legislation and court decisions regarding equal educational opportunity can be interpreted as an indication of a relatively high degree of inequality aversion with regard to education and that the measure most consistent with that position would be the standard deviation of the log of education outcomes.

The use of inequality measures employing the mean and standard deviation in this research have been given a somewhat different meaning than that discussed by Atkinson, i.e., the degree of school district responsiveness. While the characterization of the degree of inequality of educational outcomes consistant with societal values may be best accomplished by a measure such as the standard deviation of the logs of achievement scores, there is, at the present state of knowledge of the determinants of educational outcomes, no basis for placing a higher value on movement in one area of the range of the data than in another. Thus the coefficient of variation which as stated earlier weights shifts at all levels of a distribution equally is the measure employed as the empirical index of school district responsiveness.

A further rational for the use of the coefficient of variation as an indicator of school district responsiveness to disadvantaged pupils is precisely that it is an "indicator". Thus the questions of ease of computation compared with other measures are indeed relevant. The calculation of the standard deviation of the logs of achievement may be normatively more appropriate in American society at this time but the computation of this measure requires access to each pupil's achievement score.

Alternative Measures of School District Responsiveness to Disadvantaged Pupils.--In order to provide comparative examination of the coefficient of variation as an indicator

of school district responsiveness to disadvantaged pupils, several additional measures of the way in which disadvantaged pupils are being served by the schools were employed. Of a variety of measures considered the two selected have the advantage of being rather direct measures of the absolute and relative achievement performance of disadvantaged pupils. The following discussion defines and describes the development of these alternative measures.

Individual pupil files made available by the State of Michigan Department of Education contain, in addition to achievement scores, a number of classifying characteristics of the individual pupil. Of particular interest to this research was the measure of the socio-economic status of the pupil. The SES (socio-economic status) score was structured such that its statewide distribution approximated a normal distribution with a mean of 50 and a standard deviation of 10.

In defining a representative group of disadvantaged pupils within the state, the ten percent of the pupils lowest on the state SES scale were selected. Given the characteristics of the distribution of the SES score, this represented pupils with scores of 37 or less. In addition, of the approximately 500 districts with complete data, this definition of disadvantaged pupils provided data from 461 districts. The direct measures of the performance of disadvantaged pupils were based on this definition and the

analysis employed those districts which had pupils fitting this criteria.

The first direct measure of the way in which disadvantaged pupils are served by the school districts was the district mean achievement level of the disadvantaged pupils, i.e., the mean achievement score of those pupils whose SES score was less than or equal to 37. This measure permits an examination of the circumstances under which the group fares better or worse state wide.

The second direct measure employed was the ratio of the low SES group achievement mean to the achievement mean of the rest of the children in the district in that grade. The notion involved in specifying this measure was that while the state wide level of achievement of the disadvantaged group is of interest, the relative achievement of that group to the rest of the pupils in each district is of equally important concern. Knowing that my daughter is in the 90th percentile in reading nationwide is of little consolation when whe is at the bottom of her class.

Neither of these measures, however, convey the notion of "share of the benefits" since that is in fact related to the cumulative proportion of total achievement obtained by one group or another. Such a measure must consider both the relative size or proportion the subgroup is of the total number of pupils. While several measures of share of achievement benefits obtained by disadvantaged pupils were

developed, their use in the empirical investigation introduced violations of the assumptions of the statistical model employed such that clear interpretation of the results was not possible.

It is important to note again that while the two alternative measures of school district responsiveness to disadvantaged pupils can be instructive, neither fully captures the sense of the issue involved in the distribution of the benefits of the schools.

Degree of Implimentation of Differentiation Norm in the Production of Educational Experiences.--In describing the school policies and practices of the differentiation oriented school system, Brookover, et al., [14] identify the following characteristics:

(1) the systematic identification of differences among pupils,
(2) the formal classification or labeling of students,
(3) an emphasis on individualized instruction, and
(4) differentiated instructional programs.

It should be clearly stated that these policies and practices in and of themselves need not lead to a wider dispersion of pupil outcomes or to an acceleration of the rate at which the dispersion increases. Further, when such programs and practices do lead to a wider dispersion of pupil outcomes, it need not be the result of purposeful discriminatory decision making on the part of school district leaders

or educational practioners; they may only be practicing quality education as they understand it without fully understanding the consequences of that practice.

The characteristics of the differentiation oriented school system described above and the practices associated with those characteristics are manifestations of the norm insofar as they are based on the assumptions that vast differences in innate ability exist, and that those differences are identifiable and substantially unchangeable. It is Brookover's contention that the degree to which such policies are employed do reflect the acceptance of the differentiation norm and its embodied assumptions. In The Sixty-first Yearbook of the National Society for the Study of Education, entitled Individualized Instruction, Cook and Clymer write, "The net result of a good instructional program is growth for all but greater growth for the capable. Hence, there is greater spread at the end of an effective instructional period than there was at the beginning [24]."

In seeking proxy variables to characterize the degree to which the norm is accepted by a school district, none of the characterizations used by Brookover and group were available.

What is available in the data set from the State of Michigan Assessment Program are a number of variables which make it possible in part to characterize the resources employed by school districts in their instructional program.

The variables used and the rationale for their use in characterizing the degree to which the educational norm is implemented are set forth below:

1. Kindergarten - 12th Grade Instructional Expenses, Net of Teachers' Salaries, Per Pupil. (Inst. Materials Expenditures/Pupil)

This variable was constructed by subtracting teachers' salaries from total K-12 instructional expenses per pupil. While it is unclear whether the salaries of instructional specialists other than classroom teachers are included, it was felt that this was an indication of the instructional resources employed in the classrooms beyond the provision of classroom teachers.

A major shortcoming of using an expenditure item as an indicator of inputs is the issue of varying prices by region. However, the use of this variable in this case is more modest than what is attempted in the estimation of production functions. This variable is used as one of a group of variables indicating the degree of implementation of the differentiation norm.

A major characteristic of individualized instructional programs is that they are more costly in terms of materials and support systems. Thus this measure is here used as an indicator of the degree to which such a program is implemented.

2. Average Teacher Experience

Since the instruction of teachers and educators in this

norm takes place primarily in colleges of education, this variable can be a reasonable approximation of the average period since teachers were in full-time attendance at a college of education. Empirical evidence from Brown and Saks [16] is that as average teacher experience increases in the district, the standard deviation of achievement decreases. Thus in this context a decline in average teacher experience is seen as the degree to which the norm is actively accepted by the teachers and at least functionally by the school district.

3. Percentage of Master's Degree Teachers

The logic of using this variable is similar to that of the previous one. The completion of a Master's degree reflects a longer period of association with a college of education--for teachers frequently a substantial period of a part-time association--and thus a more complete imbuement with the differentiation norm. The empirical evidence of Brown and Saks here is that as the percentage of Master's degree teachers increases, the standard deviation of school district achievement scores also increase. The decision to hire Master's degree teachers may reflect the norm or, as with the previous variable, the measure at least functionally appears to indicate the degree to which the norm is accepted by teachers of the district.

4. Pupils per Classroom Teacher

Another dimension of the higher costs associated with

individualized instructional strategies is the effort to reduce class size. This may occur for reasons other than instructional strategy such as a rapid decline in pupil population with an existing commitment to teachers or the bargaining position of teachers unions. It is, however, included as an additional variable indicating the general commitment to individualized instruction.

5. Pupils per Nonteaching Professional Instruction Staff

This variable is constructed from the previous variable, pupils per classroom teacher and from a variable giving the pupils per professional staff. The latter includes in addition ot classroom teachers, principals, assistant principals, other administrative staff excluding district-wide administrative staff, consultants, librarians, guidance and counselling staff, psychological staff, and other specialists.

This measure is included as an indicator in response to several of the dimensions of the differentiating norm described by Brookover, et al. First it includes the variety of specialists involved in the support system of the individualized instruction approach. Second, it also includes the variety of personnel involved in the identification and classification of differences among pupils.

The interpretation of this variable is that as the number of pupils per nonteaching professional declines, i.e., their proportionate number increases, the school district will be more oriented toward the differentiation norm.

The Degree of Community Concensus.--The data from the 1970 Census Fourth Count made possible the development of a number of variables which characterize the general socio-economic level of school district communities and the degree of community socioeconomic hetrogeneity. Among the characteristics which it was felt might distinguish political preferences and educational preferences within communities and between communities were those related to incomes, educational attainment, mobility or stability of the population, occupations, and race.

1. Income variables

Several attempts were made a various summarizations of the level and distribution of income. Part of the difficulty in dealing with the income data derive from the way in which it is presented in the census income table. The income classes are shown below:

Under $1,000
$1,000 - $1,999
2,000 - 2,999
.
.
.
9,000 - 9,999
10,000 - 11,999
12,000 - 14,999
15,000 - 24,999
25,000 - 49,999
50,000 and over

The intervals (classes) are uniform in $1,000 units from zero to $10,000. Above that value the intervals vary considerably. In addition to frequencies associated with these

classes, total family income was available as a separate statistic.

Initially the median income and an approximation of the standard deviation of income were selected to characterize the level and dispersion of incomes respectively. The latter estimate was made by considering the midpoint of each class to be the actual income associated with the frequency for purposes of estimating the deviations from the mean.

It was then pointed out that generally income distributions appear to conform to a log normal distribution and that an estimate of the standard deviation of the log of income is easily made from the mean and median as follows:

$$SD_{Log} = \sqrt{2\ (\log \text{mean} - \log \text{median})}$$

This estimate was tried, and after some computer programming difficulty it was discovered that for a substantial number of school districts the median was in fact greater than the mean. This is an indication that the assumption of log normality does not hold in these communities and that in fact the skewedness of income is not positive as would be the case with a distribution which is normal in the logs, but is skewed in entirely the opposite direction.

At this point the interquartile range of income, the difference between the income at the bottom of the second quartile and the income at the top of the third quartile, was selected as the measure of dispersion. This measure was estimated assuming a uniform distribution within the classes

in which the quartile breakpoints occurred.

The information that there appeared to be differences in skewedness of the distributions of income suggested that this might be an interesting characteristic of school district communities to examine. An estimate of the degree and direction of skewedness was obtained from the following computation:[1/]

Skewedness = 3(mean - median)/standard deviation

In the final results the skewedness variable is not used because a programming error resulted in a meaningless estimate of the variable.

In summary, the statistics used as variables in characterizing the level and distribution of income in school district communities are as follows:

Median income

Interquartile range of income

2. Educational Attainment Variables

The census provides data on the years of school completed by individuals 25 years and over. While this does not completely describe the voting age population in 1970 (age 21 or above), it was considered to provide a reasonable approximation. The mean number of years of education attained and the standard deviation associated with it were estimated for use as variables describing the level and

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1/ This method of estimation was obtained from Kane [33], p.85.

distribution of education in the adult population of the school district community.

3. Community Stability

The 1970 Census Fourth Count, Table 28 provides information on the 1965 residence of persons 5 years and older. From this table a measure of the "stability" of a school district community was calculated. The variable represents the number of individuals who had lived in the same house or the same county in 1965 as a proportion of the total number of individuals in the category (5 years and above). As the proportion of individuals who meet this criteria increases in a community, the community is considered to be more "stable."

There is some potential bias in the statistic because the unit of observation in this research, school districts, often do not conform to other legal boundaries, including counties. Thus an individual may have moved within a county and have changed school districts, or have moved across county lines and remained in the same school district. The measure was considered a reasonable representation of the degree to which the particular population had stayed within the community.

4. Occupation Variables

The 1970 Fourth Count Census Table 58 provides data on 42 occupational classes. Unfortunately, the development of

a continuous variable or variables which would characterize the distribution of occupations from this data does not appear feasible. The various efforts at developing occupational status scores such as that of the Bureau of the Census, Reiss [43] or the effort of Blau and Duncan [9], use much more detailed definitions of occupations than are available in the data set. No summary scores appear available for the 42 categories which are employed in this data set.

As a result a single variable was developed which would characterize the proportion of total employed persons 16 years and over who were "professional, technical, and kindred workers" or "managers and administrators (except farm)." The variable was felt to be the only easily identified and intuitively appealing subdivision of the 42 occupational classes which was obvious.

5. Racial Composition Variables

A small amount of data from the Census First Count was copied from microfilm records. Included was the data necessary to compute the proportion of population which is racially "black" for each district. This variable, percent Black is the only characterization of the racial composition of communities employed in this research.

Power of Disadvantaged in School District Community.-- The distinction between who is and who is not disadvantaged under the educational norm is not clear or precise. In using the census data to approximate the power of the "disadvantaged"

group, the census category of 'below poverty level' suggests a group which may be considered disadvantaged. The Fourth Count Census tape documentation [39] states in a footnote that the definition of "poverty level" is that defined by the Social Security Administration Poverty Index.

Two variables were constructed using this definition of disadvantage. First the proportion of total families who were below the poverty level was caluculated. This variable thus estimates the numerical proportion of adults who are below the poverty level and may be considered the voting strength of the poor.

Since the unit of measure is "families" and there may be some expectation that the incidence of single parent families is higher among the poor, the variable may overestimate the proportion of adults who are poor.

The second variable used to indicate the power of those below the poverty level is an estimate of the proportion of total family income held by poor families. Since this variable is based on the report of total income received by families below the poverty level and total family income, it is considered an accurate estimate.

Community Size.--A variety of candidates for indicating the size of school districts were possible from the available data. Pupil enrollment is an often used measure. Since this research was focusing on the articulation of preferences and the political process affecting the schools it was determined

that the measure of size would be the number of voting age (21 years or above in 1970) adults in the community.

Sponsors Vs. Consumers of Education.--In an effort to examine whether the distinction between sponsors and consumers of education discussed earlier was meaningful or not, a variable was developed which attempted to express the percentage of sponsors who were also consumers of public education.

First an estimate of the number of parents of school age children was developed. To accomplish this the number of female headed families with related children under 18 years old was added to twice the number of similar male headed households. While by no means are all single parent families female headed, it was determined that in the absence of additional information the male headed households would be treated as two parent units.

In order to account for sponsors who sent their children to private or parochial schools, the above estimate of the number of parents of school age children was reduced in the same proportion as the parochial and private schools attendance is of total school attendance. This is the same as assuming that all families are of the same size--obviously not the case-- but more refined estimates were beyond the capacity of the census categories.

This estimate of the consumers of public education was

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then expressed as a percentage of the voting age adults in the community or the sponsors of public education.

Summary of Variables.--

Measures of Responsiveness to Disadvantaged Pupils

- Coefficient of Variation of Achievement
- Low SES Group Achievement Mean
- Relative Mean Achievement of Low SES Group to Balance of Grademates

Measures of Degree of Implimentation of Differentiation Norm

- Instructional Materials Expenditures Per Pupil
- Average Teacher Experience
- Percentage of Masters Degree Teachers
- Pupils Per Classroom Teacher
- Pupils Per Nonteaching Professional Instruction Staff

Measures of Community Consensus

- Mean Years of Education
- Standard Deviation of Years of Education
- Median Income
- Income Interquartile Range
- Community Stability
- Percentage Professional Workers
- Percentage Blacks

Measures of Disadvantaged Group Power

- Poverty Families As Percentage of Total Families
- Poverty Families' Income as Percentage of Total Income

Measure of Community Size

Voting Age Population

Measure of Consumers Vs. Sponsors of Education

Consumers as a Percentage of Sponsors

The use of these proxy variables in the estimation of the generalized model is presented in the following chapter.

CHAPTER V

STATISTICAL METHODOLOGY

Introduction

The generalized model described in Chapter IV was approximated through the use of multiple regression equations estimated by the ordinary least squares technique. The proxy variables described earlier were employed in estimating components of the model. The model was estimated using methematic achievement scores as measures of the benefits of education.

Of the various measures of school district responsiveness to disadvantaged pupils which were developed the following three were retained and employed in the regression equations as dependent variables:

1. Coefficient of Variation - an indicator of school district responsiveness.
2. Mean achievement of low SES group.
3. Relative mean of low SES group achievement to mean achievement of the balance of grademates.

It had been hoped that the census data would make it possible to rather completely account for the differences between communities. It was soon recognized that the characterizations of communities which was in fact possible was less than complete. For this reason the equations were estimated for several community type subsets of the data in

addition to the estimations made using all of the available complete observations. The community types considered were (1) Towns-Rural, (2) Urban-Fringe (Suburbs), and (3) Metropolitan-Cities.

The Empirical Methodology

The Choice of Multiple Regression Analysis.--The general model was approximated and estimated using multiple regression was the need to disentangle the various influences of different components of the model on the measures of school district responsiveness, i.e., the need to meet the ceteris parabus conditions of the hypotheses.

As Kane [33] points out statistical analysis provides two possible ways of accomplishing this. Experimental design approaches meet the "other things constant" conditions by the structure of controlled experiments. In cases where data is not from controlled experiments, multiple regression is employed to estimate the influence of variables other than those of primary interest and, in an ex post fashion, meet the ceteris parabus conditions.

The Statistical Model.--The general model of Chapter IV was approximated by the following multiple regression model:

$$
\begin{aligned}
R = {} & \alpha && \text{constant} \\
& + \beta_1 \text{ (Inst. Materials Exp./Pupil)} && \\
& + \beta_2 \text{ (Avg. Teacher Experience)} && \text{measures of imp-} \\
& + \beta_3 \text{ (Pupils Per Teacher)} && \text{lementation of} \\
& + \beta_4 \text{ (Masters Degrees \%)} && \text{differentiation} \\
& + \beta_5 \text{ (Pupils/Non Teaching Staff} && \text{norm} \\
& + \beta_6 \text{ (Mean Years of Education} && \\
& + \beta_7 \text{ (Std. Dev. Years of Education} && \text{measures of} \\
& + \beta_8 \text{ (Median Income)} && \text{degree of com-} \\
& + \beta_9 \text{ (Income Interquartile Range)} && \text{munity consensus} \\
& + \beta_{10} \text{ (Community Stability)} && \text{measures of de-} \\
& + \beta_{11} \text{ (Professional Workers \%)} && \text{gree of commun-} \\
& + \beta_{12} \text{ (Black \%)} && \text{ity concensus} \\
& + \beta_{13} \text{ (Poverty Families \%)} && \\
& + \beta_{14} \text{ (Poor Income \%)} && \text{measures of dis-} \\
& + \beta_{15} \text{ (Pov. Fam. \%) (Poor Income \%)} && \text{advantaged power} \\
& + \beta_{16} \text{ (Voting Age Population)} && \text{size} \\
& + \beta_{17} \text{ (Voting Age Population)}^2 && \\
& + \beta_{18} \text{ (Schooling Consumers \%)} && \text{consumers vs. sponsors} \\
& + \text{error} &&
\end{aligned}
$$

Where:

R = responsiveness of school district to disadvantaged and is measured by the previously described variables.

= constant to be estimated.

= coefficients associated with specific variables and which are to be estimated.

(Variable) = as previously defined.

Several points must be made about the statistical model.

The several components of the general model were estimated by several variables which were independently and additively included in the statistical model. A variety of analytical techniques such as analysis of principle components or factor analysis might have been employed to combine the various sets of multiple variables into a few or a single estimator of the respective components in the general model. The difficulty with such an approach is that composit variables or factors thus created are extremely difficult to interpret in terms of the original variables. Since the original variables are part of the existing information system, the interpretation of the results in terms of generally understood measures adds substantially to an understanding of the results. Further, in a policy context, the reason that many measures are in fact included in public information systems is because they are amenable to change by policy decisions. Such would be the case for the percentage Master's degree teachers. In the case of this research on the boundary question, size of district could be similarly viewed.

For these reasons, the several elements of the various components were generally entered into the statistical equations in an additive fashion. In the case of the "power"

component and the "size" component of the general model which are of primary interest in this research, further refinements of the component variables were included as is indicated.

Estimation Technique.--The various equations were estimated using ordinary least squares estimation techniques after examining the several equations for possible violations of the usual OLS assumptions

1. Heteroskedasticity

Since much of the data were summary statistics from group data there was some concern that the OLS estimation procedure might violate the homoskedasticity assumption of the procedure.[1/] This is particularly true when the dependent variable is a group mean, the error of which is a function of the group size. This would apply in this research where the mean achievement level of the low SES group is used as a dependent variable.

In order to examine the equations estimated for problems of heteroskedasticity deriving from the use of the group data, an examination of the residuals was accomplished. The residuals of the equations employing each of the respective dependent variables were both plotted and regressed against the primary suspect variable, -the size of the group from which the particular dependent variable was derived.

1/ See Kemente [35], pages 322-336.

In the attempt to fit a line to the residuals by regression a squared term for group size was included.

Neither approach indicated any systematic relationship with group size. In the case of the regressions, the F values of the fitted lines were nonsignificant, as were the individual coefficients, i.e., the constant and variables for group size. It was thus concluded that the homoskedastic assumption of the OLS was likely met.

2. Multicolinearity

An examination of the simple correlations between independent variables indicated little concern of multicolinearity in the data. Indeed, several of the variables had simple correlations which were in the order of plus or minus 0.8 - 0.9. In all such cases, however, the two variables are being interpreted as a single influence. Such is the case with the linear and the squared terms for size (Voting Age Population) as well as the several measures related to the power of the disadvantaged group within the community.

In summary, the equations were fitted using ordinary least squares estimation proceedures after examining the data to determine whether the assumptions underlying that technique were reasonably met. Three equations - one for each of the dependent variables - were estimated using four data sets based on community types. The resulting twelve equations are presented and discussed in the subsequent chapter.

CHAPTER VI

RESULTS AND CONCLUSIONS

Introduction

The results of the empirical analysis and their discussion are primarily directed toward the questions associated with the boundary issue. There are in addition findings which are specifically related to the performance of school systems which are also presented and discussed. As stated earlier, the analysis was first undertaken across all districts and subsequently done on subsets for (1) rural- town districts, (2) urban fringe districts, and (3) city-metropolitan districts. The presentation of the results will follow this general organization.

While the meanings attached to the several variables have been set forth in some detail already, it is appropriate to restate here the specific interpretation attached to the three dependent variables used as measures of school district responsiveness to disadvantaged pupils.

Coefficient of Variation of Achievement - (Standard Deviation/Mean).--The definition of this variable as argued in Chapter 3 is that it is a direct indicator of school district responsiveness to those disadvantaged under the educational norm. A decline in the magnitude of the variable

which is accomplished by a rise in the mean, a decline in the standard deviation, or both indicates either a more egalitarian preference for schooling outcomes; a choice of inputs which generate more egalitarian outcomes; or both of these situations.

The range of this variable in the data set which includes all of the districts is from 0.098 to 0.241 with a mean of 0.179. The lower bound of the range is a district where the Coefficient of Variation results from a mathematics achievement mean score of 55.9 and a standard deviation of 5.5 (5.5/55.9 = 0.098). Similarly, the actual upper bound of the range is calculated from a mean of 40.7 and a standard deviation of 9.8.

Several numerical examples of the calculation of this indicator and its magnitude may further assist in a more intuitive understanding of the results reported in this chapter. Using a value of this variable of 0.2, the following combinations of achievement mean and standard deviation will yield the same value: 10/50 = 0.2 12/60 = 0.2 8/40 = 0.2

Appendix I lists the school districts in this data set and ranks them according to the coefficient of variation of fourth grade math scores.

Low SES Group Achievement Mean.--The definition and interpretation of this variable is relatively straightforward. The value of this variable for each district is the mean math achievement score for those fourth grade pupils who meet the

criteria of being in the lowest 10 percent on the basis of socio-economic status state wide. Thus, an increase in the magnitude of this variable indicates a situation where the average achievement level of this group is better. The converse would also be true.

The range of this variable in the data set is from 36.0 to 64.8, with a mean of 49.1 and a standard deviation of 3.74.

Relative Mean Achievement of Low SES Group to Balance of Grademates.--This variable is calculated as a ratio of the Low Group Mean divided by the mean achievement of the balance of the grademates. Thus as the magnitude of this variable is greater than 1.0 the mean achievement of the low group is greater than the mean of the balance of their grademates. Similarly, as the value of this variable is less than 1.0 the low SES pupils mean achievement is lower than the achievement mean of the balance of their grademates.

This variable is seen as an indicator of the relative responsiveness of school districts to the low SES pupils as compared to the balance of pupils in the grade. The range of this variable in the data set is from 0.656 to 1.21 with a mean of 0.96 and a standard deviation of 0.065.

In interpreting results employing these three dependent variables it is important to remember that increases in the magnitude of the Low Group Mean and the Relative Mean indicate a schooling situation more responsive to the disadvantaged group of pupils. On the other hand, a decline in the

magnitude of the Coefficient of Variation indicates a similar situation. Thus the expected signs in equations employing the Coefficient of Variation will be opposite those of the other two dependent variables.

Tables 3, 5, 7, and 9 present the results of the equations fitted to data from (1) all districts; (2) town and rural districts; (3) urban fringe districts; and (4) city and metropolitan districts respectively. Variable means and standard deviations for each grouping of data follow the regression results in Tables 4, 6, 8, and 10.

As was pointed out earlier the Detroit Metropolitan School District which is on the order of ten times the size of the next largest district was eliminated from the data because of the tendency of that observation to dominate all considerations of school district size.

Table 3. Ordinary Least Squares Regression of Measures of School District Responsiveness to Disadvantaged in Michigan School Districts (Fourth Grade Mathematics Achievement Score Measures)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Constant	.165045 (4.13)***	1.15280 (7.06)***	52.5346 (5.70)***
Inst. Materials Expenditures/Pupil	.000077 (2.93)***	-.000034 (0.32)	-.008393 (1.40)
Average Teacher Experience	-.001538 (3.81)***	-.000551 (0.33)	.039228 (0.41)
Pupils Per Teacher	.001035 (3.08)***	.000602 (0.44)	-.021190 (0.27)
Masters Degree (%)	-.000128 (1.33)	.000160 (0.42)	.050188 (2.32)**
Pupils Per Non-teaching Staff	-.000014 (1.87)*	-.000040 (1.34)	-.002252 (1.32)
Mean Years of Education	.001913 (0.73)	-.021775 (2.02)**	-.720527 (1.19)
Std. Dev. - Years of Education	-.001743 (0.43)	-.012708 (0.79)	-.261071 (0.29)
Median Income ($1000)	-.001730 (1.28)	.012530 (2.16)**	.479850 (1.46)
Interquartile Range ($1000)	.000750 (0.76)	-.007390 (1.71)*	-.376500 (1.54)
Community Stability (%)	-.000073 (0.67)	-.000314 (0.73)	.009513 (0.39)
Professional Workers (%)	-.000669 (2.66)***	.000081 (0.07)	.001481 (2.40)**
Black (%)	.000516 (3.69)***	.000012 (0.02)	-.123993 (3.50)***
Poverty Families (%)	.000712 (1.09)	.000106 (0.04)	-.005467 (0.03)

Table 3 (cont'd.)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Poor Income (%)	-.001535	.017879	.642906
	(0.56)	(1.38)	(0.88)
%POV x %POORY	-.004305	-.034672	1.02972
	(0.68)	(0.65)	(0.34)
Voting Age Population (thousands)	.000507	.000292	-.050343
	(2.63)***	(0.38)	(1.16)
(Voting Age Pop.)^2	-.000003	.000002	.000363
	(1.45)	(0.26)	(0.80)
School Consumers (%)	.000179	.000283	-.004625
	(1.29)	(0.49)	(0.14)
R^2	.262	.069	.117
Number of Observations	499	463	463

* significant at .10
** significant at .05 two-tailed tests
*** significant at .01

Table 4 Variable Means and Standard Deviations for Equations Fitted To Data for All Available Michigan School Districts.

Dependent Variables	Coefficient of Variation	Relative Mean	Low Group Mean
mean	.17929	.96346	49.0566
standard deviation	.01912	.06453	3.7368
Independent Variables			
Inst. Materials Expenditures/Pupil	116.432 45.860	117.083* 45.175	
Average Teacher Experience	9.275 2.384	9.263 2.353	
Pupils Per Teacher	24.049 2.417	24.163 2.275	
Masters Degrees (%)	21.735 10.951	21.458 10.864	
Pupils Per Non-teaching Staff	231.447 109.300	230.710 107.657	
Mean Years of Education	10.684 0.717	10.682 0.687	
Std. Dev. - Years of Education	2.949 0.266	2.949 0.267	
Median Income ($1000)	10.060 2.307	10.071 2.157	
Interquartile Range ($1000)	7.388 1.944	10.913 2.457	
Community Stability (%)	78.300 9.007	78.244 9.090	
Professional Workers (%)	18.656 6.883	18.489 6.424	
Black (%)	2.129 6.669	2.087 6.074	

Table 4 (cont'd.)

Dependent Variables	Coefficient of Variation	Relative Mean	Low Group Mean
Independent Variables			
Poverty Families (%)	8.517 4.900	8.425 4.567	
Poor Income (%)	1.736 1.659	1.677 1.345	
%POV x %POORY	0.223 0.477	0.200 0.273	
Voting Age Population (thousands)	8.226 12.605	8.422 12.870	
(Voting Age Pop.)^2 (thousands)	226.221 1013.470	236.210 1049.645	
School Consumers %	47.132 7.473	4.286 6.280	

* Data set for equations employing Relative Mean and Low Group Mean are identical thus the mean and standard deviation for the independent variables are identical.

Table 5 School District Responsiveness to Disadvantaged in Michigan Towns and Rural School Districts (Fourth Grade Mathematics Achievement Score Measures)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Constant	.150170 (3.18)***	1.09943 (5.46)**	48.6837 (4.30)***
Inst. Materials Expenditures/Pupil	.000023 (0.60)	.000258 (1.59)*	.004823 (0.53)
Average Teacher Experience	-.001407 (2.96)***	-.001399 (0.68)	-.032738 (0.28)
Pupils Per Teacher	.001258 (2.91)***	.000239 (0.13)	-.073077 (0.72)
Masters Degrees (%)	-.000195 (1.65)*	.000212 (0.43)	.054655 (1.97)**
Pupils Per Non-teaching Staff	-.000024 (2.60)***	-.000029 (0.77)	-.001694 (0.79)
Mean Years of Education	.000933 (0.29)	-.016692 (1.22)	-.257611 (0.34)
Std. Dev. - Years of Education	-.001909 (0.40)	-.012598 (0.63)	-.060549 (0.05)
Median Income ($1000)	-.002370 (1.37)	.010580 (1.36)	.253340 (0.58)
Interquartile Range ($1000)	.003280 (2.33)**	-.005360 (0.89)	-.281090 (0.82)
Community Stability (%)	.000023 (0.17)	-.000382 (0.68)	.016300 (0.52)
Professional Workers (%)	-.000698 (2.30)**	-.000459 (0.33)	.097998 (1.26)
Black (%)	.000813 (3.02)***	-.001826 (1.69)	-.199184 (3.28)***
Poverty Families (%)	.000018 (0.02)	.000388 (0.11)	.003160 (0.02)

Table 5 (cont'd.)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Poor Income (%)	.001708 (0.56)	.016706 (1.08)	.615251 (0.70)
%POV x %POORY	-.007312 (1.03)	-.028712 (0.44)	-.886406 (0.24)
Voting Age Population (thousands)	.001413 (1.88)*	.003086 (0.99)	.248801 (1.42)
(Voting Age Pop.)^2 (thousands)	-.000030 (1.02)	-.000179 (1.52)(12.8)	-.012276 (1.86)*
School consumers %	.000327 (1.84)*	.000091 (0.11)	-.008387 (0.19)
R^2	.238	.048	.100
Number of Observations	348	322	322

* significant at .10
** significant at .05 two-tailed tests
*** significant at .01

Table 6 Variable Means and Standard Deviations for Equations Fitted To Data for Michigan Town and Rural School Districts.

Dependent Variable	Coefficient of Variation	Relative Mean	Low Group Mean
mean	.17748	.96563	49.204
standard deviation	.01910	.06726	3.895
Independent Variables			
Inst. Materials Expenditures/Pupil	98.993 29.468	99.933 28.611	
Average Teacher Experience	9.499 2.388	9.499 2.335	
Pupils Per Teacher	24.092 2.507	24.278 2.369	
Masters Degrees (%)	18.284 9.129	18.041 9.059	
Pupils Per Non-teaching Staff	246.561 109.245	245.232 106.211	
Mean Years of Education	10.519 0.537	10.529 0.530	
Std. Dev. - Years of Education	2.938 0.262	2.935 0.260	
Median Income ($1000)	9.226 1.711	9.296 1.675	
Interquartile Range ($1000)	6.877 1.050	6.910 1.010	
Community Stability (%)	77.696 8.626	77.544 8.671	
Professional Workers (%)	17.125 4.726	17.059 4.581	
Black (%)	1.190 3.998	1.275 4.144	
Poverty Families (%)	9.913 4.919	9.789 4.481	

Table 6 (cont'd.)

	Coefficient of Variation	Relative Mean	Low Group Mean
Poor Income (%)	2.121 1.803	2.036 1.405	
%POV x %POORY	0.292 0.554	0.258 0.303	
Voting Age Population (thousands)	3.911 3.146	4.067 3.101	
$(\text{Voting Age Pop.})^2$ (thousands)	25.166 68.655	26.122 69.626	
School Consumers %	47.223 7.072	47.345 6.807	

* Data set for equations employing Relative Mean and Low Group Mean are identical thus the mean and standard deviation for the independent variables are identical.

Table 7 School District Responsiveness to Disadvantaged in Michigan Urban Fringe School Districts (Fourth Grade Mathematics Achievement Scores Measures)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are in values of t		
Constant	.421405 (4.03)***	1.64349 (3.70)***	84.3159 (3.29)***
Inst. Materials Expenditures/Pupil	.000096 (1.92)*	-.000352 (1.81)*	-.017786 (1.58)
Average Teacher Experience	-.003531 (3.16)***	-.000803 (0.19)	.123390 (0.49)
Pupils Per Teacher	.000062 (0.08)	-.003997 (1.21)	-.165664 (0.87)
Masters Degrees (%)	.000542 (2.45)**	-.000038 (0.05)	.028861 (0.59)
Pupils Per Non-teaching Staff	.000015 (1.01)	-.000090 (1.66)*	-.004690 (1.49)
Mean Years of Education	-.011897 (1.86)*	0.053190 (2.00)**	-2.94578 (1.92)*
Std. Dev. - Years of Education	-.026882 (2.52)**	-.075564 (0.73)*	-4.15528 (1.65)*
Median Income ($1000)	-.001340 (0.49)	.017000 (1.42)	.767090 (1.11)
Interquartile Range ($1000)	-.002300 (1.41)	-.005850 (0.83)	-.494800 (1.22)
Community Stability (%)	-.000220 (1.02)	.000431 (0.52)	.035773 (0.74)
Professional Workers (%)	.000954 (1.42)	.002848 (1.00)	.384446 (2.35)**
Black (%)	.000336 (1.14)	.001589 (1.13)	-.037596 (0.46)
Poverty Families (%)	.004229 (1.42)	-.007336 (0.64)	-.517624 (0.79)

Table 7 (cont'd.)

	Coefficient of Variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Poor Income (%)	-.034674 (1.89)**	.072989 (0.99)	.554914 (0.13)
%POV x %POORY	.107807 (0.67)	-.115778 (0.19)	20.1687 (0.56)
Voting Age Population (thousands)	-.000505 (1.12)	-.001518 (0.87)	-.110324 (1.09)
(Voting Age Pop.)^2 (thousands)	.000009 (1.25)	.000030 (1.18)	.001597 (1.07)
School Consumers %	-.000013 (0.05)	.000758 (0.77)	.015807 (0.28)
R^2	.372	.394	.288
Number of Observations	114	105	105

* significant at .10
** significant at .05 two-tailed test
*** significant at .01

Table 8 Variable Means and Standard Deviations for Equations Fitted to Data for Michigan Urban Fringe Districts

Dependent Variable	Coefficient of Variation	Relative Mean	Low Group Mean
mean	.18036	.95937	48.956
standard deviation	.01695	.06344	3.378
Independent Variables			
Inst. Materials Expenditures/Pupil	150.583 46.369		150.252 46.079
Average Teacher Experience	8.117 2.109		8.022 2.077
Pupils Per Teacher	23.964 2.353		23.892 2.146
Masters Degrees (%)	28.640 11.328		28.030 11.231
Pupils Per Non-teaching Staff	201.279 109.819		202.466 113.057
Mean Years of Education	11.148 0.912		11.107 0.844
Std. Dev. - Years of Education	2.889 0.218		2.889 0.222
Median Income ($1000)	12.600 2.273		12.446 1.937
Interquartile Range ($1000)	8.864 3.123		8.556 2.384
Community Stability (%)	80.367 9.852		80.626 9.946
Professional Workers (%)	22.396 9.986		21.794 8.945
Black (%)	2.664 8.932		2.179 6.422
Poverty Families (%)	4.252 2.012		4.226 1.935

Table 8 (cont'd.)

Dependent Variable	Coefficient of Variation	Relative Mean	Low Group Mean
Independent Variables			
Poor Income (%)	0.612 0.415	0.611 0.396	
%POV x %POORY	0.034 0.047	0.033 0.043	
Voting Age Population (thousands)	14.182 13.272	14.220 13.635	
Voting Age Pop.)^2 (thousands)	375.750 775.810	386.352 803.438	
School Consumers %	49.292 7.474	49.485 7.666	

* Data set for equations employing Relative Mean and Low Group Mean are identical, thus the mean and standard deviation for the independent variables are identical.

Table 9 School District Responsiveness to Disadvantaged in Michigan City and Metropolitan School Districts (Fourth Grade Mathematics Achievement Score Measures)

	Coefficient of variation	Relative Mean	Low Group Mean
	numbers in parentheses are values of t		
Constant	.301955 (1.24)	1.03421 (1.36)	50.1652 (0.84)
Inst. Materials Expenditures/Pupil	.000060 (0.81)	-.000234 (1.03)	-.016064 (0.90)
Average Teacher Experience	-.001353 (0.62)	-.006228 (0.92)	-.133021 (0.25)
Pupils Per Teacher	-.000766 (0.45	-.005824 (1.08)	-.338662 (0.79)
Masters Degrees (%)	-.000293 (0.52)	-.000530 (0.28)	.081157 (0.55)
Pupils Per Non-teaching	-.000036 (0.97)	.000108 (0.92)	.005109 (0.55)
Mean Years of Education	-.011863 (0.77)	-.008727 (0.18)	.272749 (0.07)
Std. Dev. - Years of Education	-.019778 (1.00)	.025163 (0.38)	1.19503 (0.23)
Median Income ($1000)	.003440 (0.32)	.030750 (0.94)	.315330 (0.12)
Interquartile Range	.005900 (0.69)	-.007300 (0.28)	-.039220 (0.02)
Community Stability (%)	-.000695 (1.08)	-.000602 (0.31)	.027716 (0.18)
Professional Workers (%)	-.000155 (0.10)	-.002227 (0.48)	-.043134 (0.12)
Black (%)	-.000326 (0.71)	-.000628 (0.43)	-.131046 (1.13)
Poverty Families (%)	.011313 (3.12)***	.000155 (0.01)	-.289242 (0.30)

Table 9 (cont'd.)

	Coefficient of Variation	Relative Mean	Low Group Mean
Poor Income (%)	.001915 (0.07)	.005540 (0.06)	-2.02083 (0.29)
%POV x %POORY	-.169280 (1.37)	.180344 (0.47)	16.7290 (0.14)
Voting Age Population (thousands)	.000459 (1.16)	.000778 (0.64)	-.011076 (0.12)
(Voting Age Pop.)^2 (thousands)	-.000002 (0.72)	-.000006 (0.64)	.000109 (0.14)
School Consumers %	.0004879 (0.72)	-.000653 (0.31)	.000022 (0.0001)
R^2	.838	.550	.619
Number of Observations	37	36	36

* significant at .10
** significant at .05 two-tailed test
*** significant at .01

Table 10 Variable Means and Standard Deviations for Equations Fitted to Data for Michigan City and Metropolitan School Districts.

Dependent Variable	Coefficient of Variation	Relative Mean	Low Group Mean
mean	.19294	.95597	48.035
standard deviation	.02025	.03680	3.153
Independent Variables			
Inst. Materials Expenditures/Pupil	175.224 61.556	173.741 61.755	
Average Teacher Experience	10.736 1.657	10.765 1.671	
Pupils Per Teacher	23.908 1.659	23.935 1.674	
Masters Degrees (%)	32.913 7.634	32.862 7.736	
Pupils Per Non-teaching Staff	182.241 69.211	183.199 69.944	
Mean Years of Education	10.809 0.867	10.815 0.878	
Std. Dev. - Years of Education	3.239 0.266	3.246 0.266	
Median Income ($1000)	10.073 1.418	10.076 1.438	
Interquartile Range ($1000)	7.639 1.231	7.628 1.247	
Community Stability (%)	77.610 9.102	77.557 9.226	
Professional Workers (%)	21.540 7.184	21.646 7.256	
Black (%)	9.309 12.183	9.075 12.271	
Poverty Families (%)	8.531 3.132	8.473 3.156	

Table 10 (cont'd.)

Dependent Variable	Coefficient of Variation	Relative Mean	Low Group Mean
Independent Variables			
Poor Income (%)	1.578 0.840	1.572 0.851	
%POV x %POORY	0.159 0.137	0.158 0.139	
Voting Age Population (thousands)	30.457 27.371	30.467 27.759	
(Voting Age Pop.)^2 (thousands)	1656.515 3116.042	1677.405 3157.615	
School Consumers %	39.621 6.508	39.710 6.578	

* Data set for equations employing Relative Mean and Low Group Mean are identical, thus the mean and standard deviation for the independent variables are identical.

The Indicator of School District Responsiveness to Disadvantaged Pupils

The meaning of the Coefficient of Variation as an indicator of school district responsiveness to disadvantaged pupils has already been developed and discussed in earlier chapters. It is appropriate to comment on its performance relative to the other two measures employed.

A comparison of the indicated influence of the variables of the equations in Tables 3, 5, 7, and 9 was made between those equations employing the Coefficient of Variation and those employing the other two dependent variables. In order to avoid the possible confounding influence of differences due to community type, comparisons were made strictly within the respective community type groupings. Comparisons were limited to those single variable influences being examined in the equations, i.e., size and poor power variables were not included. Each comparison was made using the sign of the estimated coefficient as the basis of agreement, partial agreement, or disagreement. Of the 52 comparisons made the following results were indicated:

Agreement	21 cases
Partial agreement	16 cases
Disagreement	15 cases
	52 cases

There were 5 cases where statistically significant results were in agreement and 2 cases where such results did

not agree. In addition, the results of the influence of school district size were statistically significant for town and rural districts in two of the equations and were in disagreement.

The point of the above comparison is not to prove or disprove the validity of the Coefficient of Variation as an indicator of responsiveness. That point is the objective of Chapter III and the conceptual development there is the basis for the use of a measure such as the Coefficient of Variation. The above comparisons are an attempt to show the degree of correspondence between an indicator which is not intuitively obvious - the Coefficient of Variation - and two other indicators which are more intuitively appealing but perhaps less sensitive to measuring the inequality of distribution dimensions of school district responsiveness to disadvantaged pupils. As is clear form the comparisons, the range of agreement between the Coefficient of Variation and one or the other of the other measures is considerably greater than is the range of disagreement.

Some feel for the relative sensitivity of the respective dependent variables to virtually the identical data can be had by comparing the number of significant coefficients obtained using the respective measures of responsiveness. Out of a total of 72 coefficients estimated (exclusive of constants) for each dependent variable the following are the number of statistically significant coefficients obtained

with the respective dependent variables:

Coefficient of Variation	22
Relative Mean	9
Low Group Mean	10

Finally, the value of a social indicator relates substancially to the cost of information. In the case of the Coefficient of Variation, this measure is available from normally published measures of the outcomes of the Michigan Assessment Program of the State Department of Education. These measures, the mean and standard deviation, are usually available when the outcomes of schools or other public service information are reported for grouped data.

The creation of the Coefficient of Variation required the manipulation of values of the mean and standard deviation for approximately 500 school districts. The creation of the other dependent variables required the sorting of approximately 150,000 individual pupil scores or about 3000 scores for each district.

The Coefficient of Variation has performed very well as an indicator of the responsiveness of school districts to those pupils disadvantaged under the educational norm. There are some indications that it is more sensitive an indicator than either the Relative Mean or Low Group Mean variables. When the costs of preparation of the respective variables are considered, the Coefficient of Variation has clear advantages.

The Hypothesis Tested

The three hypotheses as stated in Chapter 4 relate to the influence of community size, the relative power of the disadvantaged within the community, and the heterogeneity of the community on the distribution of the benefits of schooling. The results with regard to the three hypotheses will be presented successively.

Hypothesis 1.--This hypothesis argues that as the size of school district communities are smaller, school districts will be more responsive to those disadvantaged under the educational norm. In terms of the meaning attached to the Coefficient of Variation this would imply a decline in that variable with decreased community size, or conversely, an increase in the CV as community size increases.

The group of pupils whose mean achievement and relative mean achievement is being examined by the other two dependent variables were selected on the basis of their socio-economic status within the entire state of Michigan. By the agruments and discussions of Chapter 2 they are seen as disadvantaged within the schools. This hypothesis argues that as school district communities are smaller the schools will be more responsive to this group. Thus the expected results would be that the Low Group Mean and the Relative Mean would decrease as school districts are larger.

The results from the fitted equations which bear on this hypothesis are summarized in Table 11. This table has

expressed the statistically significant results with respect to size as elasticities, when holding all other variables constant. It is appropriate to point out that the elasticities are calculated at the mean values of the variables involved. Thus they represent the percentage effect on the dependent variable associated with a one percent change in the independent variable (size) only at the respective means. Further discussion of this issue will follow with regard to specific equations.

As is fairly clear from Table 11 there is some conflict in those results which were statistically significant. The Coefficient of Variation as the indicator of school district responsiveness to disadvantaged pupils is incremented by increases in district size in the grouped data and in the data for town and rural districts. This is consistant with the outcome predicted by this first hypothesis. On the other hand, the results of the equations employing the Low Group Mean and the Relative Mean indicate that as size of district increases the well being of the low SES pupils as measured by these variables increases. These results are not consistant with the hypothesis.

Several comments on these results are appropriate. In the four equations out of twelve where the influence of size was statistically significant, none had both of the size variables significant. In all four cases, whether it was the linear term for size or the squared term which was

significant, the sign associated with that significant term supported the hypothesis. Since both terms for size were included in the equations and are highly correlated it was appropriate to report elasticities of the influence of size which are based on the coefficients of both variables even though only one was statistically significant.

Table 11 Elasticities of Response with Respect to Size of Measures of School District Responsiveness to Disadvantaged Fourth Grade Pupils

District Types	Coefficient of Variation*	Relative Mean	Low Group Mean
All Districts	.021	NS	NS
Town-Rural	.026	.007	.019
Urban Fringe	NS	NS	NS
City-Metro	NS	NS	NS

NS = coefficient for both size variables not statistically significant.

*An increase in this variable indicates a less responsive schooling situation to the disadvantaged pupils.

The limitations of the Low Group Mean and the Relative Mean discussed at the time of their defination as proxy variables in Chapter IV also bear repeating in the context of these results. Neither of these variables measures the relative share or proportion of total achievement that the low SES group obtains. Thus two districts may have a Relative Mean value based on 40/50 = 0.8 and be judged equally responsive.

However, if the low group in one of the districts is 50% of the pupils and in the other district they are 5% of the pupils these two districts are hardly equally responsive to the low SES group. The Coefficient of Variation which employs the standard deviation, on the other hand weights the frequency of any value within the total distribution by the square of its deviation from the mean. It is thus seen as more fully capturing this dimension of relative school district responsiveness to disadvantaged pupils than either of the other two variables.

In all four equations where size is a significant influence the signs of the two size variables are opposite indicating that at some range of school district size the relationship may attain a minimum or a maximum and may in fact reverse the direction of the influence. In all cases the "turn around" size is within the range of the data.

In the two cases involving the Coefficient of Variation the positive relationship between size and the CV holds throughout most of the range of the data with the turn around occuring in excess of six standard deviations above the mean. However, in the cases involving the Low Group Mean and the Relative Mean the positive relationship between these variables and size holds at the mean as indicated in Table 11 but does reverse itself within two standard deviations above the mean of district size.

While it would be questionable to claim that these results clearly support this first hypothesis, it does seem

clear that tentative support of the hypothesis can be claimed. At least there seems to be some evidence that community size is of some consequence to the responsiveness of school districts to disadvantaged pupils. The direction of that influence is not made completely clear by these results though it does seem more likely that it is such that as school districts are larger they are less responsive to disadvantaged pupils. In terms of the question of the effect of community size on whose preferences count, these results, though hardly conclusive, are not inconsistant with the notion that those minority individuals or groups who are seeking a change in the existing level, mix, or distribution of publically provided goods will have more difficulty making their preferences count in enlarged communities, other things held constant.

One last comment on these results with respect to school district size is appropriate. As reviewed earlier there has been much debate within the literature with regard to economies of scale in schools. In much of that literature the school has been the unit of observation and focus of interest. To some extent the investigation of the least cost size of school can be viewed as separate and unrelated to the issue of the size of school districts. This is true except as school districts are single school units and in so far as individual schools are the focus of the articulation of preferences or needs of parents and citizens, i.e., define

the relevant community boundary for the articulation of preferences for schooling.

If there are economies of scale in the schools or school districts of these data sets then the expected effect on the Coefficient of Variation would be a decline in its magnitude as size increases. This effect would come through an increase in the mean achievement level as size increased. Since in the above results which are statistically significant the response is in the opposite direction there are two possible conclusions which are relevant to this research. Either there are no economies of scale in the schools and districts of this data and these results accurately reflect the influence of size on the distribution of achievement scores; or there are economies of scale but the effect of size on the distribution of achievement out weighs the influence of scale. If the latter case is the true situation then these results underestimate the influence of size on the distribution of achievement and its meaning in the context of this research.[1]

Hypothesis 2.--This hypothesis argues that, ceteris paribus, as the power to participate in decisions of those

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[1] The results with respect to the Low Group Mean and the Relative Mean cannot be similarly interpreted because the proportion of "size" in the respective groups has not been accounted for in the questions.

disadvantaged under the educational norm increases, school districts will be more responsive to that group. In terms of the measures employed in this research this would argue that as the percentage of poor families increases and/or as their percentage of aggregate family income increases, the schools will be more responsive to the disadvantaged group of pupils.

The major dilemma in testing this hypothesis is the empirical specification of an estimate of "power." Some of these issues have been alluded to elsewhere. As has been indicated, the only variables available to approximate power of the disadvantaged were the percent of all families which are below the poverty level and the proportion of total community income held by those families. In order to investigate a possible interaction effect of these two measures such a term was also included in the equations. While the primary intent here is the testing of the hypothesis, some insight may also be gained as to the usefulness of these respective measures of power.

Table 12 summarizes the results of the analysis in the form of elasticities calculated at the means for those variables and equations which has statistically significant coefficients. Again, as in the case of community size, the paired term whether significant or not was included in the calculation of the elasticity. For example, if in an equation the coefficient for % Poverty Families was significant

Table 12 Elasticity of Response with Respect to Disadvantaged Group Power of Measures of School District Responsiveness to Disadvantaged Fourth Graders.

Data Source and Variables	Measures of Responsiveness: Coefficient of Variation*	Relative Mean	Low Group Mean
All Districts			
Poverty Families (%)	NS	NS	NS
Poor Income (%)	NS	NS	NS
Town-Rural			
Poverty Families (%)	NS	NS	NS
Poor Income (%)	NS	NS	NS
Suburbs			
Poverty Families (%)	NS	NS	NS
Poor Income (%)	1.437	NS	NS
Cities-Metro			
Poverty Families (%)	-11.31	NS	NS
Poor Income (%)	NS	NS	NS

NS = Coefficient for all power variables not statistically significant.

*An increase in this variable indicates a less responsive schooling situation to disadvantaged pupils.

but the interaction term was not significant, the coefficient of the interaction between % Poverty Families and % Poor Income would nevertheless be included in the calculation of the elasticity of response to % Poverty Families.

Of the twelve equations fitted the coefficients for all three terms related to "poor power" were not significant in ten. None of the equations had more than one of the three terms significant. In one of the two cases where the influence of one of the measures of poor power was statistically significant, the direction of that influence --the sign-- was opposite to that expected.

These results are hardly seen as supportive of this hypothesis. However, when one considers the levels of the measures of "poor power" in the data - the mean percent Poor Income in districts in the pooled data set is less than 2 percent - it is not a particularly surprising outcome. Some feel for this can perhaps be gained by an examination of the mean and range of the power measures in the respective data group. This information is presented below in Table 13. That there is any statistically significant influence at all at these levels of "power" is perhaps highly significant.

The general lack of statistically significant results may be the result of insufficient variability in the data. This lack of results along with the information from Table 13 may also suggest that there is a kind of minimum critical

mass of power that a group or individual must have before influence in the body politic is possible. The formation of coalitions can thus be seen as the process of amassing that critical level of power. The effects of political organization and leadership can be viewed similarly.

Table 13 Distribution and Level of Power Measures by Data Groups.

	Percent Poor Families		Percent Poor Income	
	Mean	Mean + 1 S.D.*	Mean	Mean + 1 S.D.*
All	8.5	13.4	1.7	3.4
Town-Rural	9.9	14.8	2.1	3.9
Suburbs	4.3	6.3	0.6	1.0
City-Metro	8.5	11.6	1.6	2.4

* If the variable is normally distributed within the data sets then approximately 84% of all observations are below this value of the variable.

The statistically significant indication that an increase in the "income power" of the poor in urban fringe districts results in a less responsive schooling situation (a rise in the Coefficient of Variation) is contrary to the hypothesis and unexplained. It is possible that a sort of noblesse oblige in these communities gives away as the power of poor people increases. The level of Percent Poor Income in the Urban Fringe districts seems hardly threatening and hardly supports this explanation.

The result of the influence of the Percent Poor Families in the City and Metropolitan districts is most interesting particularly since this influence was the only statistically significant one in the three equations using that data. The elasticity indicates that an increase of Poor Families from 4.3% to 4.7% results in a decline of the Coefficient of Variation from .19294 to .17112. Some feel for what this means can be had from the following numerical example: CV = std.dev. / mean ; 10/51.8 = .19294 ; 10/58.4 = .17112. As is illustrated if the standard deviation of achievement is held constant at 10, the influence of the above increase in Poor Families results is an increase in the mean achievement from 51.8 to 58.4 or a 6.6 point increase in achievement for all students including the disadvantaged pupils.

In summary, the hypothesis that as the power of a group in the community increases, the schools become more responsive to their needs or interests is <u>not</u> generally supported from the results of this investigation. The measurement of power is highly elusive and the level of the measurements used here were so low as to be almost incongruous with the concept of "power." That there was any statistically significant results at all is surprising.

The measurement of power continues to be an elusive empirical problem and this research has done little to shed light on that issue.

Hypothesis 3.--The third of the hypotheses developed in the preceding chapter argues that, ceteris paribus, as the preferences and/or needs for educational experiences within the community become more diverse, the less responsive the schools will be to minority group needs. The two variables used which it may be argued characterize the community heterogeneity per se and may represent the diversity of preferences or needs for schooling are (1) the standard deviation of educational attainment and (2) the interquartile range of incomes. Thus this hypothesis argues that as the standard deviation of education or the interquartile range of incomes increase, the schools will be less responsive to the disadvantaged group of pupils.

The disadvantaged group selected on the basis of socioeconomic status is one of a number of groups which could have been selected. Other groups which might have been considered would be (1) left-handed pupils, (2) black pupils, (3) Latino pupils, or (4) color blind pupils.

Another dimension of community heterogeneity or diversity must be introduced in order to interpret several of the other variables used to characterize communities' preferences for schooling. This dimension of communities is the distinction between diversity (heterogeneity) per se, and diverse from--a sort of distance between two points, or points of view, notion. The introduction of this notion is in part necessitated by the fact that the disadvantaged

group of pupils selected on the basis of socio-economic status are children of parents most likely to be at the lower end of the income and educational distributions which are being used to characterize community preferences for schooling. Further, since the low SES group of pupils was selected on the basis of a fixed score statewide, their position at the lower end of the income and education distributions can be seen as relatively fixed. Thus an upward movement of the mean or median can be seen as a movement of the central tendency or majority position away from those fixed at the lower end of the distribution.

A corollary to Hypothesis 3 may be stated as follows:

As the preferences and/or needs for educational experiences in the community are more diverse from those of a particular group, the schools will be less responsive to that group (other things held constant).

The results with regard to Hypothesis 3 and its corollary as stated above are presented in Table 14.

1. Measures of Community Heterogeneity

The two measures of community heterogeneity employed are the standard deviation of years of education attained and the interquartile range of incomes. While these variables were statistically significant in only a few of the equations the results which were significant were with one exception supportive of the main hypothesis. This is both in terms of the relative responsiveness to the disadvantaged

Table 14 Elasticities of Response with Respect to Various Community Characteristics of Measures of School District Responsiveness to Disadvantaged Fourth Grade Pupils.

	Coefficient of Variation*				Relative Mean				Low Group Mean			
	All Districts	Town-Rural	Sub-urbs	Cities-Metro	All	T-R	Sub	C-M	All	T-R	Sub	C-M
Standard Deviation -Years of Education	-	-	-.431	-	-	-	-.228	+	-	-	-.245	+
Interquartile Range of Income ($1000)	+	.127	-	+	-.084	-	-	-	-	-	-	-
Mean Years of Education	+	+	-.735	+	-.241	-	-.616	-	-	-	-.668	+
Median Income ($1000)	-	-	-	+	-.131	+	+	+	+	+	+	+
Community Stability (%)	-	+	-	-	-	-	+	-	+	+	+	+
Professional Workers	-.070	-.067	+	-	+	-	+	-	.001	+	.171	-
Black (%)	.006	.005	+	-	+	-	+	-	-.005	-.005	-	-

Elasticities are provided for only those coefficients which were statistically significant. Signs indicate the direction of influence of nonsignificant coefficients.

*A decline in this variable indicates a more responsive schooling situation to the disadvantaged.

group (the Coefficient of Variation and the Relative Mean) and in terms of the mean or absolute level attained by the low SES group. In general the signs of the nonsignificant coefficients further support this position.

The results in Table 14 indicate an apparent difference in the influence of heterogeneity with respect to education from that with respect to incomes. Both variables indicate that as the community is more hetrogeneous the Low Group Mean will decline. Similarly, increases in both measures of heterogeneity result in a decline in the Relative Mean. However, communities which are more heterogeneous with respect to education appear to be relatively more responsive to disadvantaged pupils whereas communities which are more heterogeneous with respect to income are relatively less responsive to the disadvantaged.

The overall indication of these results are that insofar as individuals' preferences or needs for schooling are measured by income and/or education, the more heterogeneous the community preferences, the less responsive the schools will be to minority groups.

2. Measures of Community Diversity From the Low SES Group

The statistically significant results from Table 14 generally support the corollary to Hypothesis 3. That is, as the majority preferences or needs move away form those of the low SES group, the schools are less responsive to them.

The opposite indication from the results of the Coefficient of Variation in Urban Fringe districts is unexpected and unexplained. Whether this represents a difference in the behavior of the suburban communities, a dimension of the Coefficient of Variation which has not been accounted for or an inadequacy of the model is not known.

While these results are hardly overwhelming in their support of this ammended hypothesis, they are seen as tentatively supporting the argument that as a minority group's preferences are more diverse from the majority, the body politic will be less responsive to their preferences.

3. Community Stability

The complete lack of statistically significant results with regard to the influence of the stability of a community on the distribution of achievement precludes any inference with regard to this dimension of the characteristics of communities.

4. Occupational Characteristics

As was pointed out earlier, the only occupational characterization of communities which was easily available was the proportion of professional, managerial and technical workers in the community. Again referring to Table 14, the statistically significant results indicate that as the Percent Professional Workers increase the school district is

more responsive to the disadvantaged pupils as measured by the Coefficient of Variation and by the Low Group Mean. Whether the lack of statistically significant results in the City and Metropolitan districts indicates different behavior of this group of people in those community types is not known.

5. Racial Composition

Only the percentage black was available as a measure to characterize the racial composition of communities. In four of the twelve equations fitted the coefficient was statistically significant and in all such cases the direction of influence was the same--as the proportion of blacks increase, the schools are less responsive to the disadvantaged pupils.

The low SES group is not a racial characterization of pupils. In fact the simple correlation between percent black and proportion low SES pupils is very low--about 0.15. However, it is not unlikely that where the proportion of blacks in the community is high, a large number of the low SES pupils are black.

It is interesting to note that none of the coefficients for percent black in equations fitted to cities-metro data were significant. In the case of the Coefficient of Variation the signs for percent black in the cities-metro data was reverse those for the other data groups. These results are more definitive than are the results involving the power of poor families reported earlier, even though the mean

percent black is lower than the percentage of poor families throughout the data.

A plausible explanation of this result is that a kind of visibility phenomenon is at work. The argument is that for groups who are the likely object of discrimination, where their numbers in a community are very small such that they constitute no threat, a sort of nobless oblige relationship occurs. At least they are not particularly singled out for discrimination. As the group numbers increase at these low levels they become more of a threat and the discrimination against them becomes more systematic.[1/] When the group gains a majority or becomes a significant political, social or economic force the power relationship would hold.

In general the number of communities in these data where blacks are in the majority or even a politically significant minority and where the visibility effect would conceivably be overcome are few. A count of such communities by some critical mass criteria (say $\geq$ 30 percent) and the proportion those communities are of the total number of observations in each data group might give some insight to an interpretation of the variability of results by community type. The expectation would be that as the proportion of communities with greater than 30 percent blacks increased, the visibility

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1/ This notion was suggested in personal conversation with Dr. Joseph Spielberg of the Department of Anthropology, Michigan State University, who has observed the phenomenon in occupational ceilings among Latino Americans.

effect would be moderated and even overcome in the fitted data.

Since this procedure has not been accomplished some insight that this result would be forthcoming can be had by an examination of the characteristics of the distribution of percentage black in the respective data groups. Table 15 provides this information.

Table 15 Characteristics of the Distribution of Percentage Black by Data Groups and Direction and Significance of Influence of Percent Black on Measures of School District Responsiveness

Data	Range %	Mean %	SD %	SDs to 30%	Coefficient of Variation	Relative Mean	Low Group Mean
All	0-70.9	2.1	6.7	4.1	+ *	+NS	-*
Town-Rural	0-50.5	1.2	4.0	7.2	+ *	-NS	-*
Suburban	0-70.9	2.6	8.9	3.1	+NS	+NS	-NS
Cities-Metro	0-55.3	9.3	12.2	1.7	-NS	-NS	-NS

*significant coefficient
NS - nonsignificant coefficient

The probability that a district with 30 percent black or greater are in a particular data group (1 - [probability such a district is not in the data set]) is negatively related to the number of standard deviations above the mean necessary to get to 30 percent. As Table 15 shows, the City-Metro

data has the highest likelihood (lowest number of SD to 30 percent) of having observations with greater than 30 percent black and also is the data set in which signs of coefficients have changed in the data.

The data set with the next highest likelihood of having observations of greater than 30 percent black is that for the suburban districts. Again this is associated with a change from significant coefficients to nonsignificant coefficients.

This discussion of the interpretation of the data for the percent black and its influence on school district responsiveness is not seen as proof of a theory of "visibility," i.e., that at low levels of a minority presence increases in their numbers result in more systematic discrimination against them. It is, however, viewed as a plausible explanation of the data which may in fact be a future testable hypothesis.

One last comment is appropriate on the results with regard to community racial composition. The possibility that these data can be interpreted under the genetic endowment hypothesis requires a strictly racial interpretation of genetic endowment, i.e., the assumption that the differences in endowment are primarily on the basis of race. Without that assumption it is impossible to resolve the data on race with even the limited data on community power of the poor.

It is further interesting to compare the response to race with the response to poor people. While the measures of

school response are not explicitly to race, it is not too great a stretch of the data to argue that there is some evidence that race is the basis of greater discrimination than is socio-economic class.

In summary, these data show that where the percentage of blacks is generally small, increases in their proportion result in a decline in responsiveness to low SES pupils both relatively and absolutely. There is some inferential evidence which suggests that where blacks are a substantial proportion of the community, the above reported influence may be moderated and even reversed.

The Sponsors vs. the Consumers of Public Education

In an effort to examine the question as to whether school systems are more responsive to consumers or sponsors of education, equations were fitted using the parents of school age children as a measure of school district size. Generally, the consumers variable explained less of the variation than did the voting age population variable. Although no statistical test was accomplished on the comparison, the conclusion can be tentatively reached that in the characterization of size of school district, the parents of school children are no better a measure than are the sponsors of the schools.

To examine the kinds of influence on school district responsiveness to the disadvantaged affected by non-consumer

sponsors a variable representing the proportion of total sponsors that are also consumers was used (percent consumers). Table 16 presents the limited results of this portion of the investigation.

Table 16 Elasticities of Response with Respect to Percentage of School Consumers of Measures of School District Responsiveness to Disadvantaged Fourth Grade Pupils

	Coefficient of Variation	Relative Mean	Low Group Mean
All Districts	+	+	-
Town-Rural	.087	+	-
Suburbs	-	+	+
Cities-Metro	+	-	+

Direction of influence (sign) is indicated for all nonsignificant coefficients.

In the single case where this variable was statistically significant the results indicate that as the proportion of consumers in the community increased, the schools were less responsive to the disadvantaged. Stated the other way around, the possible influence of the non-consumer sponsors of public education is to cause the schools to be more responsive to the disadvantaged. The conclusion from this result may be that citizens are for equality when it does not affect them (or their children) personally--that is, magnanimous behavior is more likely where it is costless or, at least, less costly.

The Differentiation Educational Norm Revisited--The Effects of Educational Strategies on Disadvantaged Pupils

It is appropriate to again state that the differentiation educational norm described by Brookover and others [14] and which is substantially the basis of the interpretation of the variables used here, is not seen as some conspiracy of educators in schools and colleges of education with middle Americans to systematically turn the screw on groups who have different experiences, needs or preferences than their own. The argument is rather that the philosophy of public education in current prominence implicitly holds children responsible for their past experiences and preparation for schooling, rather than assigning responsibility to educators and teachers to find where children are and start with them there. An instructional program which would best accomplish this would perhaps be even more "individualized" than the current vogue in education. Such efforts as the Teacher Improvement Program which generated the cognitive style mapping data reported on earlier would appear to be a step in that direction.

It is claimed, however, that regardless of the intentions of the principle participants in the education process, the implications of the behavior and strategies which flow from the differentiation norm are such as to frustrate efforts to make the schools more neutral with regard to social class. Further, since such changes as may be necessary to cause schools to be an institution capable of ameliorating

inequality in American society may not be costless to the children of the majority of the current consumers of schools, there is little incentive to make these changes.

Five variables characterizing the educational strategy employed by school districts were used in the equations. They were selected on the basis of their expected contribution to the implementation of a differentiation strategy of education. An examination of the results will indicate whether the measured influence of the respective variables does indeed coincide with the predicted influence. Further, the measured influences of these variables are suggestive of some of the changes in educational strategies which will lead to more equal distribution of the benefits of education as measured by achievement test scores.

These results, already presented in Tables 3 through 10, are again displayed in Table 17 in terms of mean value elasticities for those variables which had significant coefficients. This discussion will deal successively with each of the variables included under the arguments related to the differentiation educational norm.

1. Nonteaching Instructional Expenses per Pupil

This measure was entered into the equation as a characterizetion of the degree to which individualized instruction is implemented and thus the degree to which the differentiation norm is implemented. As is seen in Table 17 the

Table 17 Elasticities of Response with Respect to Various Measures of School District Instructional Strategy of School District Responsiveness to Disadvantaged Fourth Grade Pupils

Variables	Coefficient of Variation*				Low Group Per Capita Share				Low Group Mean			
	All Districts	Town-Rural	Sub-urbs	Cities-Metro	All	T-R	Sub	C-M	All	T-R	Sub	C-M
Inst. Materials Expenditures/Pupil	.050	+	.080	+	+	.027	-.055	-	-	+	-.055#	-
Average Teacher Experience	-.080	-.075	-.159	-	-	-	-	-	+	-	+	-
Pupils/ Teacher	.139	.171	+	-	+	+	-	-	-	-	-	-
Masters Degrees (%)	-	-.020	.086	-	+	+	-	-	.025	.020	+	+
Pupils Per Non-teaching Staff	-.018	-.033	+	-	-	-	-.019	+	-	-	-	+

Elasticities are provided for only those coefficients which were statistically significant.
Direction of influence (sign) are indicated for nonsignificant coefficients.

*A decline in this variable indicates a more responsive schooling situation to the disadvantaged.
#This coefficient was significant at the 11.8% level.

general direction of influence of this variable is as predicted, i.e., an increase in non-teacher instructional expenses results in a schooling situation which is less responsive to those pupils disadvantaged under the educational norm as measured by all three dependent variables. There is some indication that in Town and Rural districts this may not hold at least as indicated by the Relative Mean equation and the sign associated with the Low Group Mean. With these two exceptions the balance of the results support the predicted outcome.

As was stated earlier, this need not be the outcome of an individualized instruction program characterized by larger expenditures for classroom and instructional materials, however, under the prevailing educational norm this appeara to be the case.

A possible interpretation of this result is that the instructional materials employed in the materials support system to individualized instructional programs are of greater assistance to advantaged pupils than to disadvantaged pupils, and that their employment may in fact reduce the positive learning experiences of disadvantaged pupils. It will be recalled that in the development of the indicator of school district responsiveness to disadvantaged pupils in Chapter III, this issue was raised and included as one of the assumptions.

This should not be interpreted as meaning that expenditures on instructional materials are of no consequence in educational performance, since clearly the Coefficient of Variation was influenced by this variable. The change in the Coefficient of Variation is such as to indicate that there was a greater increase in the overall standard deviation of achievement than there was in the mean level of achievement. Neither should this be interpreted as an argument against expenditures for classroom materials. The real question is with the kind of materials used.

In summary, these data give the clear impression that increased expenditures on instruction net of teachers' salaries, presumably including mostly materials support to instruction, result in a wider dispersion of pupils' outcomes and a less responsive schooling situation for the low SES group of pupils. This would seem to argue that materials in current use in individualized instructional programs are, whether by design or otherwise, more productive with advantaged children than with disadvantaged pupils. There is some evidence that they do not increment achievement of disadvantaged pupils at all.

2. Average Teacher Experience

The meaning attached to the average years of experience of school district teachers and its basis for inclusion in the equations was that it represents the average period of

time since teachers were full-time students and exposed to the philosophy of education embodied in the differentiating norm.

As seen in Table 17 this variable was statistically significant only in those equations employing the Coefficient of Variation. The nature of its influence in those cases was consistant with that predicted, i.e., as the average teacher experience increased the school district was more responsive to those disadvantaged under the prevailing educational norm.

An examination of the means of Average Teacher Experience increased the school district was more responsive to those disadvantaged under the prevailing educational norm.

An examination of the means of Average Teacher Experience in the respective community types indicates that there are significant differences. The means and t values of those differences are provided below:

	Mean - Average Teacher Experience	t value
Town - Rural Districts	9.50	5.48
Urban Fringe Districts	8.12	3.05
City-Metro Districts	10.74	6.99

This information would suggest that children who are sent from city or metropolitan districts to urban fringe districts will not gain, on average, from the experience of teachers in the urban fringe districts.

3. Pupils Per Teacher

Because individualized instructional programs generally are characterized by smaller class size, this variable was included as another indication of the degree to which the differentiation norm was implimented. There was no particular direction of influence expected although a decline in responsiveness to disadvantaged pupils with smaller classes would not have been a surprise under the arguments of this research.

As the statistically significant results with regard to this variable in Table 17 indicate, a decline in class size results in a schooling situation relatively more responsive to disadvantaged pupils. While the only statistically significant results were from equations employing the Coefficient of Variation, the prepondernace of the signs associated with results which were not significant do indeed support this interpretation.

A plausible explanation of this influence is that in smaller classes, teachers simply have more time with all pupils including the disadvantaged pupils. In a schooling situation emphasizing individualistic behavior it may very well be that disadvantaged pupils benefit more from this change than do pupils who are highly individualistic in their learning styles.

While it is still seen as a characteristic of individualized instructional programs, it also occurs for quite

different reasons as was pointed out in earlier chapters. It is clear that this aspect of individualized instruction is of benefit to the disadvantaged pupils.

4. The Percentage of Masters Degree Teachers

The inclusion of this variable as an indication of the degree of implementation of the differentiation norm was rather similar to that argued for the average experience of teachers. The argument is that since teachers who have attained Masters degree training have been exposed more completely to the educational philosophy embodied in the differentiation norm, this variable represents, at least functionally, the degree of acceptance of that norm by school districts.

The evidence from Table 17 on this variable seems to counter the argument made with regard to its expected influence. Although the overall results appear to support the argument that as the percentage of Masters degree teachers increase the schools are more responsive to the disadvantaged pupils, there is some evidence, including some that is statistically significant, which supports the converse argument.

The prevailing view within the educational community as reflected in incentive structures is that Masters level training of teachers is desirable for quality schooling. In so far as "quality" includes responsiveness to disadvantaged

pupils, these results suggest that further investigation of the effects of Masters level training of teachers is appropriate.

5. Pupils Per Nonteaching Professional Instructional Staff

As a characterization of the differentiation norm, nonteaching professionals were seen as participating in the sorting of pupils by perceived differences and in the support system of the individualized instruction approach. The expected direction of influence of this variable was that as the relative number of this type of personnel increased, the schools would be less responsive to the disadvantaged.

The results of Table 17 are internally contradictory with regard to this variable. In the case of the equations employing the Coefficient of Variation, the influence is as expected. On the other hand the indications from the equations employing the Low Group Mean and the Relative Mean do not support the expected outcome.

Several explanations appear plausable in resolving these results. It may be that the apparent differences in outcomes is the result of the differences between what is measured by the respective dependent variables. As has been discussed previously, the Coefficient of Variation is seen as more completely measuring the relative responsiveness to disadvantaged pupils than do the other dependent variables which do not deal with the share of total achievement obtained by the low SES group.

A second plausable explanation of the results is that the differences in the results relate to different behavior by community types. A somewhat different aspect of the same argument is the possibility that the composition of "non-teaching professionals", a rather aggregate variable, is systematically different by community types.

These results leave the question of the influence of this variable somewhat unclear. They do suggest, however, that further investigation of the effect of this type of educational professional would be a worthy endeavor.

Community Types - What Differences?

The segmentation of the data into subsets for town and rural districts, urban fringe districts and city and metropolitan districts was based on early work with the data which indicated that the demographic and other characterizations of communities employed were insufficient to account for much of the differences between communities. The particular groupings were based on the availability of a classification of school districts by the State Department of Education which identified Metropolitan, City, Town, Urban Fringe and Rural districts.

A judgement was made that for reasons of number of observations, Metropolitan and City districts should be combined. Another judgement was made that Town and Rural districts were likely quite similar and those were combined into a single grouping.

Confirmation that the three subsets or groupings used are indeed statistically different was indicated using a test suggested by Kementa [35]. The test is used to determine whether regression equations run on different samples are significantly different.[1] The F statistic calculated on the equations reported in this research was significant at the 1% level.

While there were no a priori hypotheses or expectations as to the differences between community types or the different behavior of the model by community grouping, an examination of such differences as are apparent is of interest. A brief review of the results already presented with particular reference to community type differences is given below.

Community Size

The most obvious difference between the respective community type groupings related to size are the mean and distribution of size within the groups. That information from earlier tables is repeated here.

	Size - Number of Voting Age Persons	
	Mean	Standard Deviation
Town and Rural Districts	3,911	3,146
Urban Fringe Districts	14,182	13,272
City and Metro Districts	30,457	27,371

Whether these differences in the data groupings related

1/ See Kementa [35], p. 373-374.

to size explain the different results obtained - only the Town and Rural equations gave statistically significant results with respect to size - or whether some other explanation is appropriate is not known.

Poor Power

Data differences with respect to the power of poor families between the respective community type groupings were presented in Table 13. That information indicates that on average the poor in Town and Rural districts and in City and Metro districts when compared to their counterparts in the Urban Fringe districts have more than twice the numerical proportion of total families and from two to three times the proportion of total income. As was pointed out earlier, the level of poor power in all of the data sets are so low that these differences may be of little or no consequence.

The limited results with respect to these variables which were statistically significant make any inferences about different behavior between community types and the influence of poor families on the schools impossible.

Community Heterogeneity

Differences between community types exist using both the standard deviation of educational attainment and the interquartile range of income as the following information from earlier tables indicates:

	Std. Dev. Years of Education		Interquartile Range of Income	
	Mean	Std. Dev.	Mean	Std. Dev.
Town and Rural Districts	2.94	.26	6,877	1,050
Urban Fringe Districts	2.89	.22	8,864	3,123
City and Metro Districts	3.24	.27	7,639	1,231

Statistical tests of the differences between means indicate that City - Metro districts are more heterogeneous with respect to education than either of the other two community types which are not significantly different from each other. The Urban Fringe districts are most heterogeneous with respect to incomes with Town and Rural districts least heterogeneous in that regard. Those differences are also statistically significant.

Again the limited information from the equations makes identification of anything but the above descriptive differences impossible.

Divergence of Majority From Low SES Group

Median income and mean years of education shown below indicate that the low SES group are further from the majority in the Urban Fringe districts both with respect to income and education. (The respective means are statistically different from each other.)

	Mean Years of Education		Median Income	
	Mean	Std. Dev.	Mean	Std. Dev.
Town and Rural Districts	10.52	.54	9,226	1,711
Urban Fringe Districts	11.15	.91	12,600	2,273
City and Metro Districts	10.81	.87	10,073	1,418

The mean years of education was statistically significant in equations employing all three dependent variables when fitted to data from Urban Fringe districts and was non significant in virtually all other situations. The generally greater variation in that variable within the Urban Fringe data set may account for this difference although alternative explanations would be difficult to rule out.

Community Stability

There are no obvious differences between the community types with respect to community stability. This is true both with regard to the discriptive differences of the communities and in the apparent influence of this variable in the fitted equations. It will be recalled that this variable had non significant coefficients in all cases.

Percentage Professional Workers

The following information indicates the differences between community types with respect to the percentage of professional workers:

	Percentage Professional Workers	
	Mean	Std. Dev.
Town and Rural Districts	17.1	4.7
Urban Fringe Districts	22.4	10.0
City and Metro Districts	21.5	7.2

There is no significant difference between the means of the Urban Fringe and the City-Metro districts. There is, however, a significant difference between the means of both of those data subsets and the mean of the Town and Rural districts for this variable.

There is within the results presented in Table 14 an indication that the influence of professional workers on school district responsiveness to the disadvantaged is different in the Urban Fringe districts from the other two community types. The sign associated with the Coefficient of Variation in the Urban Fringe districts indicates that increases in the percentage of professional workers results in a less responsive schooling situation for disadvantaged pupils. The opposite influence is exhibited in the other community types. The statistically significant indication that the Low Group Mean is also incremented by this variable in Urban Fringe districts would lead to the conclusion that in these districts the influence of professional workers is to improve the level of educational achievement generally out to improve the achievement of advantaged pupils more. In Town and Rural districts the apparent influence is to improve the general level of

achievement and to make the schools relatively more responsive to the disadvantaged pupils. In City and Metro districts the influence appears to be to make the schools more responsive to the disadvantaged pupils but also lowers the mean of the Low SES Group and implicitly the over all level of achievement.

It should be made clear that these interpretations are based only on the signs of the coefficients for percentage professional workers in the respective equations and not on statistically significant results. These possible differences are nevertheless worth noting.

Percent Black

The major differences apparent in the data with regard to community type differences with respect to race have been elaborated in the initial reporting of the results. Table 15 and the discussion involving that table make clear that the range of the magnitude of Percent Black is greatest in the Metro-City districts and smallest in the Rural and Town districts. There appears to be some relationship between this information and the possible influence of the variable in the respective community types. While the overall influence of an increase in the Percentage Black is a schooling situation less responsive to disadvantaged pupils, that influence is less clear as the range of date in the respective data groups includes observations which have larger magnitudes of this variable.

Comsumers of Schooling

Differences between the community types exist in terms of the proportion of voting age adults who are consumers of the services of the schools. The following information on the mean and standard deviation of this variable indicates those differences:

	Percentage Consumers	
	mean	std. dev.
Town and Rural Districts	47.2	7.1
Urban Fringe Districts	49.3	7.4
City-Metro Districts	39.6	6.5

Beyond these discriptive differences, the general lack of statistically significant results makes the inference of further differences questionable.

Instructional Materials Expenditures Per Pupil

The mean level of school district expenditures for instructional materials by community type and the respective standard deviations are provided below. In all cases the differences between the means are statistically significant.

	Per Pupil Materials Expenditures -$	
	mean	std. dev.
Town and Rural Districts	98.99	29.47
Urban Fringe Districts	105.58	46.37
City - Metro Districts	175.22	61.56

The general impact of increases in this variable as indicated in Table 17 is to make for a schooling situation which is less responsive to disadvantaged pupils. There is some indication that in Town and Rural districts the overall level of achievement may be improved but that advantaged pupils achievement is improved more. In the other community types the indications are that the influence of this variable is to make the schools both relatively and absolutely less responsive to the disadvantaged pupils.

Whether the difference in the level of expenditures for instructional materials of the Town and Rural districts or some other influence explains this difference is not known. It may very well be that Town and Rural districts tend to buy different kinds of materials than do districts in the cities and suburbs.

Average Teacher Experience

Differences between community types do exist on average with respect to the average experience of teachers as the following information from earlier tables shows:

	Average Teacher Experience - Years	
	mean	std. dev.
Town and Rural Districts	9.5	2.4
Urban Fringe Districts	8.1	2.1
City - Metro Districts	10.7	1.7

While the differences between these means are statistically significant there does not appear to be much difference

between community types with respect to the influence of this variable. Generally, as was reported earlier, as the average experience of teachers increases, the schools are more responsive to disadvantaged pupils.

Whether the mean differences between communities with respect to this measure reflects employment strategy or practice, or the behavior of teachers in seeking employment is not known.

Pupils Per Teacher - Class Size

The following information by community type on class size and statistical tests on the respective means indicates that there are no significant differences between community types with respect to this variable:

	Pupils Per Teacher	
	mean	std. dev.
Town and Rural Districts	24.1	2.5
Urban Fringe Districts	24.0	2.4
City - Metro Districts	23.9	1.7

The general influence of increases in the size of classes, as reported earlier, is a schooling situation which is less responsive to disadvantaged pupils. There is little evidence of differences between community types in this regard.

Whether the uniformity of class size between community types reflects school district initiatives or the initiatives of teachers bargaining organizations is not known. The latter

would seem a logical candidate to explain this lack of differences between community types.

Percentage Masters Degree Teachers

The differences between community types with respect to the percentage of Masters degree teachers are statistically significant. The means and standard deviations are shown below.

	Percent Masters Degrees	
	mean	std. dev.
Town and Rural Districts	18.3	9.1
Urban Fringe Districts	28.6	11.3
City - Metro Districts	32.9	7.6

The results of Table 17 indicate that the influence of increases in this variable is to increment the achievement of the low SES pupils in all of the community types. However, there are indications that in the Urban Fringe districts the achievement of advantaged pupils is incremented even more and that the schools are relatively less responsive to disadvantaged pupils as the percentage of Masters degree teachers increases. In the Town and Rural and in the City and Metropolitan districts the schools are made relatively more responsive to disadvantaged pupils by increases in the number of Masters degree teachers.

Again, explanations of this apparent difference between community types are difficult to infer from this data and may very well be outside of these data sets entirely.

Pupils Per Nonteaching Instructional Professional

The information on this variable by community type which is provided below indicates that Town and Rural districts employ relatively fewer of this type of staff than do either the other two groupings of districts. The difference between the means of the Urban Fringe and City - Metro districts are not significant whereas the difference between the means of both of these district types and the Town and Rural districts are statistically significant.

	Pupils Per Nonteaching Professional	
	mean	std. dev.
Town and Rural Districts	246.6	109.2
Urban Fringe Districts	201.3	109.8
City - Metro Districts	182.2	69.2

As the initial reporting of results with respect to this variable indicated there is some apparent difference in the influence of this variable in the respective community types.

On the basis of the signs of the respective coefficients reported in Table 17 an increase in the proportionate numbers of this type of staff (a decline in this variable) in City and Metro districts results in a schooling situation which is less responsive to disadvantaged pupils as measured by all three dependent variables. In Town and Rural districts, the achievement level of low SES pupils is incremented by an increase in the use of nonteaching instructional professional

but the schooling situation is relatively less responsive to that group of pupils. In Urban Fringe districts the schooling situation is both absolutely and relatively more responsive to disadvantaged pupils as more of these professional staff are employed in the schools.

Since this variable does not distinguish between the kinds of professionals who are included, it is difficult to account for these apparent differences between community types. It is suggestive however, that further investigation of the influence of the variety of specialized staff used to augment instructional programs would be a fruitful undertaking.

CHAPTER VII

SUMMARY AND IMPLICATIONS

A Summary of the Problem and Research Approach

This thesis has examined the arguments and issues surrounding the basis for drawing or redrawing lines of legal authority around groups of people and causing the, therefore, and thereafter, to act together as a body politic--the so-called "boundary question." The major dimensions of boundaries, size and other community characteristics, are investigated to examine their effect on the articulation of group preferences as seen via the distribution of the benefit of a publicly provided service. The school district was selected as a unit of government amenable to this investigation because it is a single-purpose political entity and because measures of the benefits of schooling are likely as good as measures of any other public output.

A review of the consolidation reform tradition makes clear that the major arguments on behalf of the consolidation of local government are efficiency in production and in administration. The former is an economies of scale argument. The latter is a notion of reduced transactions costs when, under consolidation, several local governmental units are combined into one larger government for the region. Without

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questioning whether these in fact exist, the public choice approach was introduced and led to questions of the effect of consolidation on the articulation of group preferences.

In order to be able to examine and interpret the effects of size and other community characteristics on the distribution of benefits of school districts, a framework of analysis of the schooling process and the effects of education was developed. This analysis led to three assumptions about the public provision of education necessary to an interpretation of this research.

First it was assumed that, whether true or not, there exists a widespread belief that an individual's performance in school makes a difference in future achievements and approach to "success." Secondly, it was assumed that generally under the existing educational norm, children with experiences substantially different from those of the majority middle class, particularly low SES children, are on average disadvantaged within the schools. The third assumption is that parents or groups of parents in a community will seek to make the schools responsive to their preferences and/or particular needs.

Based on the evidence that socioeconomic class is a consistent influence on the performance of school children and thus on the distribution of benefits, the conceptual basis for an indicator of school district responsiveness to those disadvantaged under the prevailing educational norm was developed.

Drawing on the public choice approach and the analysis of the schooling process, three hypotheses were proposed for testing. The first related to the effects of school district size on the responsiveness to the disadvantaged group. The second argued that as power of the disadvantaged increased, school districts would be more responsive to their needs. The third argued that as the preferences and/or need for educational experience within the community are more diverse, the less responsive will schools be to minority groups. A corollary to the third hypothesis argued that as preferences and/or needs of a group are more diverse from the majority, the schools will be less responsive to that group.

A public choice model of school district behavior was developed and proxy variables were spedified to approximate the general model in the empirical portion of the research. Using a socioeconomic index for individual pupils, a group felt to be relatively disadvantaged was selected. Two direct measures of the responsiveness of school districts to that group were created and a specific "indicator of responsiveness to see disadvantaged pupils" was selected based on the earlier conceptual analysis.

The multiple regression equations approximating the model were fitted to data for town and rural districts, urban fringe districts, city and metropolitan districts and to the pooled data by the ordinary least squares method.

A summary of the results, conclusions and implications are presented below dealing first with those issues related to the boundary question and then with those issues of concern in the organization and delivery of public schooling. A final section identifies and enumerates questions for future research raised by this investigation

The Boundary Question and Associated Issues

Results and Conclusions With Respect to Community Size.--The results of this investigation as reported indicate that over much of the range of the data, as school districts are smaller, they are relatively more responsive to the disadvantaged group of pupils. This is seen as evidence that increases in community size such as are accomplished by the boundary changes associated with consolidation efforts may result in a decline in the ability of individuals or groups who are not a part of the majority on a particular issue to have their preferences count in the enlarged body politic.

Results and Conclusions With Respect to Group Power.--There was evidence, though it was not clearly conclusive, that as the power of the socio-economically disadvantaged in the community increase, the schools are relatively more responsive to that group. The evidence on the power of blacks in the community tended to reinforce this notion.

There was also evidence that when either the poor or blacks were a small proportion of the community (had a small

percentage of total power), increases in their strength resulted in a reduction in the responsiveness of the schools to socio-economically disadvantaged pupils. This appeared to be a kind of negative influence of the increased visability of a group which is the likely object of discrimination. The phenomenon was clearly more distinct in response to blacks than to the poor and can be viewed as evidence of greater discrimination on the basis of race than on the basis of class.

These results are seen as evidence that changes in boundaries which modify the relative power of groups within the community affect the ability of those groups to articulate their preferences for publicly provided services. This would apply to those already disadvantaged within the society and perhaps also to those who are advantaged.

Results and Conclusions with Respect to Community Consensus.-- There was evidence that as communities are more heterogeneous in their preferences and/or needs for schooling they are less responsive to minority groups within the communities. This evidence was both in terms of the relative responsiveness to the disadvantaged group and in terms of the group's mean level of achievement.

Furhter, there was evidence that as the consensus of the community is farther away from the preferences or needs of the disadvantaged group, the less responsive are the schools to that group.

In terms of the boundary issue, these results support the following two conclusions: (1) As the character of a community is changed by changed in the boundary, groups which are further from the majority of preferences under the new boundary than they were formerly can expect to have greater difficulty in having their preferences count. (2) As the character of a community is made more heterogeneous by changes in the boundary, minority groups will have greater difficulty in having their preferences count.

The influence of the proportion of persons in professional occupations indicates that generally the schools are more responsive to disadvantaged pupils as the proportion of these workers in the community increases. This result is both in relative and in absolute terms. There was evidence that in urban fringe districts increases in the proportion of professionals resulted in an increase in the mean achievement of the low SES pupils but that the achievement of the advantaged pupils increased more.

Implications.--The rather clear implications of these results to the boundary question is that while consolidation may result in lower cost of delivery of public serivces, it may not result in increased satisfaction for all citizens. Stated again, while consolidation of communities may reduce the cost of providing a specific service, it will also effect the distribution of the benefits of the service and will influence the character of the demand for that service.

Those who stand to gain by consolidation are those who are more likely to be closer to the majority of the enlarged community, or whose relative power as a group will be improved. Those who stand to lose are those whose preferences are further from the majority under consolidation, whose relative power is reduced (this would apply to each person as an individual), or whose relative power is unchanged but who will have greater difficulty in having their preferences felt in the larger community.

When alternative mechanisms for obtaining economies of scale in production such as contractual arrangements between governmental units are considered, the remaining argument for the consolidation position relates to the potential of consolidation to equalize the per capita resource or tax base for public expenditures of a region. While consolidation may indeed be an effective means to reduce locational inequalities in the public expenditure resource base there are other ways to accomplish this same end. Among the alternatives to consolidation are methods which would not expose groups, whose interests consolidation is ostensibly to serve under this argument, to the other implications of consolidation here set forth. Such may be the case of a more effective and equitable revenue sharing program, or in the case of schools, federal or state leadership in the financing of education.

The logical extension of these conclusions appears to lead to a society organized into relatively small homogeneous

units of local government with overlapping jurisdictions of special interests which do not coincide with the general purpose units. The normative question as to whether that is the kind of society this writer wants to be a part of raises some real dilemmas which will be discussed shortly.

Rather along the line of this implication, a recent thesis by Ann Markusen [37] questions the hypothesis expounded by Tiebaut that settlement patterns are primarily the result of citizens "voting with their feet" for the kinds of qualities of services they want. The extension of the Tiebaut view also argues for small, homogeneous governmental units.

Markusen rather persuasively challenges the Tiebaut view that locational decisions primarily reflect a revealed preference for a package of local services. She argues that in addition to the effects of public service impacts on the well being of a household, there is a substantial redistributional impact of income, or benefits from income, toward or away from the household via the public sector process. The latter may be equally as important in locational decisions of households as is the package of local public services.

Markusen proceeds to show that local governments tend to be responsive to citizens and to operate in the interests of residents as if they were maximizing the representative resident's utility function including the aversion to a

distribution of income or its benefits away from residents. Thus local government is seen as constructing its own market for its services by manipulating entry into the community and public sector tax and expenditure structure. This she argues is the basis of the movement toward community homogeneity and thus local government tends to "exacerbate the tendency toward stratification" [37] within the society.

Although not clearly explicit, Markusen seems to point to the consolidation of communities as a means of ameliorating social and economic stratification . The findings of this thesis are that dimensions of consolidation appear to increase the inequality in the distribution of the benefits of schooling. This would suggest that consolidation also appears to "exacerbate the tendency towards stratification."

Without in any way challenging the substance of Markusen's argument with regard to the locational decisions of families or the behavior of local government in restricting entry, neither of which are the subject of this research, this writer must question whether consolidation is necessarily the most logical or even efficient way of modifying the stratification impact for those who prefer a more equal distribution of benefits of the society.

A clear implication of consolidation in a representative government system is a greater concentration of power in the hands of elected or appointed officials. The effects of a sense of powerlessness (i.e., "you can't fight city hall"

but you may be able to fight town hall) on the individual's productivity, creativity, and sense of well being are difficult to evaluate, but also difficult to ignore.

To this writer the prospect of a socity of small homogeneous groups franchised into local governments is somewhat less than appealing. However, that situation may be preferred to large heterogeneous groupings where a larger number of individuals are disenfranchised on the basis of race or class. Further, the organization of society into small homogeneous groupings which interact as equals may be a more realistic intermediate step to a truly culturally democratic or pluralistic society which allows groups who are different to find some sense of personal and group integrity and relate to others from positions of self and mutual respect.

Issues Related to the Organization and Delivery of Public Schooling

Results and Conclusions With Respect to Instructional Materials.--The instructional expenditures per pupil net of teachers' salaries was the best available measure of expenditures on instructional materials. The results indicate that in general as these expenditures increase, school districts are less responsive to the disadvantaged group of pupils. The interpretation of these results is that they are evidence that existing instructional materials are more productive of learning as measured by achievement on advantaged pupils than they are on disadvantaged pupils.

Within the normative view on behalf of equality if educational outcomes or even a view that schools should be more class neutral, these results would argue for substantial efforts in the development of materials (technology) more precisely suited to currently disadvantaged pupils. This would require an educational norm which may be more "differentiating" than that described by Brookover but which would see these pupil differences as a responsibility of educators rather than as an explanation of unequal outcomes.

An example may make this point clearer. The apparent view of educators (as opposed to many linguists) is that black dialect represents a language deficiency rather than a language difference. As a result, the preparation of instructional materials in black dialect has yet to be much exploited or examined on behalf of that group of children.

Results and Conclusions With Regard to Characteristics of Staff of Schools.--The results with regard to staff characteristics indicate that as school district staffs are more recently imbued with the differentiation educational norm (average teacher experience), that the schools are relatively less responsive to disadvantaged pupils. Similarly, the evidence from Urban Fringe districts is that as staffs are more completely imbued with that norm (percentage Masters degrees) the schools are less responsive to disadvantaged pupils. The evidence from the Town and Rural districts and

the City-Metro districts with respect to Masters degree teachers is that socio-economically disadvantaged children in those districts are better served as the relative number of Masters degree teachers increase.

The implications of this evidence strongly suggest that substantial changes in the philosophy of education underlying the educational norm are needed within teacher training institutions, if the schools are to ameliorate inequality in American society or even just cease to exacerbate it.

It also suggests as Michaelson [49] points out, that a re-examination of the training and preparation of teachers is of some merit. It may very well be that for some schooling situations those experiences which lead individuals to become teachers' aides or other such paraprofessionals may indeed be better preparation than is the formalized instruction of colleges of education. In fact, it may very well be that personality traits or other nonacademic characteristics may be more important and more productive resources in ameliorating the inequality of educational outcomes than any formalized training. There is already some evidence of this with regard to the verbal ability or proclivity of teachers and the acquisition of language skills.

One further implication that this evidence suggests is that for the short run those wishing to make the Urban Fringe schools more responsive to the disadvantaged might seek to have incentives to teachers to obtain Masters degrees reduced

or replaced with incentives to gain experiences which will clearly interrupt the perspectives embodied in the prevailing educational norm.

The evidence with regard to instructional professionals other than classroom teachers is not clear. There is tentative evidence they serve to increase inequality of educational outcomes and have a negative effect if any on the level of achievement of the low SES group.

One possible conclusion of this result is that if such professionals are employed ostensibly to better serve the disadvantaged--the proportionate numbers are on the average greater in the City and Metro districts--the strategy is worth questioning.

Results and Conclusions with Respect to Class Size.--These data indicate that as classes are smaller the schools are more responsive to the disadvantaged group of pupils.

Implications.--If seeking to reallocate the resources of a school district to achieve a more equal distribution of benefits, the reduction of class size and incentives to teachers to remain in the system are more likely productive strategies than are the employment of nonteaching professionals, increased expenditures in instructional materials now available, or incentives to teachers for further formalized training.

There are several implications to the organization of

school districts to be drawn from the results dealing with the boundary issue. The first general implication for school districts is rather similar to that made with regard to the boundaries of local government. If the goal is a more equal distribution of benefits within a school district, the organization of schools into smaller, more homogeneous districts is clearly implied from this research. Such a change does not, however, speak to differences between these small homogeneous districts. It does suggest that the distribution of benefits between groups when consolidated may be no more equal than before consolidation. Further, the level of benefits of a particular group depending on their power and position in the community may be lower.

The finding of Brown and Saks [16] that school inputs do make a difference in achievement outcomes was also inferred from this research. This result would imply that a more equal distribution of resources between schools within districts and between school districts may be more effective in ameliorating inequality in the distribution of educational outcomes in the larger society, than would be the consolidation of school districts.

Neither approach is likely to affect in any way the apparent differences in the impact of instructional materials. However, the behavior of teachers and school district staffs is more likely to be affected on behalf of the disadvantaged under the smaller, relatively more homogeneous organization

of districts than in consolidated districts. It would seem that a similar argument can be made with regard to schools within a large district.

An explicit extension of this implication reflects on the legal efforts of such groups as the NAACP-Legal Defense Fund to achieve a more equitable treatment of pupils of color or race differences. Where these efforts imply redistricting to achieve racial balance, the implications of this research are that there is no a priori basis for expecting the desired results to be forthcoming. Depending on the changes in the character of the consolidated district, there may be some reason to believe that the opposite effect will be obtained. The argument is similar with regard to legal efforts which result in intradistrict busing.

In both cases where busing is the mechanism, the evidence is that proportionately larger numbers of black pupils are bused than white pupils. Where this is the case the rise in transport costs to the black community in articulating its preferences can be expected to be higher than to the white community. As a proportion of total resources (time and income) this increased cost may be even more regressive to the black community and could influence the relative effort of the groups and thus the responsiveness of the schools to them. It should be recalled that what is being described here are the effects on the distribution of the acquisition of cognitive skills of fourth graders as measured by achie-

-vement scores. The impact on high schoolers' continuance into college or on dropout rates, or other such valid concerns have not been dealt with in this research.

This implication would seem to argue that those seeking legal redress for unequal benefits from school districts may find that those ends can better be served by several alternative strategies. The continued pursuit of a legal basis for more equitable educational financing would seem appropriate. The legal insistence on a more equal distribution of resources between schools within a district, e.g., class size and teacher experience might be implied by this research. Clearly more difficult, but perhaps not beyond the realm of possibility, might be the legal challenge to materials which are obviously not suitable to a particular racial or class group. Even a close judicial defeat on this issue might be highly productive.

One further statement on these comments with respect to school busing is appropriate. It is with considerable hesitation that they are made at all. It appears clear to this writer that there are many who oppose busing for racist reasons. It also appears that there are many who support busing because of the racist position of those who oppose it. It is appropriate in the world this writer would like to live in to challenge racism. However, the ideology of the major spokespersons for a position does not necessarily change the consequences or implications of actions or policy implied by

that position. The personal dilemma seems to be to choose what appears to be a racist position or to throw the baby out with the bath water.

Suggestions For Further Research

This research has been an investigation of the effect of the structure of schools and school districts on the performance of schools with respect to a particular group of pupils. While the results reported do provide some indication of the direction of influence of some of the variables, they cannot be seen as clearly conclusive. Virtually all aspects of this research are suggestive of areas for future research. Of particular note would be the following:

1. The results with respect to group or community size are clearly tentative. They are, however, interesting in the light of the other work that has been done with respect to economies of scale in education. The results here reported suggest that future work on economies of scale could be made richer by the inclusion of distributive issues.

The examination of interactions between group size and boundary rules other than geographical ones as in this research would also seem a fruitful area for future efforts. Along that line, there was no consideration in this research effort of a possible interaction between size and homogeneity. Since the apparent affect of many local government ordinances and tax structures are, according to Markusen [37], to make

for more homogeneous communities, some future examination of that interaction would seem useful.

2. The notion of a "visibility" effect identified as a plausible explanation of the influence of increases in the power of the poor and blacks when their numbers are small is certainly a worthy research question.

3. Following the work of Brown and Saks [16] referred to earlier and the results of this research, there seems a clear implication that research with regard to understanding the education process must focus on individuals as the unit of observation. The ideas embodied in the cognitive style mapping used in this research are suggestive of possible methods of distinguishing between individual children in a schooling situation and thus identifying more clearly the effects of different inputs to the education process.

4. The results of this research clearly identified that differences between the community type groupings used do indeed exist. Beyond the discriptive differences there was little explanation of apparent response differences between types of communities in this data. Any effort to examine the production, delivery, and demand for publicly provided services must come to grips with the possibility of systematic differences in the behavior of communities. This research has done little to shed light on that question and does suggest this as a fruitful area of endeavor.

5. There has been little in this research which is suggestive of Pareto better solutions. In fact in some regards this has been a research investigation of conflicts between diverse interests. To the extent that this effort has been productive it is suggestive that perhaps more research which explicitly identifies the interests which will be served may be more useful in elevating public debate than where those issues are disguised within some notion of "efficiency."

6. Intergovernmental service contracting has been suggested as an alternative to consolidation as a means of capturing such benefits as are possible from lower cost methods of production associated with scale or size. Research related to the structure, conduct and performance of contract arrangements as well as other arrangements between governmental units would be a most fruitful area of investigation.

7. A part of this research effort has been the development of an indicator of school district responsiveness to disadvantaged pupils. The appendix includes a listing of districts ranked by that indicator. Should this indicator be used in the evaluation of schools or districts, particularly if it is used as a basis of allocating resources between districts, an investigation of the changes in the indicator over time would be a most important area of ongoing research.

APPENDIX

APPENDIX I

Ranking of Michigan School Districts By Coefficient of Variation of 1970 Fourth Grade Mathematics Achievement Test Scores. (Ranking is from lowest value of CV - most responsive to disadvantaged pupils - to highest value of CV - least responsive to disadvantaged pupils.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
1	.0984	MADISON NO 2	2002	4
2	.1145	ADLANTA COMM	1159	5
3	.1150	BURT TWP	240	5
4	.1171	FOWLER	1091	5
5	.1176	ISHPEMING	5205	3
6	.1182	WHITE PINE	810	5
7	.1199	PEWAMO-WESTPHALIA COMM	2032	5
8	.1232	CHASSELL TWP	860	5
9	.1241	SUTTONS BAY	1547	5
10	.1244	IRON MOUNTAIN	5727	3
11	.1298	CARNEY-NADEAU	956	5
12	.1356	NORTH MUSKEGON CITY	2665	4
13	.1359	NATIONAL MINE	672	5
14	.1383	IRONWOOD CITY	7441	2
15	.1386	BURR OAK COMM	1098	5
16	.1389	VANDERBILT AREA	779	5
17	.1394	BRECKENRIDGE COMM	3099	5
18	.1431	GROSSE ILE TWP	46832	4
19	.1439	FRANKFORT AREA	2053	5
20	.1447	LAKE LINDEN-HUBBELL	2324	3
21	.1453	BLOOMFIELD HILLS	19042	4
22	.1466	PICKFORD	1090	5
23	.1478	ROCK RIVER TWP	706	5
24	.1480	ROGERS UNION	3727	3
25	.1484	REPUBLIC-MICHIGAMME	1314	5
26	.1491	ALMONT COMM	2398	5
27	.1498	GENESEE NO 6	1093	4
28	.1502	NORWAY-VULCAN AREA	2910	3
29	.1504	INLAND LAKES	1778	5

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
30	.1504	HANCOCK CITY	4138	3
31	.1507	CHARLEVOIX	3707	3
32	.1509	NEW BUFFALO AREA	3521	3
33	.1510	NEGAUNEE	5240	3
34	.1512	CAMDEN-FRONTIER	2022	5
35	.1513	BESSEMER CITY	1771	3
36	.1518	WESTWOOD HEIGHTS	4472	4
37	.1518	EAST GRAND RAPIDS	7654	4
38	.1521	ONEKAMA CONS	1876	5
39	.1531	GOODRICH AREA	2596	5
40	.1533	NEWAYGO	2525	5
41	.1541	NORTH DICKINSON	1144	5
42	.1546	HOMER COMM	2564	5
43	.1547	GERRISH HIGGINS	2282	5
44	.1550	HART	2199	5
45	.1552	GLADWIN RURAL	4318	3
46	.1562	MESICK CONS	1357	5
47	.1566	BEAL CITY	1148	5
48	.1567	MUNISING	3220	3
49	.1569	MACKINAW CITY	294	5
50	.1569	CARO COMM	6341	3
51	.1571	VESTABURG COMM	1513	5
52	.1573	MEMPHIS COMM	1986	5
53	.1573	ST CHARLES COMM	2961	5
54	.1577	MASON COUNTY CENTRAL	3326	5
55	.1577	CLAWSON CITY	9520	4
56	.1584	BENDLE	5174	4
57	.1590	FORSYTH	4246	5
58	.1590	HILLMAN COMM	1510	5
59	.1593	SOUTHGATE COMM	19660	4
60	.1594	BIG RAPIDS	7755	3
61	.1596	GALESBURG-AUGUSTA	3815	3
62	.1596	WEST IRON CO	5844	3
63	.1599	BELLAIRE	1505	5
64	.1599	FREMONT	5904	3
65	.1600	MIDLAND CITY	23181	2
66	.1600	ALLEN PARK	17970	4
67	.1601	HOLLAND CITY	16349	2
68	.1602	WHITEFORD	2194	5
69	.1603	WAKEFIELD TWP	2079	3
70	.1604	SUMMERFIELD	2075	5
71	.1607	CONSTANTINE	2988	5
72	.1610	AKRON-FAIRGROVE	2245	5
73	.1611	ST JOSEPH CITY	11825	2
74	.1611	FLUSHING COMM	11149	4
75	.1614	BAD AXE	2565	3

APPENDIX I (cont'd)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
76	.1615	MONTROSE TWP	3273	5
77	.1617	IDA	3215	5
78	.1619	SCHOOLCRAFT COMM	2036	5
79	.1620	CENTER LINE	14771	4
80	.1621	REESE	3053	5
81	.1626	ROCKFORD	6643	3
82	.1629	MIO-AU SABLE	1870	5
83	.1630	SHELBY	2197	5
84	.1637	OAK PARK CITY	18004	4
85	.1639	ADDISON COMM	2913	5
86	.1640	OSCEOLA TWP	1083	5
87	.1641	EAST CHINA TWP	12044	3
88	.1642	KINGSLEY AREA	1240	5
89	.1644	BIG BAY DE NOC	1199	5
90	.1647	CENTRAL LAKE	1379	5
91	.1650	MERRILL COMM	1950	5
92	.1651	STANDISH-STERLING COMM	4114	5
93	.1652	FOREST PARK	3331	3
94	.1654	ESSEXVILLE-HAMPTON	4807	4
95	.1660	HARBOR SPRINGS	1988	5
96	.1661	SAGINAW TWP COMM	15703	4
97	.1663	BEAR LAKE	972	5
98	.1664	FITZGERALD	12658	4
99	.1667	DETOUR TWP	859	5
100	.1667	NORTH HURON	1336	5
101	.1667	GRASS LAKE COMM	2545	5
102	.1667	ROCHESTER COMM	16497	3
103	.1667	MASON COUNTY EASTERN	1553	5
104	.1667	EWEN-TROUT CREEK	1760	5
105	.1670	TRAVERSE CITY	22571	2
106	.1670	PORTAGE TWP	12324	4
107	.1670	CASS CITY	4004	5
108	.1670	YALE	3954	5
109	.1670	CROSWELL-LEXINGTON COMM	5318	3
110	.1670	WALKERVILLE RURAL	613	5
111	.1670	TRI-COUNTY AREA	3078	5
112	.1673	BRIGHTON AREA	6678	3
113	.1676	LAKEVIEW	13379	4
114	.1676	COLON COMM	2610	5
115	.1679	STEPHENSON	3105	5
116	.1682	PLYMOUTH COMM	23096	2
117	.1682	BYRON COMM	3618	5
118	.1683	FOWLERVILLE COMM	3355	5

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
119	.1684	PENTWATER	837	5
120	.1684	EAST LANSING	25957	4
121	.1686	MONABELLA COMM	3514	5
122	.1686	CARSONVILLE COMM	1689	5
123	.1686	BENTLEY COMM	5772	4
124	.1687	SARANAC COMM	2204	5
125	.1687	BRONSON COMM	4150	5
126	.1687	NORTH BRANCH AREA	3207	5
127	.1688	DEARBORN CITY	68317	4
128	.1691	CALUMET	5023	5
129	.1691	WHITE CLOUD	2338	5
130	.1692	CHARLOTTE	8329	3
131	.1692	SPARTA AREA	5012	3
132	.1693	BIRMINGHAM CITY	38188	4
133	.1695	MORENCI AREA	2671	5
134	.1696	MARCELLUS	2785	5
135	.1698	LESLIE	3052	5
136	.1698	LUDINGTON AREA	8427	3
137	.1700	QUINCY COMM	3588	5
138	.1700	MASON CONS	3665	5
139	.1701	RUDYARD TWP	4154	5
140	.1703	CHIPPEWA VALLEY	5603	4
141	.1703	CHELSEA	5414	3
142	.1703	ADAMS TWP	1637	5
143	.1705	ASHLEY COMM	1174	5
144	.1705	GLEN LAKE COMM	1707	5
145	.1707	WILLIAMSTON COMM	3624	3
146	.1709	VASSAR	4026	3
147	.1711	GRAND HAVEN	12912	2
148	.1711	TAYLOR	39842	4
149	.1711	LAKE CITY AREA	1756	5
150	.1712	WEST OTTAWA	8025	5
151	.1712	MANISTIQUE CITY	4559	3
152	.1713	MONA SHORES	13599	4
153	.1714	REDFORD UNION	20932	4
154	.1715	MANISTEE CITY	7108	3
155	.1715	HOUGHTON LAKE	4195	5
156	.1716	TROY	14646	4
157	.1718	CHEBOYGAN	6339	3
158	.1721	KENTWOOD	12239	4
159	.1721	ZEELAND	7550	3
160	.1721	LITCHFIELD COMM	1668	5
161	.1722	NORTHVILLE	8960	3
162	.1723	NAPOLEON	3302	5
163	.1724	BENZIE COUNTY CENTRAL	3559	5

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
164	.1725	MANCELONA	1990	5
165	.1725	OVID-ELSIE	4968	5
166	.1726	MARYSVILLE	4386	4
167	.1730	LINCOLN PARK CITY	31406	4
168	.1730	COMSTOCK PARK	4288	4
169	.1731	NORTH DEARBORN HEIGHTS	6742	4
170	.1732	ST JOHNS	8128	3
171	.1734	OTSEGO	6039	3
172	.1736	HASTINGS	8799	3
173	.1737	HUDSONVILLE	5355	3
174	.1740	FENTON AREA	6275	5
175	.1740	STOCKBRIDGE COMM	3852	5
176	.1740	LAPEER	13941	3
177	.1740	ROMEO COMM	6999	3
178	.1743	IMLAY CITY COMM	3909	5
179	.1743	PORTAGE TWP	4681	3
180	.1745	WHITTEMORE-PRESCOTT AREA	2241	5
181	.1747	BERKLEY CITY	20892	4
182	.1749	BEVERTON RURAL	3152	5
183	.1749	MASON	6813	4
184	.1749	ANCHOR BAY	5948	3
185	.1751	SWARTZ CREEK COMM	7062	3
186	.1752	MONTAGUE	3543	3
186	.1753	ROSEVILLE	30303	4
187	.1753	HARBOR BEACH COMM	2817	3
188	.1754	FREELAND COMM	2732	5
189	.1755	PETOSKEY	6217	3
190	.1755	ADRIAN	15502	2
191	.1756	RAPID RIVER	1268	5
192	.1757	MARQUETTE CITY	12308	2
193	.1758	KINGSTON COMM	1441	5
194	.1758	KEARSLEY COMM	9970	4
195	.1759	BULLOCK CREEK	3549	5
196	.1760	PORTLAND	3065	3
197	.1761	CRAWFORD AU SABLE	3357	5
198	.1763	GALIEN TWP	1924	5
199	.1764	CARROLLTON	4550	4
200	.1764	TECUMSEH	6911	3
201	.1764	HOWELL	9915	3
202	.1766	BARAGA TWP	1400	5
203	.1766	MARION	1810	5
204	.1766	ONAWAY AREA	2469	5
205	.1767	KENOWA HILLS	6130	4
206	.1768	VANDYKE COMM	31394	4

APPENDIX I (cont'd.)

Rank	Coefficient Of Variation	School District	Size - Number of Voters	Community Type *
207	.1768	OWENDALE-GAGE-TOWN AREA	1444	5
208	.1769	SOUTH LAKE	17472	4
209	.1769	REETHS PUFFER	6836	4
210	.1773	LAINGSBURG COMM	1619	5
211	.1773	ENGADINE CONS	1030	5
212	.1774	BLISSFIELD COMM	4378	3
213	.1774	ALLEGAN	6720	3
214	.1775	BELDING AREA	5511	3
215	.1776	LITTLEFIELD	863	5
216	.1777	BATH COMM	2760	4
217	.1777	BROWN CITY COMM	2218	5
218	.1777	MATTAWAN CONS	2993	5
219	.1778	HESPERIA COMM	2069	5
220	.1779	VANDERCOOK LAKE	3273	4
221	.1779	WATERVLIET	3516	5
222	.1780	CHERRY HILL	9238	4
223	.1781	MARSHALL	7407	3
224	.1782	SOUTH REDFORD	19377	4
225	.1782	WARREN CONS	54372	4
226	.1784	STURGIS CITY	8111	3
227	.1785	WHITE PIGEON COMM	2262	5
228	.1786	AIRPORT COMM	7074	5
229	.1788	COMSTOCK	10694	4
230	.1788	JEFFERSON CONS	5808	5
231	.1789	TWIN VALLEY	18145	4
232	.1789	HAZEL PARK	18145	4
233	.1792	OAKRIDGE	3486	5
234	.1792	CONCORD COMM	2099	5
235	.1792	FOREST HILLS	6110	4
236	.1793	CEDAR SPRINGS	4110	5
237	.1793	WEST BRANCH-ROSE CITY AREA	6123	5
238	.1794	EDWARDSBURG CONS	4440	5
239	.1794	LAKEVIEW	17308	4
240	.1794	WYANDOTTE CITY	24816	4
241	.1795	MORLEY-STANWOOD COMM	2648	5
242	.1795	CLARKSTON COMM	10378	5
243	.1797	OWOSSO	14390	2
244	.1798	TRENTON	12404	4
245	.1798	DURAND AREA	5299	3
246	.1800	AU GRES-SIMS	1190	5
247	.1801	BUCHANAN	5261	3
248	.1801	SOUTHFIELD	38449	4
249	.1803	CLARE	3767	3

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
250	.1804	AVONDALE	8675	4
251	.1804	BREITUNG TWP	5172	3
252	.1805	NORTHVIEW	5912	4
253	.1805	LES CHENEAUX COMM	1174	5
254	.1808	ALMA CITY	6870	3
255	.1809	LAWRENCE	1600	5
256	.1809	MORRICE AREA	1649	5
257	.1809	MAPLE VALLEY	3619	5
258	.1809	OLIVET COMM	2902	5
259	.1809	ST IGNACE	1615	3
260	.1811	DECKERVILLE COMM	2225	5
261	.1811	FENNVILLE	2823	5
262	.1811	EVART	2648	5
263	.1813	SANDUSKY COMM	3744	5
264	.1815	GRAND LEDGE	10653	4
265	.1815	VICKSBURG COMM	8921	3
266	.1816	SPRING LAKE	4737	4
267	.1818	ELK RAPIDS	1760	5
268	.1818	ORCHARD VIEW	6238	4
269	.1820	LANSE TWP	3034	3
270	.1820	GRANT	3086	5
271	.1820	ONTONAGON AREA	3157	3
272	.1822	LAKESHORE	7466	4
273	.1822	WAVERLY	10145	4
274	.1823	CENTRAL MONTCALM COUNTY	4153	5
275	.1824	DAVISON COMM	8532	4
276	.1824	NEW HAVEN COMM	3341	5
277	.1825	FRANKENMUTH	3798	5
279	.1827	SAND CREEK COMM	2547	5
280	.1827	BERRIEN SPRINGS	6457	5
281	.1827	ITHACA	4037	3
282	.1827	RIVERVIEW COMM	6562	4
283	.1828	ALCONA COMM	3088	5
284	.1829	CARMAN	17076	4
285	.1829	PINCKNEY COMM	4744	5
286	.1829	CALEDONIA COMM	5693	5
287	.1829	ELKTON-PIGEON-BAY PORT	4931	5
288	.1831	KENT CITY COMM	2417	5
289	.1831	HOLLY AREA	7133	3
290	.1832	BEECHER	8857	4
291	.1832	FLAT ROCK COMM	3233	4
292	.1833	DRYDEN COMM	1144	5
293	.1833	ST LOUIS	4204	3
294	.1833	KALKASKA	2437	5

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
295	.1834	HILLSDALE COMM	6965	3
296	.1835	ALGONAC COMM	6818	3
297	.1835	HUDSON AREA	3486	5
298	.1835	FARMINGTON	35082	4
299	.1836	NORTHWEST JACKSON TRAIL	9532	5
300	.1838	BANGOR TWP	8941	4
301	.1838	HOLT	7982	4
302	.1839	HARPER CREEK	6526	4
303	.1840	LAKE ORION COMM	10827	3
304	.1841	DEERFIELD	1109	5
305	.1842	BAY CITY	46670	1
306	.1842	MELVINDALE-N ALLEN PARK	13375	4
307	.1842	COLDWATER CITY	11419	3
308	.1842	MAYVILLE COMM	2408	5
309	.1844	MERIDIAN	3188	5
310	.1846	FULTON	2449	5
311	.1847	BARK RIVER-HARRIS	1226	5
312	.1847	CHESANING UNION	6106	3
313	.1848	CLIMAX-SCOTTS COMM	2003	5
314	.1850	UTICA COMM	36713	4
315	.1850	WEBBERVILLE COMM	1551	5
316	.1851	OSCODA AREA	8754	5
317	.1851	VAN BUREN	12906	3
318	.1851	LIVONIA	64718	4
319	.1852	ARMADA AREA	2724	5
320	.1853	GRANDVILLE	10500	4
321	.1854	THORNAPPLE-KELLOGG	4353	5
322	.1854	LAKE FENTON	3564	5
323	.1854	HALE AREA	1839	5
324	.1856	GULL LAKE COMM	6431	5
325	.1857	PENNFIELD	5468	4
326	.1857	HARPER WOODS CITY	7539	4
327	.1860	MILAN AREA	7991	3
328	.1861	BRANDYWINE	3634	5
329	.1862	PINCONNING AREA	5695	5
330	.1863	MADISON HEIGHTS	8437	4
331	.1864	MONROE CITY	24569	2
332	.1864	COOPERSVILLE	4847	5
333	.1865	RICHMOND COMM	3842	3
334	.1865	CRESTWOOD	12899	4
335	.1866	WHITMORE LAKE	2292	5
336	.1867	GRAND BLANC COMM	14261	4
337	.1869	HURON VALLEY	16803	3
338	.1869	TAWAS AREA	4725	3

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
339	.1871	SAUGATUCK	1751	5
340	.1871	EAST DETROIT	32166	4
341	.1871	KALEVA-NORMAN-DICKSON	1813	5
342	.1871	HOPKINS	2693	5
343	.1873	BRIDGEPORT COMM	8913	4
344	.1873	CORUNNA	5839	3
345	.1873	PARCHMENT	4912	4
346	.1876	CLINTON COMM	2264	5
347	.1876	MENOMINEE	8273	2
348	.1876	CLINTONDALE	10115	4
349	.1876	GODFREY LEE	3871	4
350	.1877	GIBRALTER	5713	4
351	.1882	LINDEN COMM	3883	5
352	.1882	L'ANSE CREUSE	18702	4
353	.1882	BEDFORD	10963	3
354	.1884	MICHIGAN CENTER	3830	4
355	.1884	GREENVILLE	8147	3
356	.1884	HARTFORD	3130	3
357	.1885	HARTLAND CONS	3894	5
358	.1886	FRUITPORT COMM	6426	4
359	.1887	ESCANABA CITY	12557	2
360	.1888	HEMLOCK	4285	5
361	.1892	WAYLAND UNION	4065	5
362	.1892	POSEN CONS	1343	5
363	.1896	FRASER	12147	4
364	.1896	NORTH ADAMS	1683	5
365	.1897	HARRISON COMM	3789	5
366	.1898	MCBAIN RURAL	1491	5
367	.1899	CADILLAC CITY	8419	2
368	.1900	MARTIN RURAL	1788	5
369	.1902	IONIA	8734	3
370	.1903	HAMTRAMCK CITY	19133	1
371	.1904	MT MORRIS CONS	7062	4
372	.1904	BYRON AREA	1896	5
373	.1905	BIRCH RUN AREA	3662	5
374	.1906	PINE RIVER AREA	2104	5
375	.1907	JONESVILLE COMM	2779	5
376	.1908	RAVENNA	2538	5
377	.1912	DELTON-KELLOGG	3846	5
378	.1913	CLIO AREA	8898	3
379	.1914	NEW LOTHROP AREA	2037	5
380	.1915	DUNDEE COMM	3979	3
381	.1917	FARWELL AREA	3100	5
382	.1920	WESTERN JACKSON CO	4505	5
383	.1921	OXFORD AREA	5496	3

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
384	.1921	MILLINGTON COMM	3948	5
385	.1922	COLOMA COMM	5723	5
386	.1922	BRIDGMAN	2346	5
387	.1922	SALINE AREA	6040	3
388	.1925	HOLTON	1752	5
389	.1925	LAKEVIEW COMM	3996	5
390	.1925	MANCHESTER	2585	5
391	.1927	MENDON COMM	1814	5
392	.1928	BRITTON-MACON AREA	1482	5
393	.1928	WEST BLOOMFIELD TWP	6857	4
394	.1928	PAW PAW	5061	3
395	.1930	EAST JACKSON CO	4911	4
396	.1932	SOUTH LYON COMM	6517	5
397	.1935	COVERT	1714	5
398	.1936	CASSOPOLIS	5763	3
399	.1937	SAULT STE MARIE	10533	2
400	.1937	COLEMAN COMM	2506	5
401	.1937	WATERFORD TWP	33173	5
402	.1940	LAKEVILLE COMM	4840	5
403	.1940	NORTHPORT	767	5
404	.1942	HASLETT	4160	4
405	.1944	PERRY	3396	3
406	.1944	HURON	4485	3
407	.1947	DECATUR	2851	5
408	.1949	INKSTER CITY	8614	4
409	.1949	GARDEN CITY	21348	4
410	.1950	RIVER VALLEY	5493	5
411	.1952	NILES	16151	2
412	.1952	ROCK	683	5
413	.1952	HANOVER-HORTON	2250	5
414	.1954	MT PLEASANT CITY	14554	2
415	.1956	WALLED LAKE CONS	17093	3
416	.1959	UNION CITY COMM	3343	5
417	.1960	ARENAC EASTERN	1295	5
418	.1963	OKEMOS	8180	4
419	.1964	CARSON CITY-CRYSTAL AREA	3479	5
420	.1967	BRANDON TWP	3123	5
421	.1970	WALDRON AREA	1149	5
422	.1973	PORT AUSTIN	1192	5
423	.1973	PITTSFORD RURAL	2075	5
424	.1976	BLOOMINGDALE	2673	5
425	.1977	ROYAL OAK CITY	55259	4
426	.1978	BUENA VISTA	6955	4
427	.1980	PORT HURON CITY	34274	2
428	.1983	ECORSE	9315	4

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
429	.1984	SHEPHERD	3084	5
430	.1988	CAPAC COMM	2551	5
431	.1992	CLARENCEVILLE	11213	4
432	.1992	THREE RIVERS	7976	3
433	.1992	DE WITT	2454	4
434	.1992	WYOMING	16602	4
435	.1996	GODWIN HEIGHTS	7169	4
436	.1996	EATON RAPIDS	6726	3
437	.1996	ALPENA CITY	16752	2
438	.1996	ALBION CITY	8681	2
439	.1996	HAMILTON COMM	4523	5
440	.2000	MUSKEGON HEIGHTS CITY	9483	1
441	.2000	ANN ARBOR CITY	69700	1
442	.2000	GOBLES	2199	5
443	.2004	SOUTH HAVEN	7653	3
444	.2008	ONSTED COMM	3260	5
445	.2012	CHIPPEWA HILLS	5092	5
446	.2013	WESTWOOD COMMUNITY	11096	4
447	.2013	WOODHAVEN	3450	4
448	.2024	READING COMM	2207	5
449	.2026	TEKONSHA COMM	1294	5
450	.2035	LINCOLN CONS	5235	5
451	.2036	COLUMBIA	4411	5
452	.2036	DOWAGIAC UNION	8887	3
453	.2037	ATHERTON COMM	4219	4
454	.2041	WAYNE COMM	45317	4
455	.2041	VAN BUREN	12906	3
456	.2049	SPRINGPORT	2575	5
457	.2052	MARLETTE COMM	3545	5
458	.2054	CHAMPION-HUMBOLT-SPURR	544	5
459	.2058	LOWELL AREA	6101	3
460	.2058	WHITEHALL	4334	3
461	.2061	LAKEWOOD	6073	5
462	.2065	LAMPHERE	11818	4
463	.2070	DEXTER COMM	4194	5
464	.2074	DETROIT CITY	939485	1
465	.2074	CENTREVILLE	2189	5
466	.2075	PELLSTON	1572	5
467	.2076	PLAINWELL COMM	5682	3
468	.2077	BANGOR PUBLIC	3643	5
469	.2081	YPSILANTI CITY	23908	2
470	.2086	EAU CLAIRE	2305	5
471	.2086	PECK COMM	1185	5
472	.2087	JOHANNESBURG-CENTRAL	1532	5

APPENDIX I (cont'd.)

Rank	Coefficient of Variation	School District	Size - Number of Voters	Community Type *
473	.2087	BATTLE CREEK	30075	1
474	.2088	ATHENS AREA	1913	5
475	.2093	SPRINGFIELD CITY	2169	4
476	.2094	PONTIAC CITY	58680	1
477	.2096	WILLOW RUN	8169	4
478	.2105	RIVER ROUGE	10294	4
479	.2107	FERNDALE CITY	23990	4
480	.2107	KALAMAZOO CITY	62042	1
481	.2113	LAWTON COMM	2032	5
482	.2113	ROMULUS COMM	12578	3
483	.2115	SAGINAW CITY	54036	1
484	.2117	UBLY COMM	2538	5
485	.2119	MUSKEGON CITY	27926	1
486	.2122	MT CLEMENS COMM	14969	2
487	.2124	HIGHLAND PARK CITY	21913	1
488	.2128	KELLOGGSVILLE	5601	4
489	.2131	GAYLORD COMM	4445	3
490	.2136	LANSING	82319	1
491	.2149	FLINT	110605	1
492	.2175	BELLEVUE COMM	2331	5
493	.2188	JACKSON UNION	41055	1
494	.2192	POTTERVILLE	1132	4
495	.2206	GRAND RAPIDS	116398	1
496	.2210	BENTON HARBOR	23645	2
497	.2216	DANSVILLE	1833	5
498	.2319	MANTON CONS	1582	5
499	.2330	BRIMLEY	1055	5
500	.2408	BALDWIN	2643	5

* 1 = Metropolitan Districts
2 = City Districts
3 = Town Districts
4 = Urban Fringe Districts
5 = Rural Districts

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